Meteor Cruise No. M62, Legs 5A + 5B

07. November - 30. December 2004

Recife - Ascension - Walvis Bay

Table of Contents

5.1 Participants M62/5

Name	Discipline	Institution	Leg
Devey, Colin W., Prof.	Petrology, volcanology; Chief scientist Leg 5A	IFM-GEOMAR	5A
Lackschewitz, Klas, Dr.	Hydrothermalism; Chief scientist Leg 5B	IFM-GEOMAR	5B
Bannert, Bernhard	Technician, TV sled	IFM-GEOMAR	5B
Bislich, Oliver	Student: Oceanography	IUPHB	5B
Engemann, Greg	Engineer; Team ROV	ASR	5B
Fowler, Lee	Engineer, Team TOBI	SOC	5A
Günnewig, Petra	Meteorologist: CTD	IUPHB	5A+B
Hüttig, Daniel	Technician, Team ROV	FZB	5B
Kim, Young-Guyun	Student: Geophysics	Seoul NatU.	5A
Klügel, Andreas, Dr.	Petrology, volcanology	GeoB	5A
Knee, Abigail	Biology	WHOI	5B
Ksienzyk, Anna	Student: petrology	GeoB	5A+B
Kührig, Britta	Meteorologist: CTD	IUPHB	5A+B
Kuhn, Thomas, Dr.	Mapping, Hydrothermalism	IFM-GEOMAR	5B
Matthew, Duncan	Engineer, Team TOBI	SOC	5A
Mertens, Christian, Dr.	Oceanography, CTD/LADCP	IUPHB	5B
Mosch, Thomas	Student: water chemistry, methane	IFM-GEOMAR	5A+B
Murton, Bramley, Prof.	Oceanography, petrology, TOBI data	SOC	5A
Nowald, Nikolas	Team ROV	FZB	5B
Paulick, Holger, Dr.	Petrology, volcanology	IMUB	5B
Ratmeyer, Volker, Dr.	Geology, Team ROV	FZB	5B
Reuter, Michael	Engineer, Team ROV	FZB	5B
Rousse, Ian	Engineer, Team TOBI	SOC	5A
Schmale, Oliver	Ph.D. student: water chemistry, methane	IFM-GEOMAR	5A+B
Schmidt, Werner	Geology, Team ROV	FZB	5B
Schubotz, Florence	Student: petrology	GeoB	5A
Schröder, Marcel	Technician,Team ROV	FZB	5B
Seiter, Christian	Geology, Team ROV	FZB	5B
Stöber, Uwe	Student: CTD	IUPHB	5A+B
Storm, Sonja	Student: petrology	IFM-GEOMAR	5A+B
Stange, Karen	Technician: water chemistry, methane	IFM-GEOMAR	5A+B
Sültenfuss, Jürgen, Dr.	Oceanography, helium	IUPHB	5B
Stecher, Jens, Dr.	Biology	FSF	5B
Teichgräber, Tanja	Student: seismology	IFM-GEOMAR	5A
Thierer, Peter Oliver	Ph.D. student: seismology	IFM-GEOMAR	5A
Tille, Stefanie	Student: petrology	GeoB	5A+B
Tyler, Steve	Ph.D. student: tectonics, TOBI data	SOC	5A
Walter, Maren, Dr.	Oceanography, CTD/LADCP	IUPHB	5A+B
Wefers, Peggy	Technician: water chemistry, methane	IFM-GEOMAR	5A+B
Zielinski, Frank	PhD student, biology	MPIB	5B
Kahl, Gerhard	Meteorology	DWD	5A+B
Ochsenhirt, Wolf-Thilo	Meteorology	DWD	5A+B

IFM-GEOMAR IFM-GEOMAR, Leibniz-Institut für Meereswissenschaften, Wischhofstrasse 1-3, D-24148 Kiel, Germany

IUPHB Institut für Umweltphysik, Universität Bremen, Otto-Hahn-Allee, D-28359 Bremen, Germany

SOC	Southampton Oceanography Centre, European Way, Southampton SO14 3ZH, U.K.
Seoul NatU	Seoul National University, School of Earth and Environmental Sciences, Seoul 151-747, Korea
GeoB	Fachbereich Geowissenschaften, Universität Bremen, Postfach 330440, D-28334 Bremen, Germany
FSF	Forschungsinstitut Senckenberg, Senckenberganlage 25, 60325 Frankfurt am Main, Germany
MPIB	Max-Plank Institut, Celsiusstr. 1, 28359 Bremen, Germany
WHOI	Woods Hole Oceanographic Institution, Redfield 2-14, Woods Hole, USA
ASR	Alstom Schilling Robotics, 201 Cousteau Place, Davies, CA 95616, USA
DWD	Deutscher Wetterdienst, Zentrale, Frankfurter Str. 135, 63067 Offenbach, Germany

5.2 Research Program

The aim of the cruise was to determine, using the British TOBI device, amongst others, the volcanological and tectonic nature of the seafloor in a portion of the Mid-Atlantic Ridge (MAR) between 4-11°S (Fig. 5-1). Several segments which are separated from one another both by transform- and non-transform faults were studied. Using different probes mounted on TOBI, we collected real-time as well as off-line pressure, temperature and nephelometry coincident with the side-scan coverage.

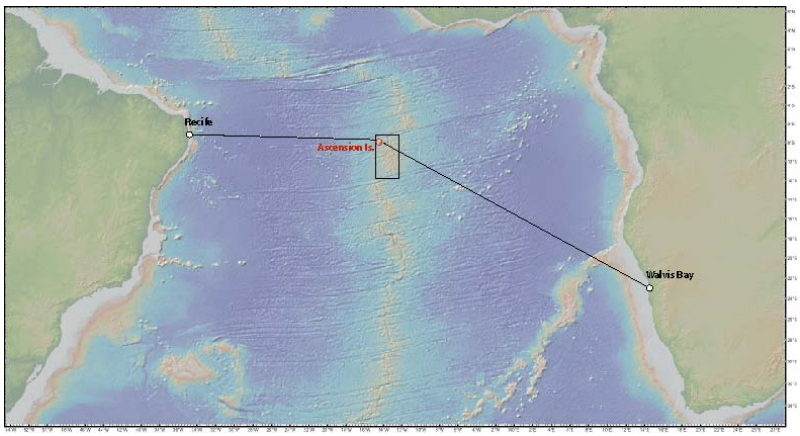

Figure 5-1: Track of cruises M62/5A&B. For detail of working box see later figures.

With this basic information about the nature and activity of the seafloor, we used a ROV (remotely operated vehicle), dredges and corers to sample the seafloor and CTD to sample the water column. Analyses for methane in the water were carried out on board, helium determinations will be made in the laboratory after the cruise. Additionally we made LADCP and XCP measurements to examine the vertical mixing within the water column above hydrothermal vent fields. Through the combination of total bathymetric and tectonic coverage of the seafloor and the information from the water column together with sampling in-situ of the seafloor itself we wish to address the following questions:

- What are the relative contributions of tectonics and magmatism to plate accretion in the South Atlantic?
- What is the characteristic length scale to change from magmatic to tectonic accretion?
- How does the transition from magmatic to tectonic accretion take place? Is it always linked to a ridge discontinuity? How does the degree of melting change at such places?
- Are hydrothermal fields linked to particular tectonic settings?
- How much material and energy are presently being released on these segments? How does this tie in with theoretical predictions?

- How far do lavas flow in the South Atlantic Ridge valley? What is the volume of individual lava flows? Are the eruptive centres mono- or polygenetic?
- Do the eruptive centres within a single segment have a unique mantle source?
- How much helium is being released from the hydrothermal systems? Is this correlated with temperature anomalies?
- What sort of correlations exist between helium and methane anomalies? Are serpentinisation processes occurring between 4-11°S?
- How much vertical mixing is taking place in the water column above the Mid-Atlantic Ridge? To what extent do temperature anomalies from the hydrothermal fields play a role in this?

Working programme: we adopted the same methodology used successfully for linked volcano-tectonic and hydrothermal studies. The work comprised combined survey/sensing and sampling programmes along a first-order section of the axial zone of the MAR. First, surveying was carried out using the deep-tow sidescan sonar vehicle TOBI, acquiring two parallel adjacent and partially overlapping swaths of imagery up to 11 kilometres width total. The survey covered segments A1-A4 (Fig. 5-1). This provided imagery of the geology of the axial floor and base of rift valley walls. The underway sensor component of the work included six MAPRs (miniature autonomous plume recorders) mounted at various heights above and beneath TOBI. These data loggers provided continuous information on the optical clarity of the water column that the deep-tow package is encountering and, thus, indicated retrospectively the location of any hydrothermal plume signals encountered, coregistered with the underlying seafloor imagery and bathymetry, throughout the TOBI survey area. This novel technology has been used extremely successfully in recent years. Wherever preliminary hydrothermal plume signals were detected by the TOBI sensor-array, detailed follow-up work was conducted using CTDs. The approach at any given site will be to carry out a number of CTD and/or MAPR deployments chosen to intersect maximum along-axis plume anomalies. This provided the ideal basis for an intensive and targeted CTD/LADCP deployment, for sampling of water for helium and methane determinations, and for a detailed samping programme of the seafloor using the ROV.

5.3 Narrative of the Cruise

(A. Klügel, T. Kuhn)

The final preparations for cruise M62/5 were carried out on the METEOR in the harbor of Recife (Brazil) between November 4 and 6. All 22 scientists of Leg 5A boarded the ship on Nov. 6 and a reception was held for German and Brazilian officials.

The METEOR disembarked from Recife on the morning of Nov. 7 and began her transit to the working area near Ascension island. The scientists used the six-day transit to set up and to test the laboratories, CTD/LADCP, and the equipment for water and rock sampling. During the transit, methane was continuously analyzed in air by a probe mounted at the ship's bow as well as in seawater taken from beneath the ship. Tests of the CTD equipment with rosettes and of the TOBI deep-tow sidescan sonar vehicle were successfully carried out between Nov. 10 and 12.

Shortly after passing Ascension island, the northern edge of the working area (7°31.5' S) at the Ascension Fracture Zone (AFZ) was reached in the afternoon of Nov. 13. TOBI was

deployed for her first mapping track but had to be recovered soon after because of a technical problem. Whilst this was fixed, a CTD station was run further south at a locality of presumed hydrothermal activity. TOBI was deployed again in the morning of Nov. 14 and for the next 6 days produced stunning images of the seafloor along a 6 km-wide stripe of the MAR axis from the AFZ towards the south. On the inflated segment A3 (around 9°40' S) TOBI mapped an area of 22 by 64 km by following several east-west adjacent profiles.

TOBI and the six attached MAPRs were recovered in the afternoon of Nov 20. Whilst the devices were prepared for the next deployment, the seafloor further south was mapped by HYDROSWEEP to provide the necessary bathymetric data for TOBI, and a CTD station was run. TOBI was deployed again in the afternoon of Nov. 21 and continued to map the MAR southward as far as 11°34' S. The METEOR then turned and mapping continued along the MAR northward until the early morning of Nov. 27. After TOBI and the MAPRs were brought back on deck, several OBS, which had been deployed during M62/4, were recovered along the axis of segment A1.

From Nov. 28 to 29, a number of CTD stations were run between 8°26' and 8°49' S (the segment boundary A1-A2) in order to localize hydrothermal plumes and their sources.

R/V Meteor sailed to Ascension Island on December 01, 2004 to exchange scientists for the cruise 62-5b. The vessel left Ascension on Dec 1 at 13:00 and sailed to an area of segment 3 at 9°13.2’ S and 13°18’W. Three CTD/Rosette casts were carried out on Dec. 2 in an area where strong positive temperature anomalies (+0.2 °C) had been found during TOBI stations. After no methane anomalies as well as no T anomalies could be detected by the CTD it was decided to carry out further CTD mapping along the non-transfrom offset between segment 1 and 2. The afternoon and evening of Dec. 2 R/V Meteor was in transit to this area where nine CTD/Rosette station were carried out during Dec. 3 (station # 1222 – 1230). Several of these stations discovered strong methane anomalies up to 120 nmol/l in water depths between 2600 m and 2800 m on the northern tip of a N-S striking ridge east of the northernmost TOBI tracks of segment 2. This northern tips ends in the non-transform offset.

Station work finished at 02:00 am of Dec. 4. R/V Meteor sailed to Ascension arriving at Georgetown at 09:00 am where the 1st. officiers were exchanged. R/V Meteor then returned to the working area at 8°18’S/13°30’W. On her way back to the working area a check of the navigation system GAPS was carried out. This procedure lasted until midnight before R/V Meteor could continue its journey to the working area where it arrived on Dec. 4 at 04:00 am. Two hydrocast stations were run close to the station with the highest methane anomalies at 8°17.97’S / 13°30.75’W in order to map the 3d structure of this anomaly. A first ROV Quest station that was started on Dec. 5 at 10:00 had to be stopped because of technical problems with the thrusters. An OFOS track was carried out instead to explore the seafloor close to the methane anomaly. This station lasted until 22:00. More hydrocast stations were run during the night. A second ROV Quest station started on Dec. 6 at 10:30 am. During this station a volcanic ridge was mapped using the different camera systems of ROV Quest. The ridge is situated about 100 m to the south of the hydrocast station with the highest CH_4 values. Due to continued problems with the navigation system GAPS and due to a failure in a hub connecting the different camera systems this station had to be aborted. Quest was back on deck at 19:00 and R/V Meteor started again to sail to Ascension island where refueling was planned for Dec. 7.

On December 7, at 16:00 refueling was finished and R/V Meteor started her transit to the southern working area. Arriving there on Dec. 8, 8:00 am, seven hydrocast stations were carried out between 9°44' S and 9°34' S over the shallowest part of this MAR-segment which rises up to about 1500 m water depth. The objective of these stations was to get a general idea about the water masses and the hydrothermal potential of this area which is characterized by high magma production due to the vicinity of the Ascension hot spot. However, no methane anomaly were detected in any of the water samples. During the night of Dec. 8 – 9 recovery of an OBS which couldn't be retrieved during M62/4 (at 9°33,44 S 13°20,84 W) was attempted, unsuccessfully. Afterwards R/V Meteor sailed back to the northern working area to the location with the high methane anomalies (close to 8°18'S / 13°31'W). On the way back Hydrosweep profiles closed some bathymetric gaps from the previous cruise.

On Dec. 9, at 10:00 the third ROV Quest station of this cruise started. During this station the seafloor area around the methane anomaly (CTD station 1230) was mapped and explored. Apart from some strong anomalies in light transmission, no hydrothermal signals could be detected. The rest of the day and the following night was filled with more CTD stations to get more information about the 3d distribution of the hydrothermal plume.

A CTD-YoYo station was carried out to the north of CTD station 1230 on Dec. 10. This station covered the water column between seafloor and about 2000 m water depth and was run between 8°17.75'S/13°30.60'W and 8°17.17'S/13°30.92'W. In the afternoon an OFOS track mapped the seafloor to the SE of CTD 1230 between 8°18.5'S/13°30.75'W and 8°17.7'S/13°30.4'W. This station revealed rather young pillow basalts immediately south and southeast of CTD 1230 but rather old pillow lava east and northest of it. Furthermore, several nearly vertical scarps characterize the seafloor in the latter area indicating active tectonics.

The night between Dec. 10 and 11 more CTD stations were carried out to monitor and sample the more regional 3d distribution of the hydrothermal plume. ROV Quest dive 29 (station 1263) started on Dec. 11, at 11:00 am and mapped the area to the south of the previous dives. Due to technical problems the dive had to be finished after 1.5 hours on the seafloor. OFOS station 1264 explored the area to the north of CTD station 1230 in the afternoon and evening of Dec. 11. A second CTD yoyo transect was carried out over this area to map the proximal hydrothermal plume in 3d.

The fourth ROV dive was carried out on Sunday, Dec. 12. ROV Quest stayed nearly 9 hours at the seafloor exploring the area to the east and north of CTD station 1230. A rock sample as well as 3 water samples with Niskin bottles were also taken during this dive. One distinct particle anomaly was detected in a small basin north of the CTD station. Methane values in the bottom water are 30 nmol/l and a thick Mn oxide crust covers the basaltic rock, both parameters indicating active hydrothermalism close by. However, no such site was found during the dive. Additional CTD stations were carried out during the night some kilometers to the east of the station 1230.

Dec. 13 started with another Dive (# 31, st. 1272) which mapped a depression about 150 m wide and 50 m deep situated to the south of CTD st. 1230. Small temperature anomalies of about 0.05°C were found in two parts of this basin but no other signs of hydrothermal activity like alteration of rocks, hydrothermal precipitates or hydrothermal fauna were discovered. Young pillow basalt cover the whole part of the basin. Interestingly, only few talus was mapped in the basin even if its formation may be tectonically controlled. This might be due to the

contemporaneous magmatic and tectonic activity. The small temperature anomalies might be caused either by mixing with water masses higher up in the water column or by diffuse emanation of warm water. Four CTD stations were run during the night to map the water column to the NW of st. 1230. An OFOS track (st. 1277) explored the basin immediately NW of CTD st. 1230 close to an area where 30 nmol CH_4/l were measured during ROV dive 30.

Another CTD yoyo station was carried out close to CTD station 1230 in the morning of Dec. 15. However, the high methane values found during previous stations in this area could not be confirmed. At 13:00 ROV Quest dive 32 started and lasted for 23 hours. During this station the whole area to the west and south of CTD 1230 was explored. Again, no hydrothermal activity could be disclosed. CTD stations completed Dec. 16 and the following night. These stations were run within the valley of the non-transform fault and should complete data to reconstruct the 3d distribution of the hydrothermal plume. Another CTD yoyo track was carried out to the NNW of the previous one in the morning of Dec. 17, but also could not confirm the high methane values found during the beginning of the cruise. However, the methane concentrations were still larger than 10 nM in water depths between 2700 and 2800 m.

ROV dive 33 started at 4 pm on Dec. 17. It lasted overnight until 8:15 am of Dec. 18 and explored the upper rift valley flanks in the northwest of the working area. The flank is characterized by steep walls on the edge of which abundant fauna could be found. Furthermore, cross-cutting faults were found striking nearly N-S and WNW-ESE. Apart from a few Fe-stained rocks no hydrothermal signals were found.

More CTD stations followed on Dec. 18 carried out to the N and SW of the working area to look for more hydrothermal signals in an area where we have not looked in detail so far. ROV dive 34 (st. 1291) started at 14:30. It explored an area streching from the southern part of the working area to the western and northern parts and lasted until 7:30 am the next morning. Afterwards R/V Meteor sailed to the central part of segment 2 of the MAR 8°30'S / 13°32'W and 8°33'S / 13°32'W in order to carry out four stations using a short gravity corer. The objective of these stations was to sample young basalts (basaltic glass) in an area of young lava flows indicated by TOBI side-scan sonar (see Figure 5-5). Having finished Meteor sailed back to the working area of the previous ROV dives. Dive 35 started on Dec. 19, at 20:30 and was supposed to explore the valley of the non-transform fault that separates the first and second segment of this MAR part. The dive lasted until 11:30 am of the next day. Along the southern flank of this valley, immediately beneath a large escarpment along which an increased fauna density was found during dive 34 (see above), hydrothermally altered rocks and sediments as well as a T anomaly of 0.14°C in the pore water of the sediments could be discovered at the end of dive 35. However, time was running short, therefore no further exploration of this site was possible.

Station work of cruise M62/5 was finished after this station and R/V Meteor started her transit to Walvis Bay. In the early afternon of Dec. 27 a fire in the engine room stopped all operations of R/V Meteor for 12 hours. Only the very professional handling of this serious problem by the technical crew made possible the safe return of R/V Meteor to the port of Walvis Bay on Dec. 29, at 06:00 am. All containers were brought to the pier and loaded there by the scientific and technical crew. The scientists of cruise M62/5B disembarked until the early afternoon of Dec. 30, 2004.

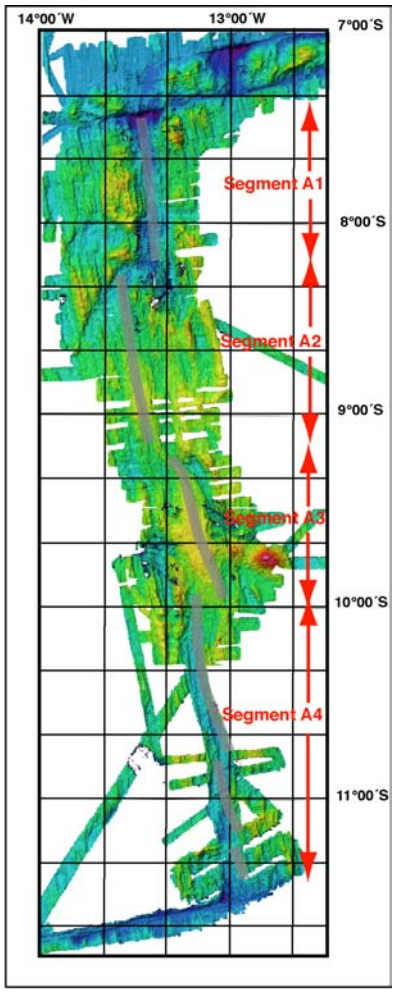

Fig. 5-2: Detailed bathymetry of the four main segments studied during METEOR 62/5 cruise.

5.4 Preliminary Results

5.4.1 TOBI Sea-Floor Imagery

(B. Murton, S. Tyler, C.W. Devey)

The TOBI system deploys a deep towed dual sidescan sonar system based around 30 KHz. Range to each side of the nadir (central zone) is 3 km, yielding a total swath width of 6 km. The imagery was processed using the Southampton Oceanography Centre's PRISM system (developed by T. LeBas). It was run during this cruise on a LINUX computer. The processing takes account of range dependent non-linear attenuation of the sonar signal and amplitude variation of the sonar beam pattern. It also corrects for the heading of the TOBI vehicle using both gyro-compass and track heading, makes a slant-range correction for the altitude of the vehicle above the seafloor, and predicts the position of the vehicle behind the ship using an inertial navigation system, thus repositioning the sonar pings in geographic space and time.

As a result, the TOBI sidescan sonar imagery is projected in geographic coordinates. The data we have processed for this cruise uses a Mercator projection, with reference latitude of 8°S and the spheroid reference model WGS84.

TOBI sidescan sonar imagery yields a mean pixel resolution of $6m^2$ although the original imagery is over-sampled at by a factor of 8. The imagery is stored as binary 16 unsigned bit files in the .img format for easy use in the ERDAS Imagine^{INC} image processing package, that is available commercially.

Four second-order ridge segments were explored, south of the Ascension fracture zone, over a distance of 1000 km along-axis. Approximately 6000 km^2 of seafloor were imaged, with an average depth of 3100 m. Segments are referred to in this section from numbers A1 to A4 from North to South, respectively. The ridge depth decreases from 4250 m in the north and south of the area, to 1500m in the centre of segment A3.

The following are some examples of features imaged during the deployment:

Northern volcano, segment 1 (Figure 5-3)
A 1.5 km diameter flat-topped volcano with 200 m diameter central crater, lava fields to the southeast extend at least 4km. These comprise lobate-fronted lower lavas overlain by a single sheet flow. Together, the volcano and its lava flows are unfaulted and cover the fissured and sedimented older seafloor, indicating a pre-deformed age for this young volcanic system.

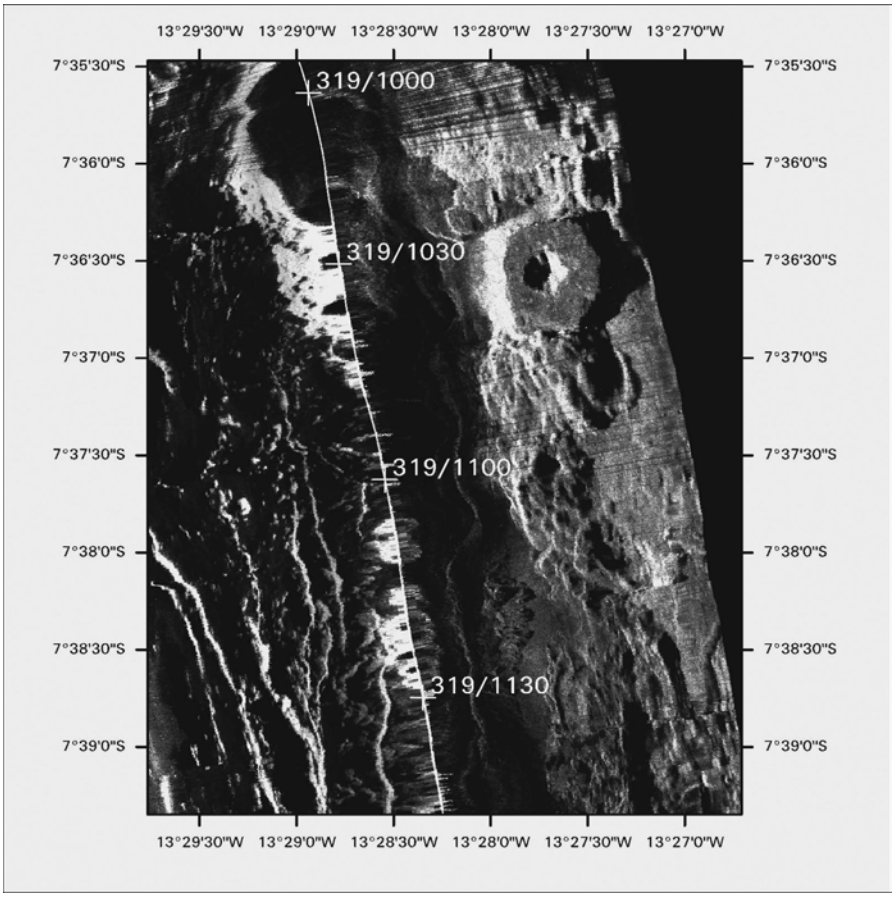

Figure 5-3: Volcano 1, northern-end of Segment A1. The time stamp, along the vehicle track, refers to Julian day, hour and minute for the vehicle. Navigation is predicted position of the vehicle using inertial navigation that is referenced to ship's GPS position. Vehicle positioning is good to ± 100m.

Segment A1, dextral jog in axial valley walls (Figure 5-4).
Dextral jogs in the axial valley, that offset the trend of the ridge segment by a few hundred metres, cause termination in axial valley wall faults. An example of this is shown in Figure 5-4. This feature shows the extent of submarine erosion of the axial wall and hence its tectonic and erosional aging. The resulting spurs and talus fans are clearly seen, creating a serrated edge to the fault wall terminations.

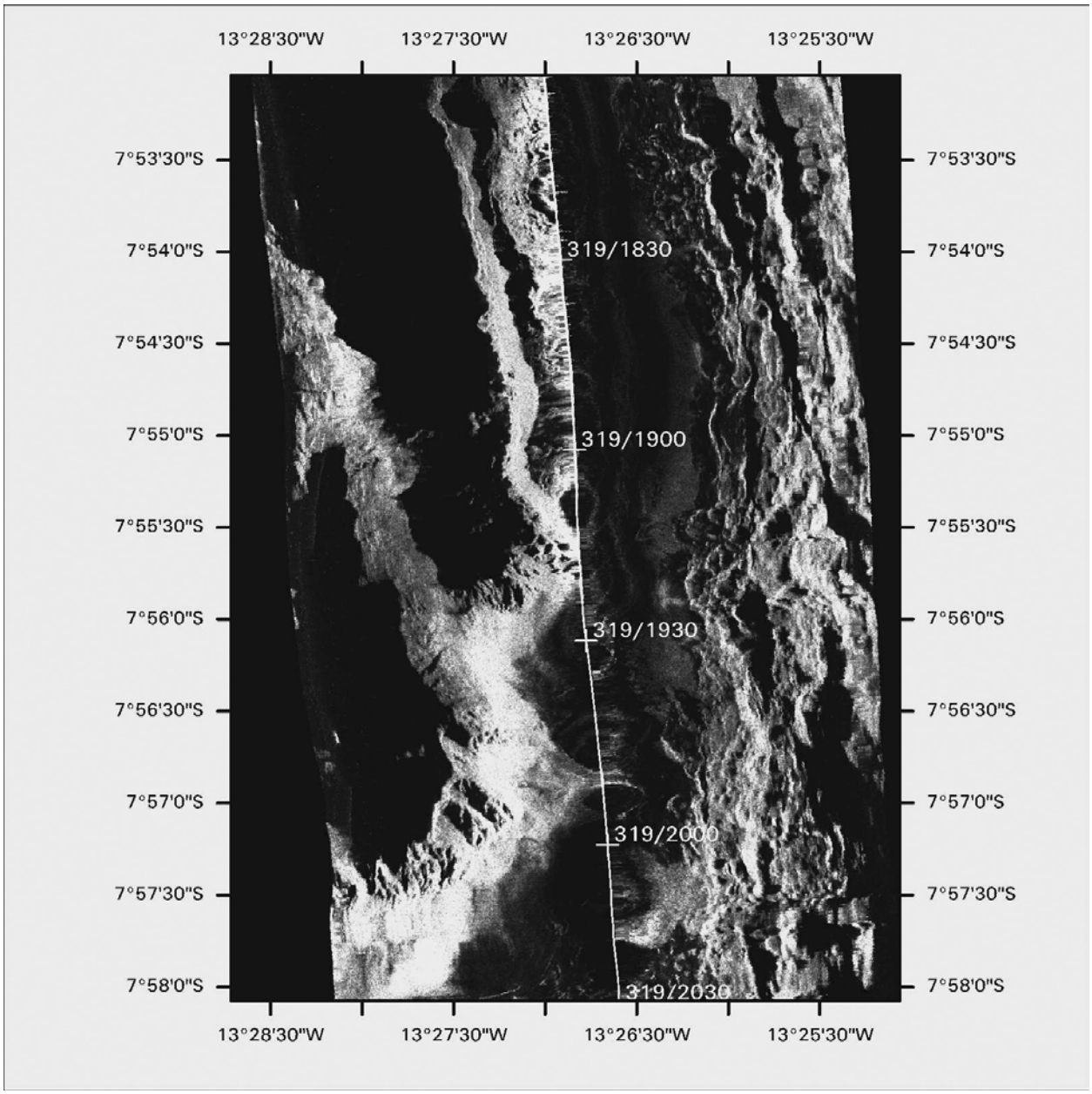

Figure 5-4: Terminations in western axial valley wall faults, Segment A1. Erosional spurs and gullies filled with talus and scree are clearly seen.

Segment 2, Sheet-flows (Figure 5-5)

Two extensive sheet-flows are seen at the northern-central end of Segment A2. The northern sheet-flow has an area of 4.5 million square metres, while the southern one has an area of 6.3 million square metres. The flows emanate from the neovolcanic axis and spread north-eastwards for over 6km. The southern flow clearly on-laps older faulted and fissured terrain at its southern boundary. There are lobate internal reflectors within the flows that indicate either flow fronts or pressure ridges.

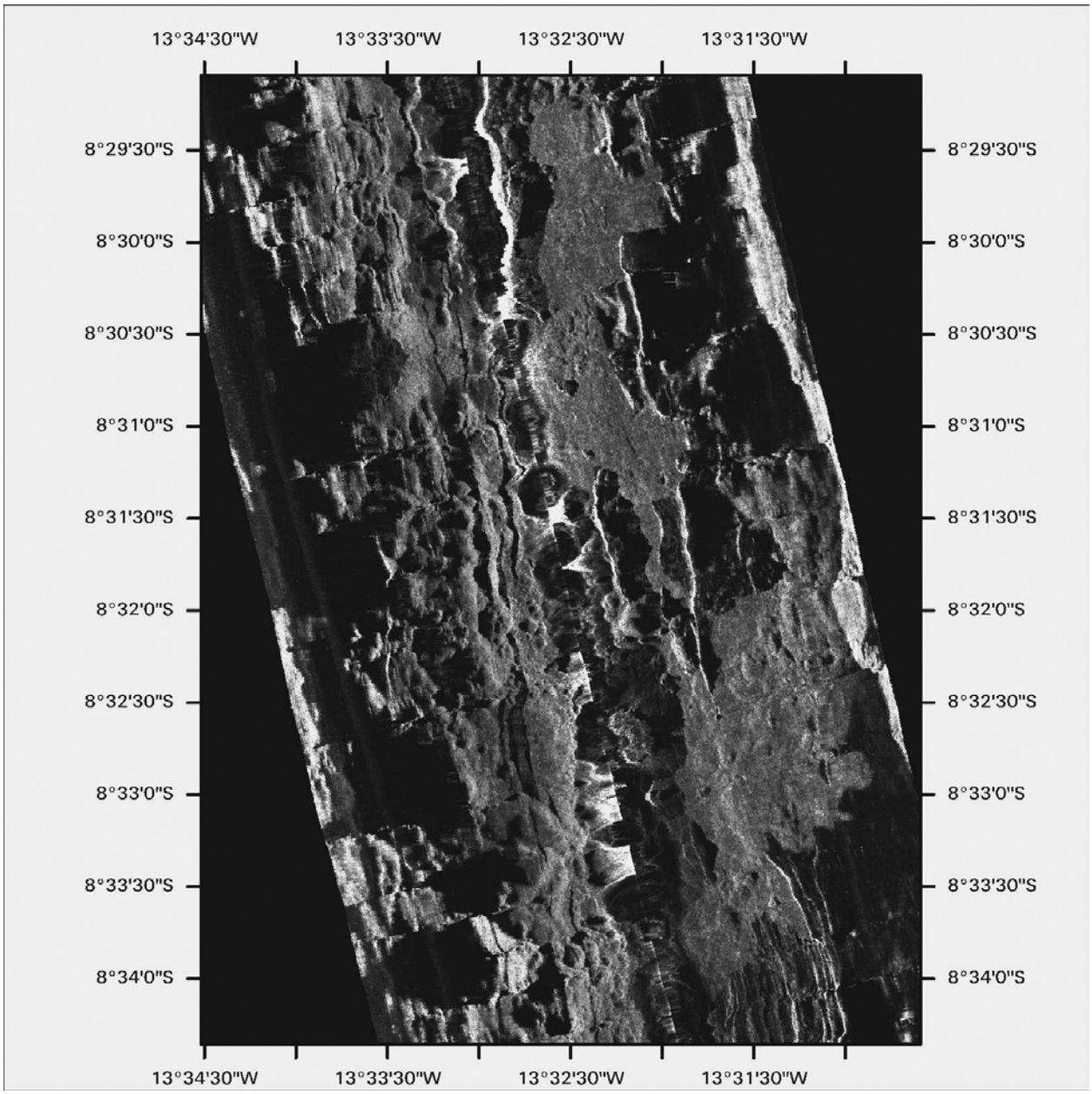

Figure 5-5: Segment A2, extensive, young sheet flows, totalling 11 million square metres. Unfractured and unsedimented, these flows have yet to be deformed by tectonic extension across the ridge axis.

Central Segment A2, mega-sheet flows (Figure 5-6).
Flooded **A**xial **S**ummit **G**raben (ASG), sheet flow with an area of 16.7 million square metres and a run out of over 11 km. This flow fills an ASG, of 2.6 km width, that marks the plate boundary in the centre of Segment 2. The sheet flow trends 170°, is 11.7 km long and 2.4 km wide. To its western side are two en echelon, low ridges, 2.8 km and 3.2 km long and offset by 400 m dextrally. The ridges are formed from a line of rounded mounds, each ~370 to 150 m wide. The ridges trend 170, parallel to the ASG. This flow is uncut by any fissures of fractures and clearly on-lap fissured and sedimented older crust beneath.

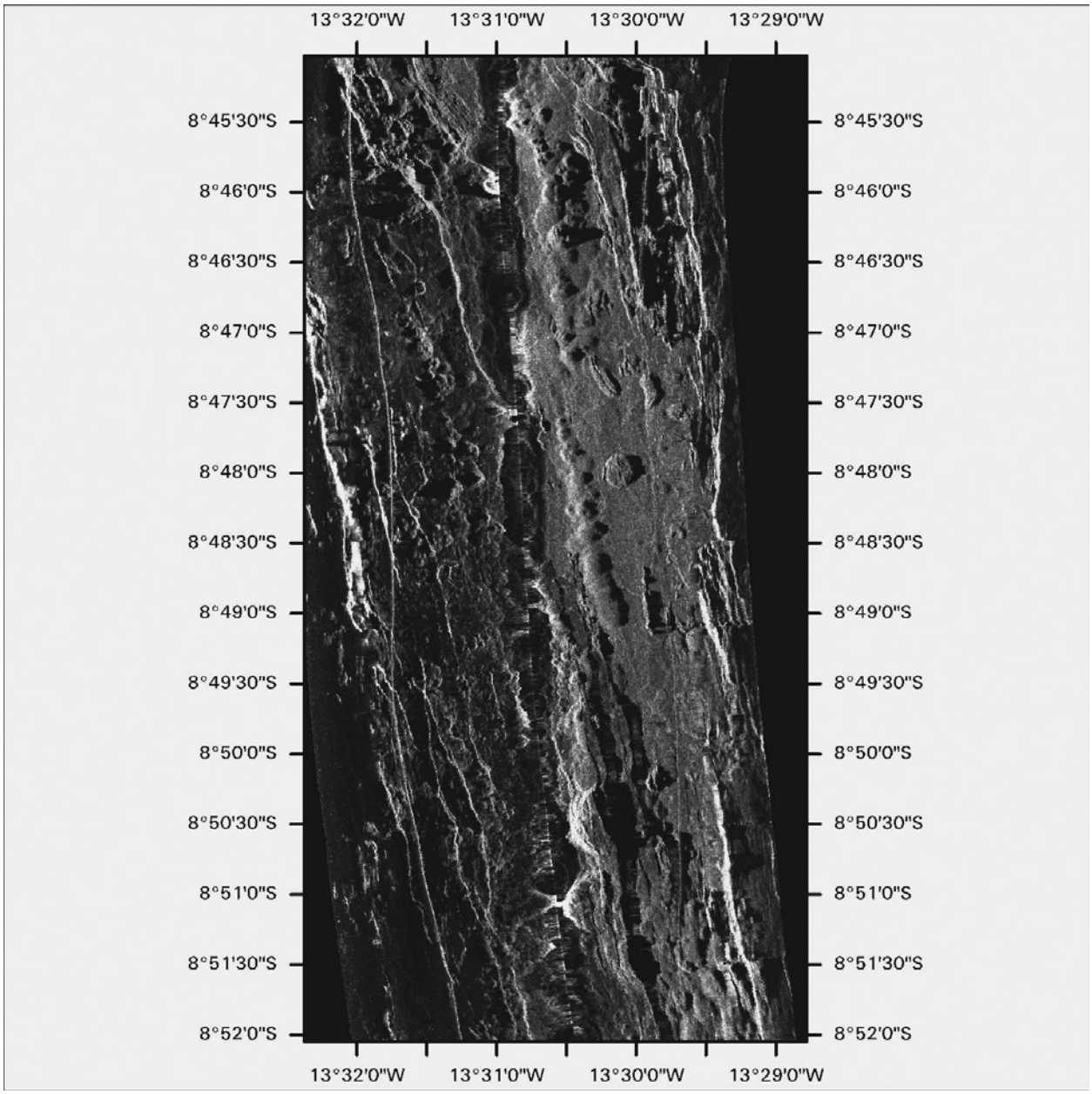

Figure 5-6: Flooded Axial Summit Graben, centre of Segment A2.

Asterix's Knob volcano (Figures 5-7, 5-8)

Central segment A3, flooded plateau with an ASG, sheet flows and the Asterix's Knob volcano at its centre. The volcano is 1.8 km in diameter, and 200 m high. The ASG is 1.05 km wide 4 km to the south of the volcano, narrows to 40 0m within 100 m of Asterix's, and widens to 2.34 km at 3 km to the northwest. The ASG is also sinisterally offset at the latitude of the volcano. While the ASG sheet flows are extensive, with runout of 4.5 km each side of the ASG, and unfaulted, Asterix's volcano is extensively fractured by axial-parallel faults trending 162°. Note in Figure 5-8a that the splay in fault trends south of the volcano are consistent with a rotation of far-field stress tensors caused by the gravity-induced spreading of the volcanic plateau that forms Segment 3. The three Figures (5-7 & 5-8a&b) provide perpendicular look directions of the Asterix ASG.

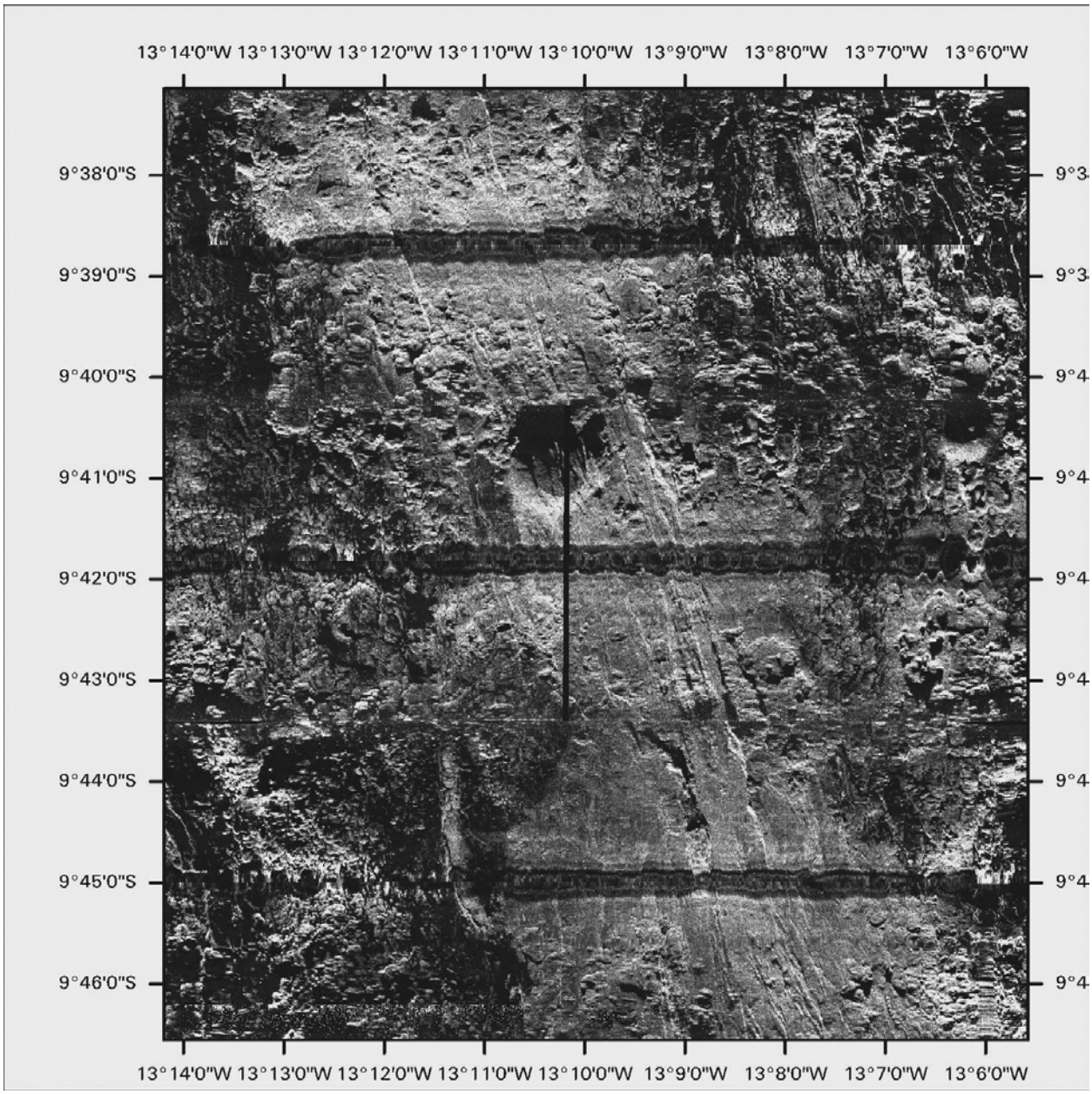

Figure 5-7: Asterix's Knob volcano and ASG from east-west passes of the TOBI sidescan sonar, mosaiced together. Note the relative accuracy of the intertial navigation processing that has positioned continuous features across each pass without any significant offsets.

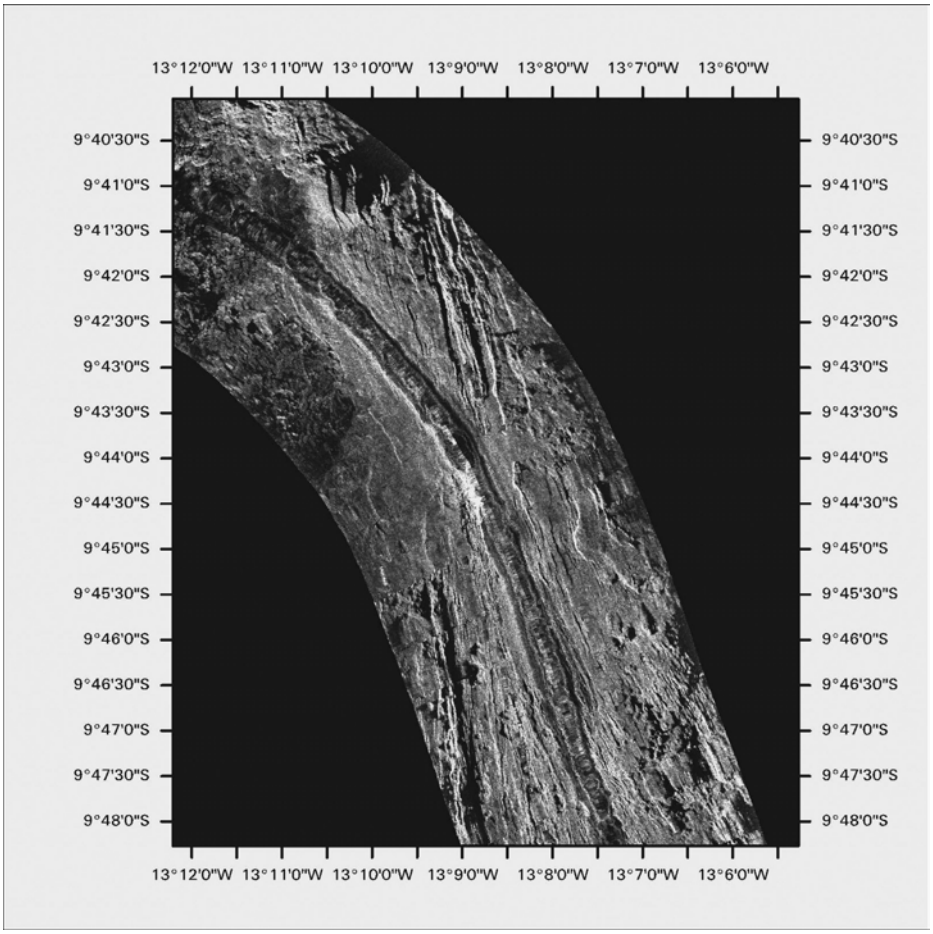

Figure 5-8a: NW-SE to N-S pass of the TOBI system imaging the Asterix ASG ,its sheet flows and the splay of ASG faults.

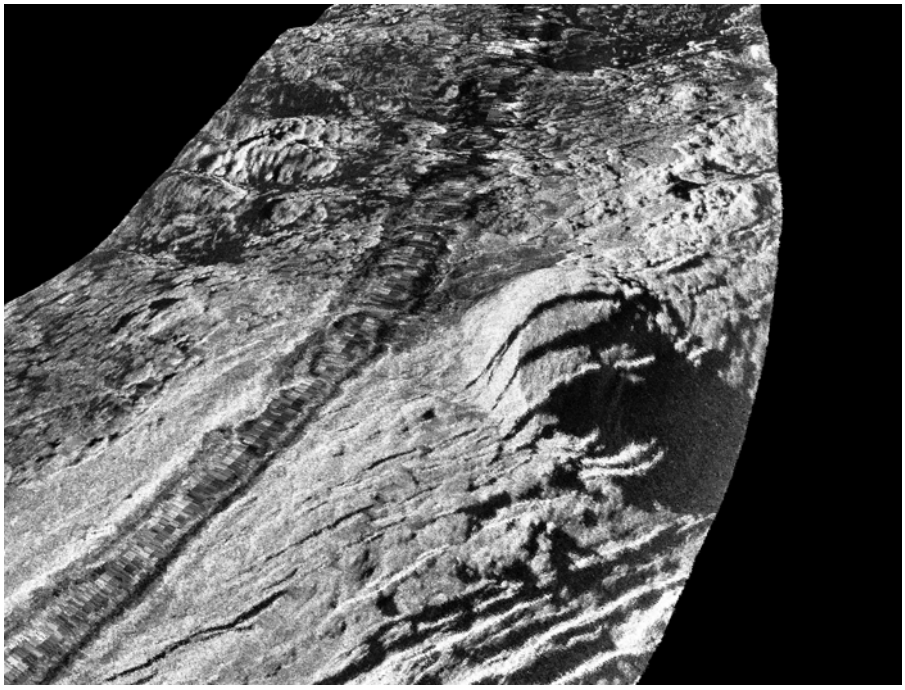

Figure 5-8b: TOBI sidescan sonar image of the Asterix seamount, with the imagery draped over bathymetry to give a 3D perspctive view from the southwest. Note the dissection of the seamount by N-S trending faults.

Volcano Cluster, west of the Asterix ASG, Segment A3 (Figure 5-9)
Linking the Asterix ASG to the NW-SE-trending chain of large seamounts on the eastern flank of the MAR, at this latitude, are a cluster of circular volcanoes. These range in diameter from 400 m to 1.2 km. many have flat tops and central craters that are 1/3 of the basal diameter. Progressively towards the east, these volcanoes become increasingly obscured by a thickening sediment blanket.

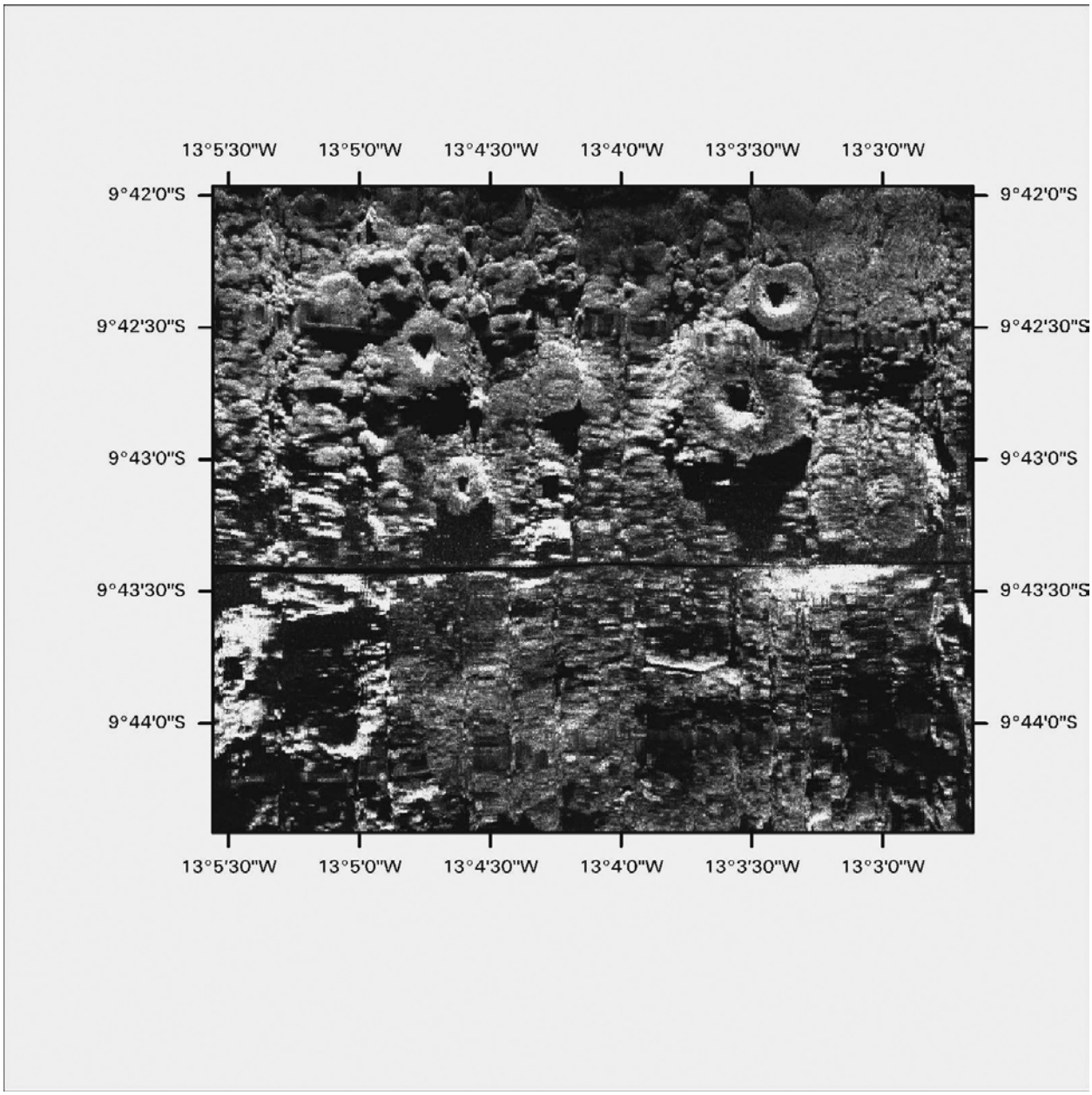

Figure 5-9: Cluster of volcanoes linking the Asterix's Knob volcano to the chain of large seamounts (including Grattan Seamount) 12 km to the east.

Northern-end of Segment 2 (Figure 5-10)

This image locates the highest temperature anomaly on the bottom of the neovolcanic floor measured during the TOBI deployments. The cross marks where a 0.05°C anomaly was detected by CTD and MAPR survey. The temperature anomaly was NOT accompanied by any positive salinity anomaly (hence indicates buoyant warm water originating from the seafloor) and underlies a 400m thick negative T and S anomaly (i.e. a neutrally buoyant plume of probable hydrothermal origin), and positive nephel anomaly, between 3000 m and 2400 m. The neovolcanic ridge, at this location, propagates into the axial valley wall at the southern-end of the non-transform discontinuity separating Segment A1 from Segment A2.

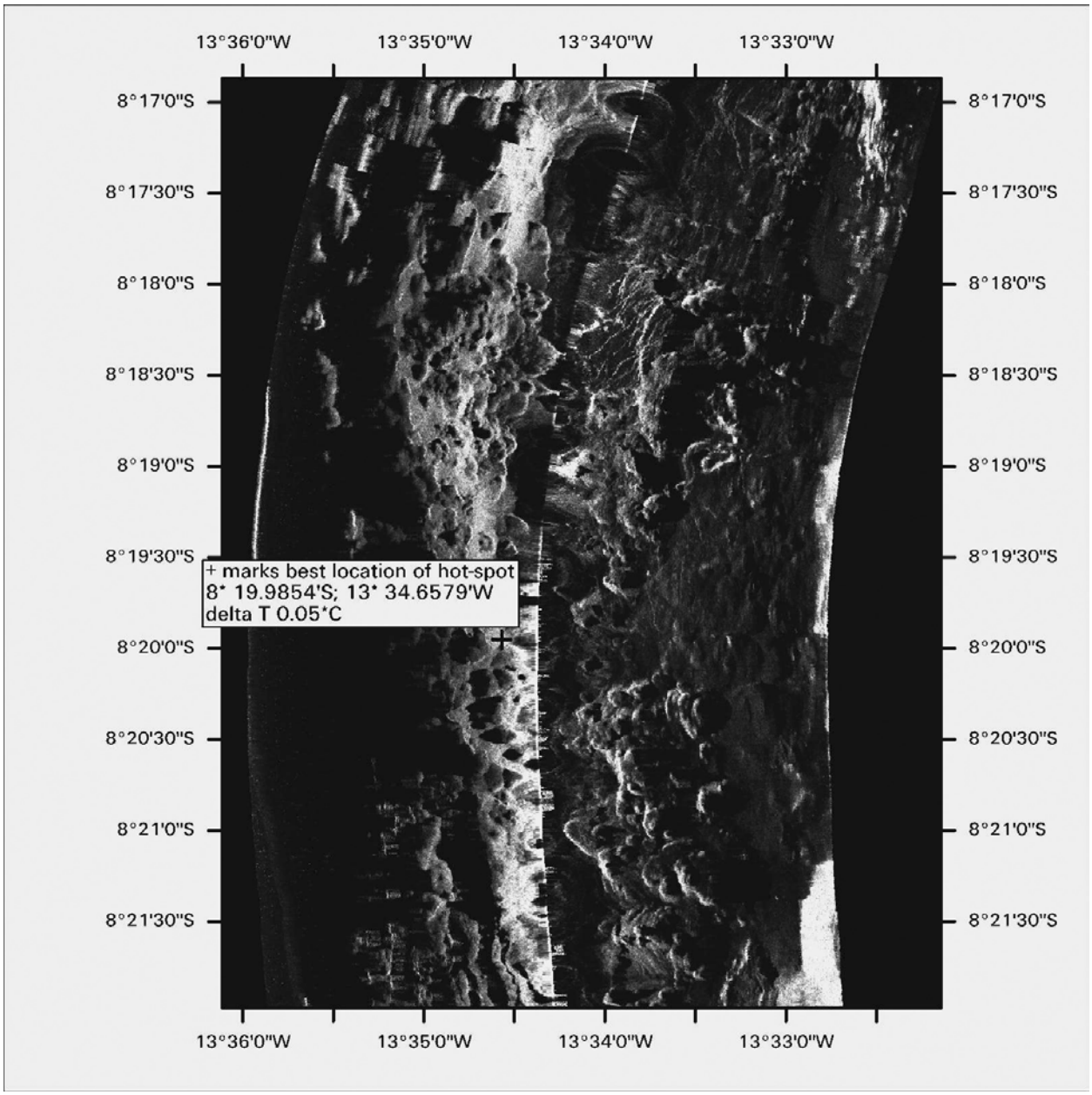

Figure 5-10:Northern tip of Segment A2. The + marks the site of highest water temperature anomaly from the TOBI vehicle ("hotspot"), delta T = 0.05C, altitude 15m, bottom depth 2940m. Possible hydrothermal source, located on the crest of an axial volcanic ridge as it intersects an axial valley wall fault.

5.4.2 Seafloor Mapping and Geology

(T. Kuhn, H. Paulick, K.S. Lackschewitz, J. Stecher)

Detailed seafloor mapping was carried out during M62/5B within the right-lateral non-transform offset (NTO) separating Segments A1 and A2 (Figure 5-11). The propagation of the neovolcanic ridge of segment A2 towards the rift valley wall is clearly visible west of 13°35'W and north of 8°20'S. Another valley running parallel to the west of the current rift valley (west of 13°40'W at 8°15'S) may be the former rift valley the tectonic activity of which may have been terminated by a ridge jump (Brugier et al., 2003). Obviously, the ESE striking structures that mark the non-transform offset do not cut this former rift valley. Therefore, the onset of the offset may be dated after the first ridge jump.

The non-transform offset is asymmetric with a larger and deeper basin in the east and a smaller and shallower one in the west. Deepest water depth in the eastern basin reaches more than 3900 m whereas in the western basin it reaches only about 3750 m. The shallowest points of the rift mountains that surround the NTO reach less than 1300 m which results in a depth difference of more than 2600 m over a minimal horizontal distance of about 13 km.

The western part of NTO is bound by NW-SE and NE-SW striking structures, the latter also widely ocur within the western basin. The eastern basin seems to be dominated by roughly N-S striking features. Within the basins and especially along their southern boundary ESE striking features occur and these may be the dominating structures along which the transcurrent movement has taken place. The large seamount to the north of the western basin is considered to mark an inside corner high of the NTO (Brugier et al., 2003).

Steep slopes interrupted by plateaux characterize the eastern flank of the western basin indicating active tensional tectonics. Over one of these plateaux high methane concentrations between 10 and 120 nmol/l were measured in 2700 m water depth (box marked in Figure 5-11). This area was subject to intense video mapping during M 62/5B carried out with both the ROV Quest and OFOS. Since no hydrothermal field could be detected despite the methane anomalies and other indications this area was named Cheating Bay (Figure 5-12).

Cheating Bay covers an area of about 1500 x 1500 m in water depths between 2860 to 2960 m. It is surrounded in the north by NW-SE- and in the east and south by roughly N-S-striking ridges. It opens to the west where the seafloor plunges along nearly vertical walls into the rift valley down to 3500 m. Cheating Bay consists of a plateau at 2900 m water depth in the southwest, two basins in the south and east reaching down to 2960 m and a basin running SE-NW in the central part of the bay and N-S in the northwestern part of it. This central basin also reaches water depths of 2960 m and makes up about one third of the areal extend of Cheating Bay.

Cheating Bay is covered by sedimented and unsedimented basaltic lava flows that form ridges and pillow mounds between a few and about 15 m high. The pillows are bulbous with a large number of protrusions and typical rind textures (Figure 5-12). In some parts, ropy lava occur probably indicating higher lava viscosity. Given the appearance of flow fronts, the thickness of lava flows, their relative age and the local morphology, the local sources of the lava flows may be to the SE and NE of Cheating Bay. However, fissure eruptions rather than single point eruptions may also be possible. This is because areas with young lava flows are also characterized by steep cliffs, escarpments and open fissures.

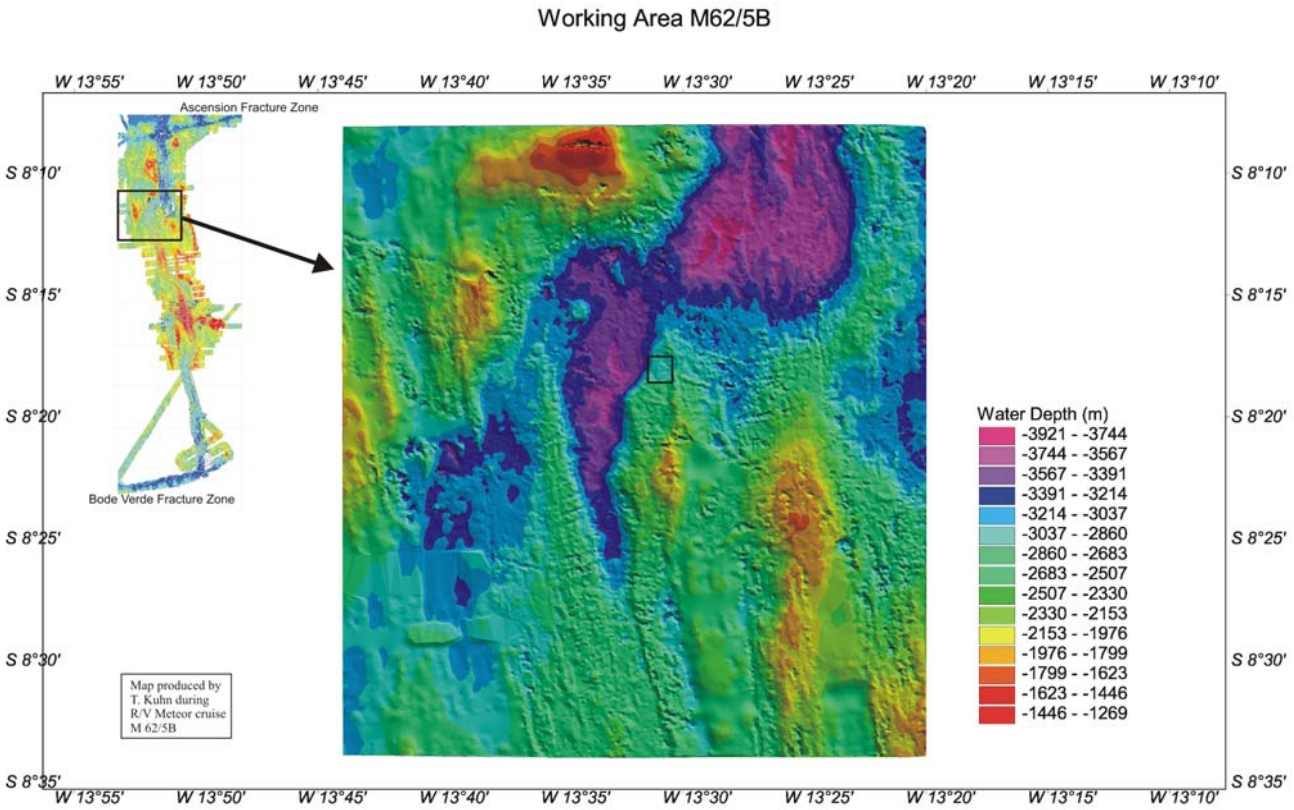

Figure 5-11: Bathymetric map of the non transform offset separating Segments A1 and A2 (upper left, see also Figure 5-2). Detailed working area during cruise M62-5B is marked by the rectangle and is called “Cheating Bay”.

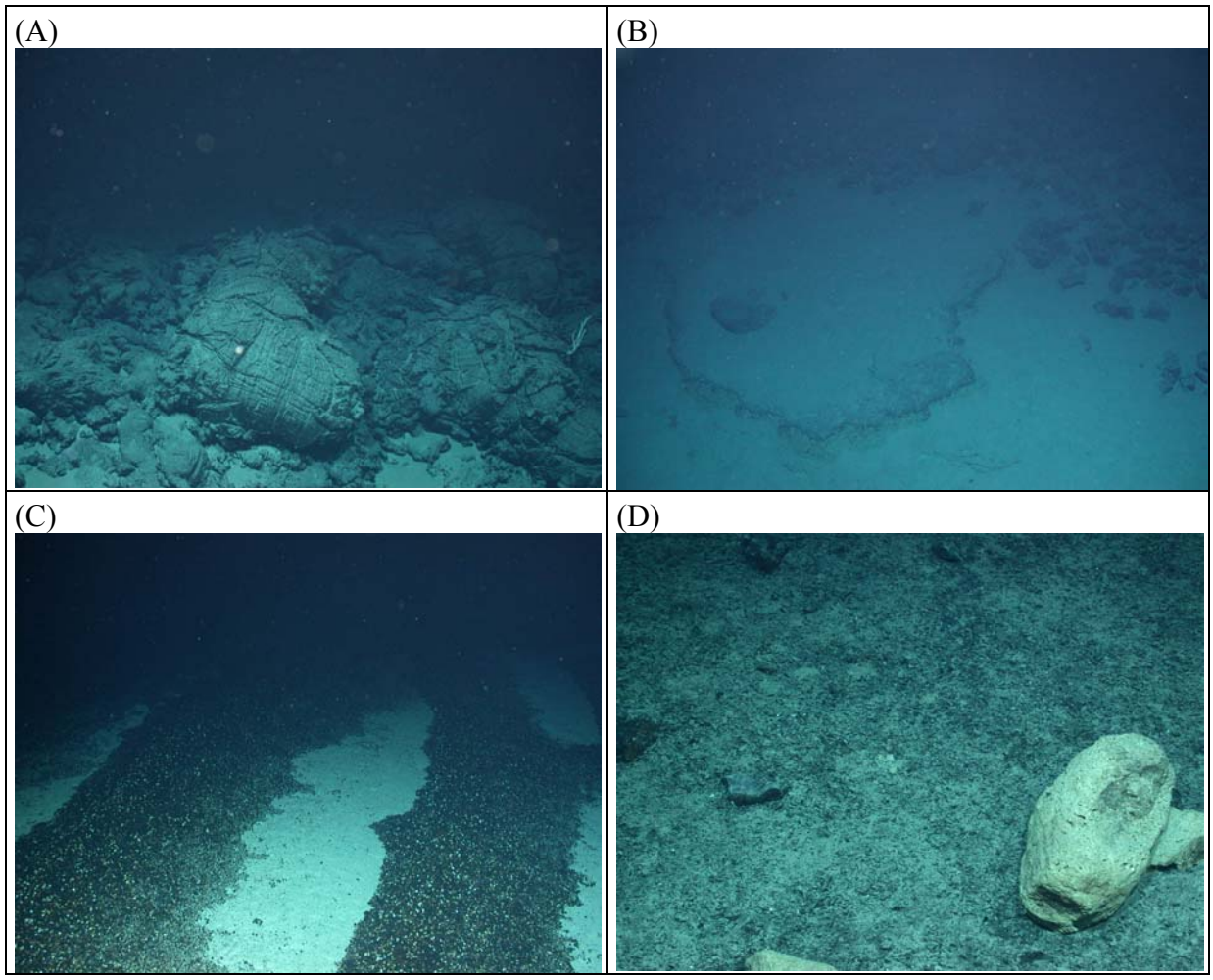

Figure 5-12: Seafloor observations during ROV tracks. (A) slightly sedimented pillow basalt (dive 27 close to CTD station 1230 with highest CH_4 value of 115 nmol/l); (B) crust-like sediment consisting of volcanic glass indurated by Mn oxide as upper crust and indurated pelagic sediment underneath (dive 32); (C) thecosomatan gastropod shell field gathered in ripples on pelagic sediment (dive 34); (D) (hydothermally?) altered and backed sediment observed on the rift valley flank close to the location of a T anomaly of 0.14°C (dive 35).

Pelagic sediments cover the seafloor in most parts of the SW plateau and the central basin. They consist of carbonate ooze. Crust-like indurated sediments occur at the southwestern edge of the bay and consist of volcanic glass indurated by Mn oxide as upper crust and indurated pelagic sediment underneath (dive 32; Figure 5-12). Unusual large, ripple-like gatherings of empty snail shells appear in different parts of Cheating Bay (Figure 5-12). They can cover an area of 60 m by 20 m and reach a thickness of more than 25 cm. They occur in different size cohorts and are probably the result of near-bottom current sorting.

The youngest volcanic rocks were mapped in the southern basin of Cheating Bay where sediments are nearly absent, a higher number of ropy lava occur and some temperature anomalies of +0.05°C were detected in the near-bottom water. The oldest and most sedimented rocks were mapped on the southwestern plateau.

No active hydrothermal vent site has been detected in Cheating Bay during M62/5B despite the strong signals in the water column above it. The 0.05°C temperature anomalies in the SE of the area may be explained by vertical intrusion of upper water layers as indicated by LADCP

measurements (see chapter 5.4.5). Altered rocks and yellow sediments that may be of hydrothermal origin were only detected on the rift valley flank in 3330 m water depth to the west of Cheating Bay (Figure 5-13). This area is situated on a plateau beneath a steep wall marking the rift flank. The plateau is characterized by roughly N-S oriented talus ridges and small scarps. When stirring the sediments with the ROV manipulator a temperature anomaly of +0.14°C was measured with the CTD mounted in about 2 m height on the ROV frame.

Most of the rocks recovered from Cheating Bay were covered by relatively thick Fe-Mn oxyhydroxides (up to about 5 mm). Since hydrogeneous Fe-Mn crust grow with very slow growth rates of about 1-2 mm/Myr and at least some of the rocks being probably younger than 1 Ma the thick Fe-Mn oxyhydroxides may be of hydrothermal origin and therefore, also indicate hydrothermal activity nearby. However, no Fe-Mn crusts were found on the rift flank at the site of the +0.14°C temperature anomaly.

The preferred strike of open fissures and steep walls indicating active tectonics within the Cheating Bay area roughly are as follows: (i) N-S, (ii) N30° (NE-SW) , and (iii) N135° (NW-SE). The orientation of these small-scale structures are consistent with the orverall strike of structures within the NTF (see above). Three small plateaus between 2960 and 3020 m water depth mark the northwestern boundary of Cheating Bay. They are separated by NW-SE striking normal faults. Their western boundaries are formed by nearly vertical walls marking the upper limit of the rift flank.

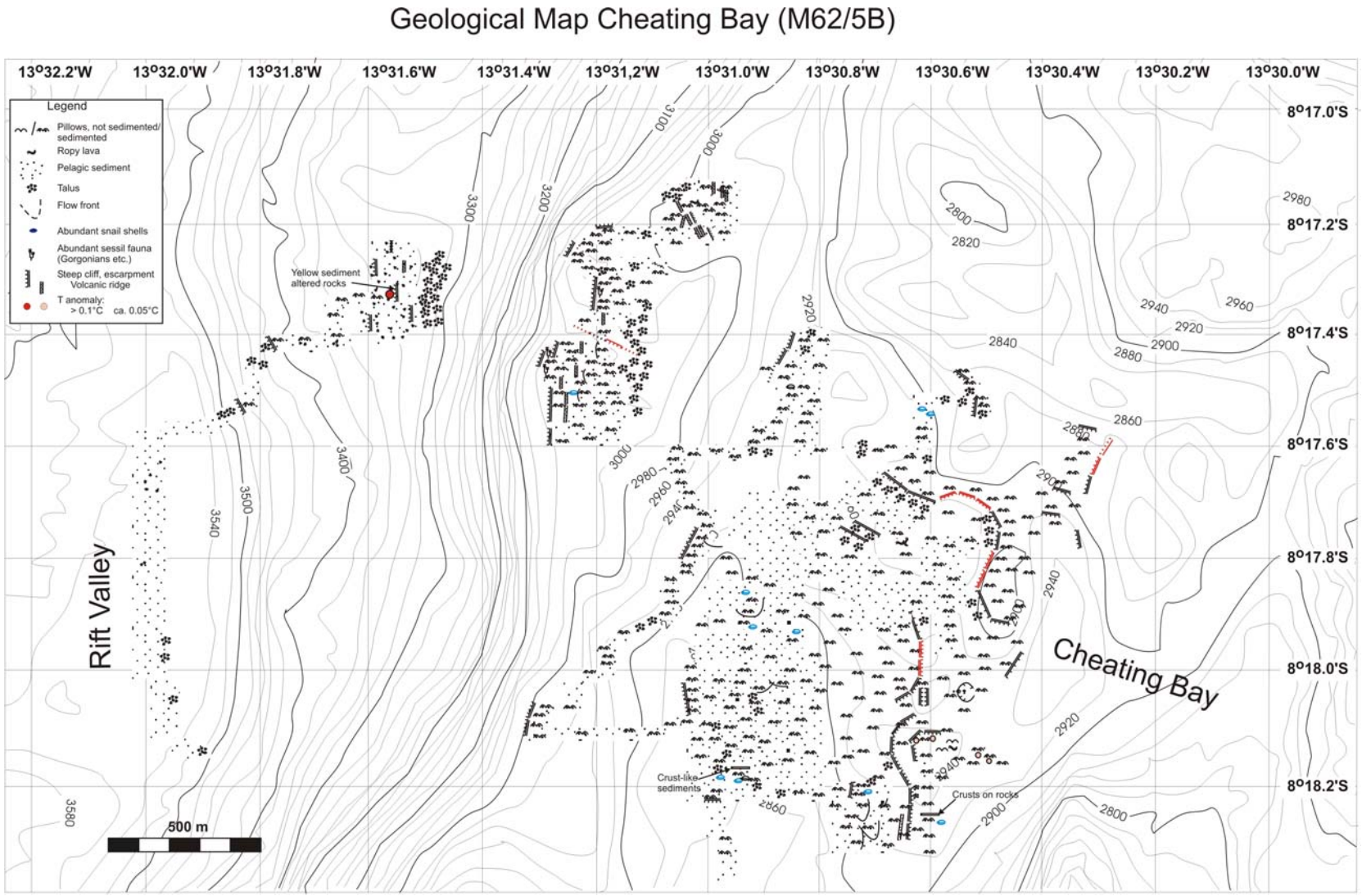

Figure 5-13: Geological map of the Cheating Bay based on 9 ROV and 4 OFOS tracks carried out during M 62/5B. Structures marked in red are interpretive.

5.4.3 ROV Deployment

(K.S. Lackschewitz, V. Ratmeyer, T. Kuhn, H. Paulick, J. Stecher)

The remotely operated deep diving robot QUEST is an electric 4000m-rated, commercial work-class ROV, operated by MARUM, University of Bremen, since May 2003. The robot was designed and manufactured by Schilling Robotics, Davis, USA. The total QUEST system weighs 45 tons (including the vehicle, control van, workshop van, electric winch, 5000-m umbilical, launch-and-recovery-frame, and transportation vans) and can be transported in four 20-foot vans, including 2 transportation vans, control van, and workshop van. Using a MacArtney Cormac electric driven storage winch to manage the 5000m of 17.6 mm NSW umbilical, not even hydraulic connections have to be installed during mobilisation.

Within SPP1144, QUEST was used the first time aboard Rv METEOR during leg M60-3 in January 2004. QUEST's technical innovations played a key role to gain operational success aboard Rv METEOR and provided a flexible and highly adaptable platform for scientific sampling and observation tasks. Since then, new features include the highly integrated USBL positioning system, based on the french IXSEA-GAPS inertial Navigation and Positioning system. In addition, QUEST uses a Doppler velocity log (DVL) to perform StationKeep Displacement, automatically controlled 3D positioning, and other auto control functions. However, due to a malfunction of the Doppler device the DVL Navigation could be used only during the first 2 dives. A new launch-and-recovery-frame was installed (Figure 5-14), enabling much smoother and safe handling of the ROV.

Figure 5-14: Launching of the ROV with a new deployment frame.

Designed and operated as a free-flying vehicle, QUEST system exerts precise control over the 60-kW electric propulsion system so the vehicle can maintain stationkeep as well as traversing over several hundred meters without a TMS (tether management system). During M62-5, these functions provided the basis for geological mapping of the selcted area, detailed close-up photography and video, and sampling of rocks, sediment and water samples with 2 different robotic arms. In addition to QUEST's standard control feautures, the vehicle provides lift capacity of up to 250 kg with the RIGMASTER manipulator, as well as a set of different scientific tools and adaptions for biological and geological sampling. A major new installation is the advanced camera and lighting suite, consisting of up to 2.4 kW light power and 7 different video and still cameras.

However, some technical issues occured due to a new set of rotors provided by the manufacturer. Due to their first test at depths over 3000 m during leg M62-5, some of the thruster parts failed. The problem was identified and could be successfully fixed on the remaining thrusters. As a result, the system proved to be fully operational even with limited thruster capability.

Besides cameras and manipulators, the scientific equipment installed during M62-5B consisted of a CTD with turbidity and high-temperature sensors, a set of niskin bottles, a 675 kHz scanning sonar, a pair of green lasers, a sample drawer and several different sampling tools such as "hand" nets and grabbing devices.

The scientific data base system used at MARUM feeds all ROV- and ship-based science and logging channels into an adapted real-time database system (DAVIS-ROV). The QUEST control system provides transparent access to all RS-232 data and video channels and thus is easily accessible. During operation, data and video were distributed to minimize crowding in the control van. Using the existing ship's communications network, sensor data were distributed by the real-time database via TCP/IP from the control van into various client laboratories, regardless of the original raw-data format and hardware interface. This allows topside processing equipment to perform data interpretation and sensor control from any location on the host ship. "Dive summaries" containing all data of interest including video and digital still photographs were compiled after each dive. Using the database's export capabilities in combination with the french software product "ADELIE" developed at IFREMER, GIS based plots, data graphs and divetrack maps containing time and position-referenced scientific data, video and images were available shortly after or even during the dives.

Post-cruise data archival will be hosted by the information system PANGAEA (www.pangaea.de) at the World Data Center for Marine Environmental Sciences (WDC-MARE), which is operated on a long-term basis by MARUM, University of Bremen, and the Foundation Alfred Wegener Institute for Polar and Marine Research, Bremerhaven (AWI).

During M62-5B aboard Rv METEOR, QUEST could be successfully deployed during 9 out of 11 dives encountering sea states up to 4, and winds of up to 6 bft., using the ships stern A-frame in combination with the new customized deployment frame. Total bottom time of 64,5 hours could be achieved between 2800 and 3500 m depths. QUEST was deployed for the first time over night, with one dive of 25 hours continuous operation (dive 32).

During all operations, the crew of Rv METEOR provided a very successful and smooth handling on deck, excellent navigation and professional technical support to fulfil the scientific tasks required.

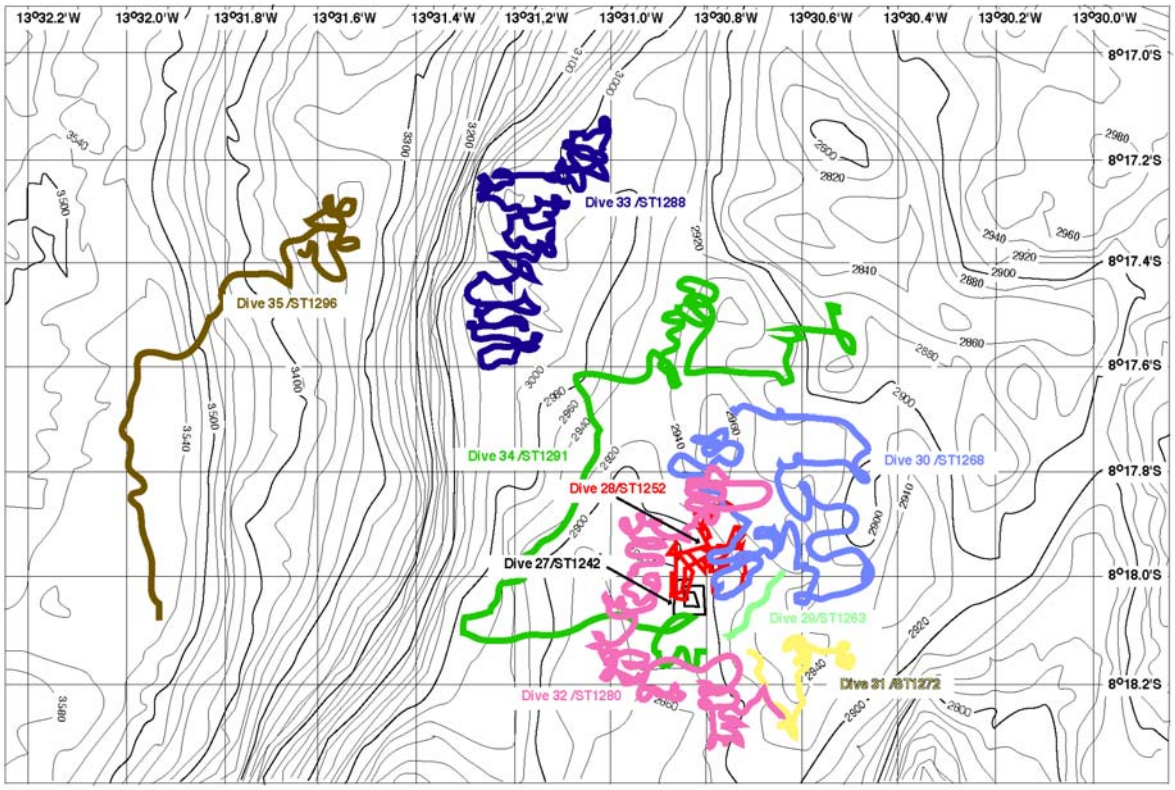

Figure 5-15: ROV tracks at Cheating Bay. Tracks are labelled with both ROV dive number and Meteor station number.

A total of 9 ROV dives at the seafloor were carried out during M62/5B (Table 5-1), most of them on the volcanic ridge east of the rift valley (Working area I = "Cheating Bay") but also in the rift valley and at the eastern flank of the rift (Figure 5-15). The objectives of the ROV dives were (i) to explore for an active hydrothermal field, (ii) to map the different geological units and tectonic features, (iii) to measure the near-bottom water temperature and turbidity in order to detect hydrothermal activity and (iv) to take rock, sediment, water and biological samples.

Table 5-1: Objectives and summary of ROV stations during M62/5b.

Station	Area	Location	Depth	Date	Brief description
1236-ROV	Volcanic ridge at a non-transform fault ("Cheating Bay")	8°18.00' S 13°30.80' W	2930 m	05.12.04	End of ROV station at 2200 m due to problems with the thrusters

1241-ROV	Cheating Bay	8° 17.80' S 13°31.00' W	2923 m	06.12.04	End of ROV station at 273 m due to problems with the navigation data transfer and the winch.
1242-ROV (dive 27)	Cheating Bay	8° 18.10' S 13° 30.90' W to 8° 18.10' S 13° 30.80 W'	2915 m to 2912 m	06.12.04	Mapping of Cheating Bay, search for hydrothermal activity; The soiral track shows sedimented basaltic rocks and relatively fresh pillow lavas along volcanic ridges (flows?) to the east whereas the area to the west is characterised by a sediments with ripples. After 2 hours at the bottom the ROV dive had to be stopped due electrical problems of the camera system.
1252-ROV (dive 28)	Cheating Bay	8° 18.10' S 13° 30.90' W to 8° 18.10' S 13° 30.80 W'	3345 m to 3447 m	09.12.04	Continue mapping of station 1242 ROV in Cheating Bay, but on a more northerly course. Only basalt and pillows along the track, few lobate flows, in some places sediments with clusters of brown brachiopods are common; Hydrothermal activity was not visible, but the turbidity and temperature senors have shown some anomalies in their profiles. After 4 hours on the bottom the ROV dive had to be stopped due to a leck in one hub connector and technical problems of two thrusters.
1263-ROV (dive 29)	Cheating Bay	8° 18.00' S 13° 30.70' W to 8° 18.10' S 13° 30.70' W	2936 m	11.12.04	Investigation of the area south of the previous dives by flying in a spiral-like way. Finding of a steep mound of lobate-looking lava with a lot of talus at the slope, lava flow fronts and white sedimented terrains with brown thecosomatan gastropod shell clusters. Due to technical problems the dive had to be stopped after 1 hour at the seafloor.
1268-ROV (dive 30)	Cheating Bay	8° 18.00' S 13° 30.80' W to	2943 m to	12.12.04	Exploring the area east and north of the CTD station 1230. The area to the east is a sedimented terrain which is lying at the end of a NW-SE striking depression. South of the terrain follows NNE-SSW striking lava flows with some collapse-pits. At the eastern boundary of the dive track is a 60m-high hill at 2280 m waterdepth which is composed of pillow-flows. The western flank of the hill is characterised by steep, partly vertical, slopes.

		8° 17.80' N 13° 30.80' W	2967 m		The northern end of the depression consists of a steep slope with several talus fans. A bottom water sample taken at the end of the dive (8°17.836' S, 13°30.803' W) shows a methane value of 30 nmol/l and a basaltic rock is covered by a thick manganese crust. Both are clear indications for active hydrothermalism close by.
1272-ROV (dive 31)	Cheating Bay	8° 18.20' S 13° 30.80' W to 8° 18.10' S 13° 30.50' W	2915 m to 2950 m	13.12.04	Exploring a 50m-deep and 350x400 m wide hole in the southeast of the working area. The steep slopes of the hole show a step-like morphology and consist of fresh pillows. Three temperature anomalies of 0.04-0.05 °C were detected at the lowest step at the western slope and a middle step at the eastern slope but the methane values of water samples are below 2 nmol/l.
1280-ROV (dive 32)	Cheating Bay	8° 17.70' S 13° 31.00' W to 8° 18.20' S 13° 30.60' W	2964 m to 2946 m	15.12.04 16.12.04	Mapping the plateau between OFOS Stations 1236 in the east and 1264 in the west. The dive started where we stopped ROV-station 1268. The plateau is covered by white sediments with pillows inbetween. The western edge is characterized by sediment crusts which consist of volcanic glass backed by manganese oxid on top and backed pelagic sediment beneath. The area at the end of the dive southwest of the hole (see dive 31) comprises several lava flow fronts.
1288-ROV (dive 33)	Upper part of eastern rift flank	8° 17.60' S 13° 31.20' W to 8° 17.20' S 13° 31.00' W	3041 m to 3005 m	17.12.04	Mapping the upper part of the eastern rift flank. The eastern flank consists of small plateaus which are vertically separated by 20 to 30m. The western edge of the upper rift flank is characterised by an escarpment at 3050-3070 m which is displaced sometimes 50m to the west by fractures. On the plateaus a deep graben is visible over 100m which is striking NNE-SSW. At 8°17.46' S and 13°31.29' W we have found abundant fauna at the western edge of the flank. The area at the northern end of the dive shows cross-cutting faults striking nearly N-S and WNW-ESE. Apart from a few Fe-stained rocks no hydrothermal signals were found.
1291-ROV	Western	8° 18.10' S	2906 m	18.12.04	Exploring the plateau south of CTD

(dive 34)	boundary of Cheating Bay	13° 30.80' W to 8° 17.50' S 13° 30.50' W	 to 2888 m		station 1230, westernmost region of Cheating Bay and parts of the northern depression. The plateau consists of white sediments with sedimented pillows inbetween. The region to the west is characterized by sediments, pillow flows and talus. The western edge is built by a steep escarpment. Another tectonic escarpment was mapped at 8°17.79' S and 13°31.00' W. The area along the western edge comprises pillows and talus fans. The depression in the north shows strongly sedimented pillow lavas and talus fans. At the northeastern edge of the depression we found a 65x25 m wide field covered with thecosomatan gastropod shells up to 50cm-thick.
1296-ROV (dive 35)	Central rift valley and plateau at the eastern rift flank in 3350m water depth	8° 18.10' S 13° 31.90' W to 8° 17.50' S 13° 31.60' W	3579 m to 3385 m	19.12.04 20.12.04	Mapping the rift valley and a plateau at the eastern wall of the rift valley. The rift valley is entirely covered by white sediments. The lower eastern flank is built by a step-like slope until 3340 m. The plateau at 3350 m shows altered basalts covered by yellowish fine sediments and large yellowish blocks. During sampling of the yellowish sediments the ROV-CTD has measured a temperature anomaly of +0.14°C from 2.56°C to 2.70°C at 2m above the seafloor. Both, the yellowish sediments and the temperature anomaly are distinct indications for low-temperature hydrothermalism underneath the surface.

Abbreviation: ROV = Remote Control Ocean Vehicle Quest 4000. The coordinates and depth are given from the first bottom view to start final hieving. Date is reference to UTC.

With respect to the main objectives described above the following conclusions can be made:

(i) During all ROV dives no active hydrothermalism (e.g. black smokers, shimmering water, concentrations of vent fauna) were seen.

(ii) Cheating Bay consists of several pillow lava ridges with terrains of pelagic sediments inbetween. The southeastern part of the working area is mainly covered by young basaltic lava flows, whereas the northwestern part shows older, sediment-covered pillow lavas. Several escarpments and fissures at the western and eastern edge of the ridge are clear indications for active tectonic processes.

(iii) Increased bottom water temperatures were found in several places but only a temperature anomaly of 0.14°C found during ROV station 1296 is clearly related to an increasing heat transfer from a hydrothermal system below the surface. Other temperature anomalies of 0.05°C which occurred in the small basin located in the southeast, are probably related to mixing processes in the water column.

(iv) Most of the microcrystalline basaltic rocks sampled in the central area of Cheating Bay are covered by Mn-oxide which is clearly related to hydrothermal plume fallout. The volcanic glass shows only minor palagonitization. Only one basalt sampled from the area covered by yellowish hydrothermal sediment (ROV station 1296) shows distinct alteration structures.
Nearly all water samples taken by Niskin bottles comprise methane values close to background seawater values. However, one water sample close to the CTD station 1230 shows a high methane value of 30 nmol/l indicating an active hydrothermal source close by.

5.4.4 Hydrothermal Turbidity Signals

(A. Klügel, F. Zielinski, A. Ksienzyk, S. Storm, O. Bislich)

As hydrothermal fluids exit a black-smoker orifice they immediately mix with the ambient sea water resulting in dissolution and precipitation of mainly iron sulfide. The fluids rise buoyantly and expand to become a hydrothermal plume. The plume eventually reaches neutral buoyancy, where it spreads laterally and is carried away by deep ocean currents. Hydrothermal plumes or effluent layers have distinctive hydrographic, optical and chemical characteristics and can therefore be located by tracing respective anomalies in the water column.

To trace such turbidity anomalies, data loggers dubbed MAPR (Miniature Autonomous Plume Recorder) have proven useful in the past. At pre-set time intervals, these loggers measure (1) turbidity with a Sea Tech Light Backscatter Sensor (LBSS, nephelometer), which senses scattered light from a small volume within centimeters of the sensor window; (2) temperature with a thermistor mounted in a titanium probe (resolution 0.001°C); and (3) pressure with a 0-6000 psi gauge sensor (resolution 0.2 psi).

During M62/5, a set of six MAPRs was employed for the TOBI tracks, for one MAPR string Yo-Yo (#1218) and one CTD Yo-Yo (#1287); in addition, a single MAPR was employed on almost every CTD station and on four OFOS tracks. The minimum LBSS background value recorded for the respective station was subtracted from all data to convert the raw voltage values into nephelometric turbidity units (ΔNTU). The data were also filtered to remove spikes from rare larger particles in the water column. Local temperature anomalies along each TOBI track were calculated by using a 5th-order polynomial fit of the overall temperature-pressure-relationship, which was subtracted from the measured values at each pressure plane.

Turbidity signals along TOBI tracks. During the 12 days of TOBI tracks, background turbidity as measured by the MAPRs was between 0.030 and 0.036 V but increased notably within inflated Segment A3 at <1500 m water depth. Elevated turbidity signals were recorded at a number of localities partly correlating with high signals from TOBI's Light Back Scatter System and with temperature anomalies. In general, a positive turbidity anomaly coinciding with a negative temperature anomaly is, in the Atlantic, characteristic of a buoyant hydrothermal plume. All of the local turbidity anomalies found, however, were comparatively small (max.

ΔNTU = 0.008 V). In conjunction with geologic information from TOBI's seafloor imagery, a number of sites were identified that show a high potential for nearby hydrothermal activity. The results are summarized in Table 5-2 and an example of the MAPR data for a part of Segment 1 is shown in Figure 5-16. Remarkably, a potential plume signal at 7°53'S (Figure 5-17) was found near a proposed hydrothermal site as based on a pronounced Mn anomaly in seawater at 2300 m depth (German et al., 2002).

Table 5-2: Summary of sites with elevated turbidity signals during TOBI tracks (14-20 November: station# 1182; 21-27 November: station# 1185).

Date	Time	Lat S	Long W	Max. ΔNTU (V)	P at max. turb. (db)	Comments
14.11.04	13:00	7°45	13°27.7	0.004	3100	no T anomaly
14.11.04	20:00	7°59.9	13°26.5	0.008	2600	-0.08°C T anomaly
15.11.04	06:30	8°20.0	13°34.7	0.004	2750	near Nibelungen Field: local deep, -0.08°C T anomaly
15.11.04	12:15	8°33.7	13°32.3	0.003	2300	only 1 MAPR, no T anomaly
15.11.04	19:30	8°48.9	13°30.8	0.002	1700	+0.15°C T anomaly
16.11.04	07:00	9°13.0	13°24.3	0.002	1900	-0.13°C T anomaly
17.11.04	05:30	9°45.1	13°24.6	0.004	2300	local deep near smt., +0.25°C T anomaly
18.11.04	08:15	9°38.7	13°22.1	0.004	2300	local deep near smt., +0.06°C T anomaly
18.11.04	18:45	9°35.7	13°06.5	0.003	1800	local deep near smt., -0.1°C T anomaly
19.11.04	13:00	10°02.5	13°04.7	0.004	2000	-0.1°C T anomaly, "the Mexican" structure: area with some LBSS and T anomalies
19.11.04	19:30	10°10.7	13°13.2	0.004	2200	narrow -0.1°C T anomaly, "Mexican" structure
20.11.04	05:00	10°32.6	13°08.2	0.003	2750	-0.06°C T anomaly
22.11.04	10:30	11°22.5	12°56.5	0.003	2750	no clear T anomaly
23.11.04	04:00	11°06.5	13°01.9	0.005	2900	no T anomaly
23.11.04	21:00	10°27.1	13°07.6	0.005	3100	local deep, +0.12°C T anomaly
24.11.04	06:15	10°06.2	13°08.1	0.004	2900	-0.06°C T anomaly, "Mexican" structure
25.11.04	05:30	9°11.6	13°19.7	0.006	2300	local deep, +0.15°C T anomaly
26.11.04	02:00	8°26.0	13°36.3	0.002	2500	-0.1°C T anomaly
26.11.04	09:15	8°14.9	13°32.1	0.004	2500	associated -0.06°C T anomaly
27.11.04	02:30	7°40.0	13°25.3	0.004	3400	-0.05°C T anomaly

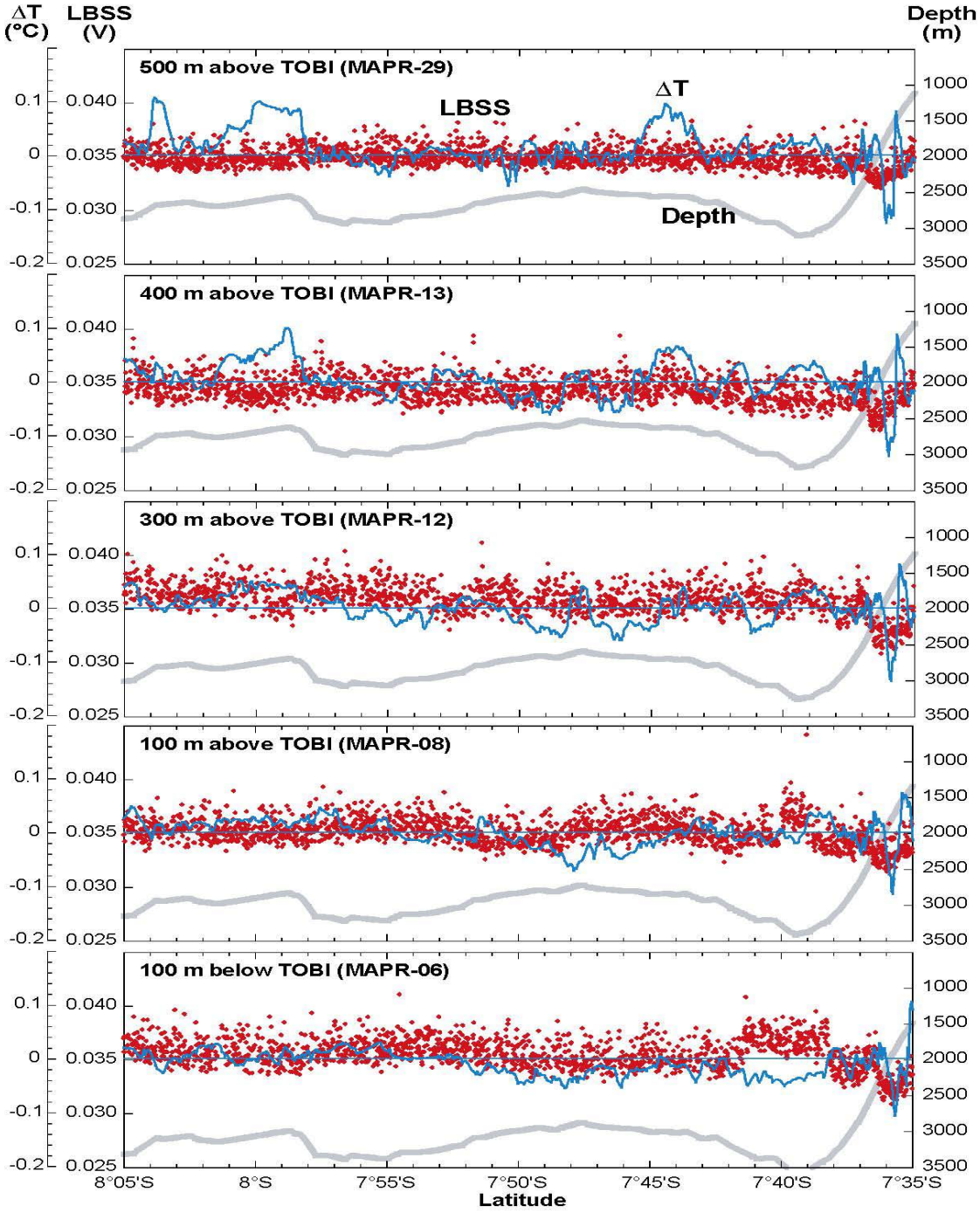

Figure 5-16: MAPR data from TOBI track #1185 at the northern part of Segment A1 plotted against latitude. Note the increased LBSS values between 7°39' - 7°41'S coinciding with a negative T anomaly of MAPR-06; a corresponding anomaly was found along TOBI track #1182, ca. 6 km further west, between 7°44' - 7°47'S. Note that some positive T anomalies do not coincide with changes in the LBSS data.

Turbidity signals at CTD and OFOS stations. Elevated turbidity signals in the water column were found on 17 stations (Table 5-3). A maximum turbidity of 0.133 V was found on station 1230 at a pressure of 2670 db corresponding to a maximum CH_4 concentration of 115 nM at a pressure of 2690 db. In general, there is an obvious correlation between methane concentrations and turbidity signals (Figure 5-18).

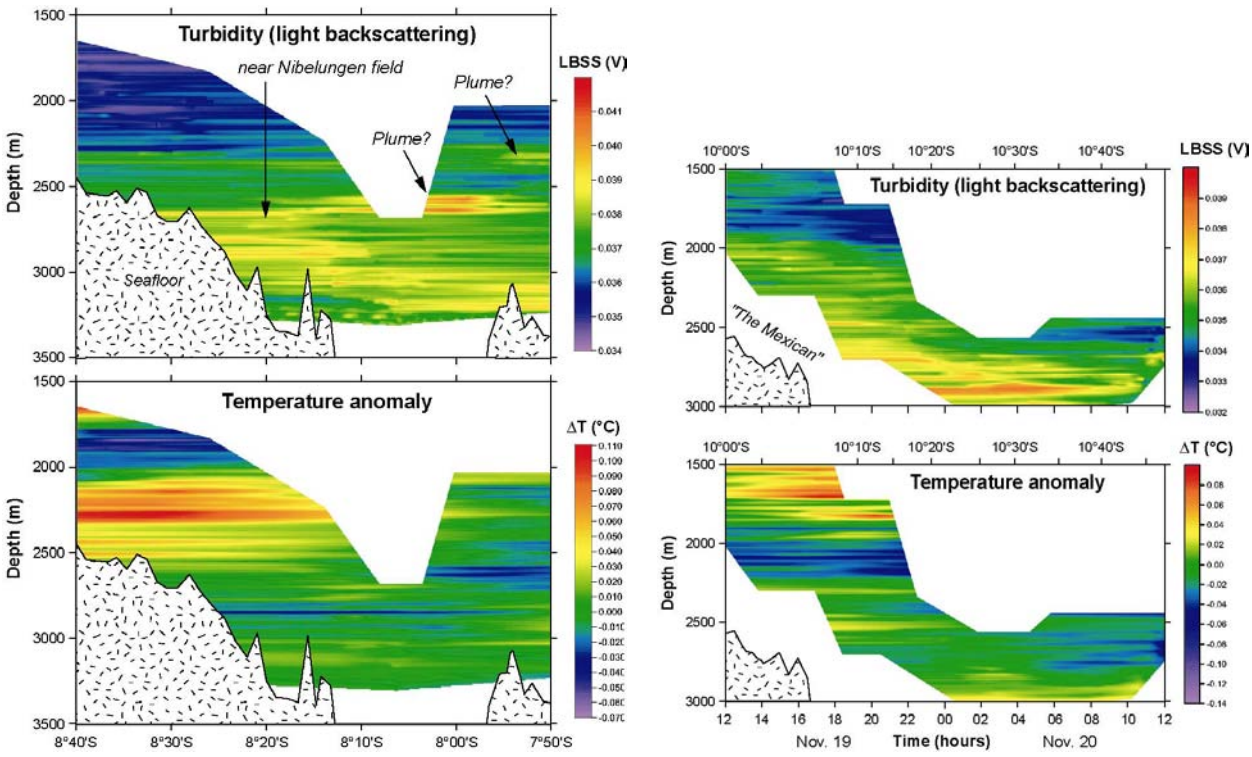

Figure 5-17: Left: Distribution of turbidity and T anomaly along TOBI track #1182 between 7°50'S and 8'40'S (Segment A1). Potential plume signals are apparent at 7°53'S and 8°00'S where increased turbidity correlates with a negative □T, but Figure 5-16 shows that these signal are not found at the same latitude during TOBI track #1185 ca. 6 km further to the east. Another potential plume signal, albeit more diffuse, was found near the Nibelungen field. Right: Distribution of turbidity and T anomaly along TOBI track #1182 between 10°00'S and 10'45'S (Segment A3) shows some areas with increased turbidity and T anomalies but little correlation between both.

Figure 5-19 shows an SW-NE transect based on nephelometric data from 7 CTD stations at the Nibelungen field. Major turbidities are found at pressures between 2600 and 2800 db with a maximum at station 1230. North of the main working area at the Nibelungen field, another strong turbidity signal was detected at station 1282 with a peak of 0.09 V at 3430 db pressure. This value is comparable to the maximum seen at station 1230 but is found considerably deeper suggesting a different source of turbidity. Another local turbidity maximum of 0.0136 V within station 1182 at a pressure of 1840 db could be related to still another particulate source.

Table 5-3: CTD and OFOS stations where elevated turbidity signals could be detected.

Station	Lat W	Long S	MAPR	Fixed	Max turbidity ΔNTU (V)	Pressure at max ΔNTU (db)
1224	8.300	13.533	12	next to CTD	0.0197	2715
1227	8.283	13.520	12	next to CTD	0.0219	2656
1228	8.300	13.523	12	next to CTD	0.0281	2739
1229	8.312	13.533	12	next to CTD	0.0172	2734
1230	8.300	13.513	12	next to CTD	0.1331	2668
1233	8.297	13.512	12	next to CTD	0.0175	2644
1234	8.298	13.508	12	next to CTD	0.0311	2700

1236	8.308	13.520	09	on OFOS	0.0478	2943
					0.0396	2637
					0.0267	2699
1238	8.305	13.515	12	next to CTD	0.0240	2728
1239	8.303	13.518	12	next to CTD	0.0372	2627
1257	8.300	13.508	12	next to CTD	0.0193	2666
1258	8.313	13.515	09	next to CTD	0.1267	2943
1265	8.307	13.508	12	next to CTD	0.0214	2846
1276	8.000	13.000	12	next to CTD	0.0150	2821
1279	8.310	13.508	12	next to CTD	0.0168	2662
1282	8.167	13.467	12	next to CTD	0.0136	1838
					0.0902	3428
1287	8.293	13.523	12	next to CTD	0.0211	2618
			06	50 m above Rosette	0.0226	2658
			08	100 m above Rosette	0.0214	2670
			09	150 m above Rosette	0.0156	2674
			13	200 m above Rosette	0.0322	2669
			29	250 m above Rosette	0.0153	2639

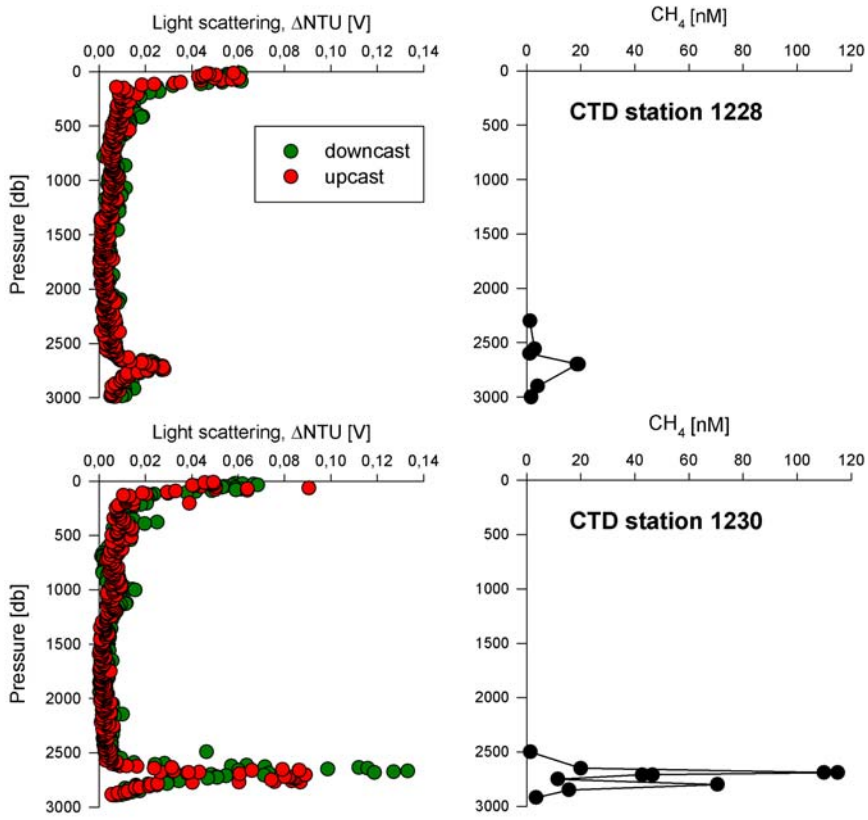

Figure 5-18: W-N transect resulting from 2 CTD stations. Turbidity measurements are compared to CH_4 concentrations. Green and red circles correspond to downcast and upcast values, respectively. Notice the striking correlation between peaks in turbidity and peaks in CH_4 concentration.

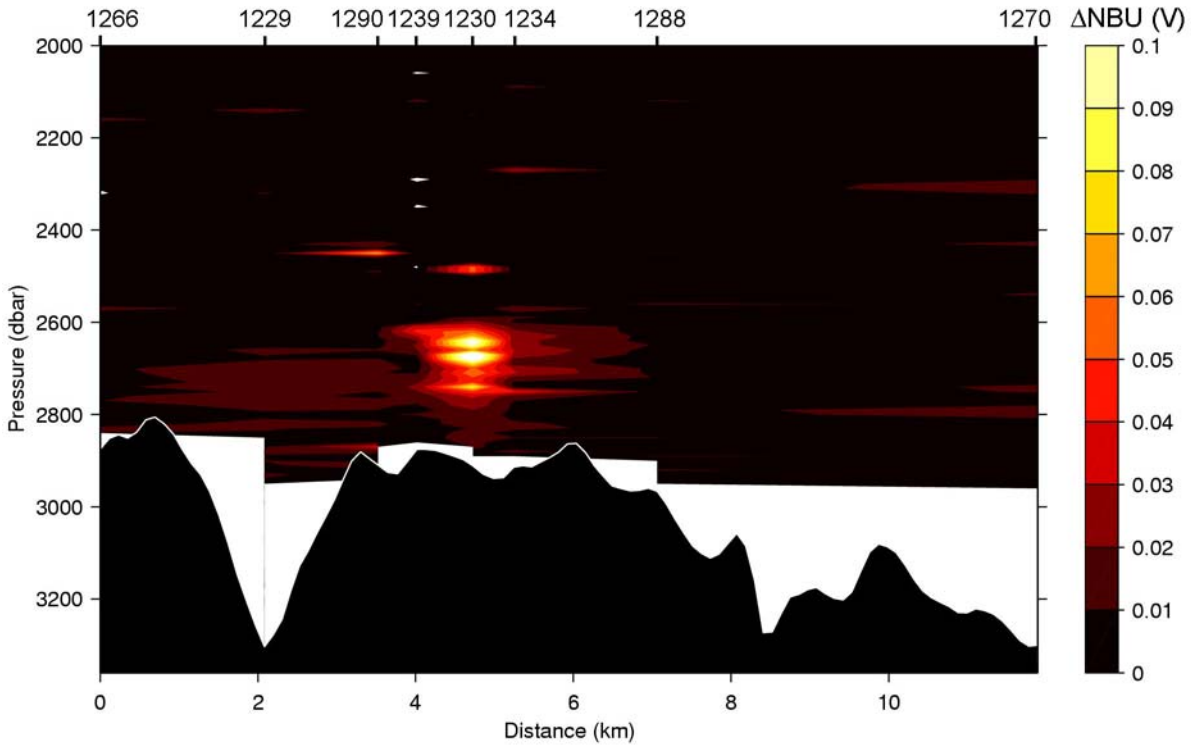

Figure 5-19: SW-NE transect near the Nibelungen field showing turbidity distribution as detected by MAPRs attached to the CTD rosette. Station numbers indicated on top.

5.4.5 CTD and LADCP

(M. Walter, C. Mertens and U. Stöber for the oceanography group)

The aims of the hydrographic work during Meteor cruise M62/5 were threefold: During leg M62/5A, the main goal was to identify possible target regions of hydrothermal activity in the area of research. During M62/5B, the temperature, salinity, turbidity and velocity field of the near field of the hydrothermal plume was mapped to describe the general hydrography in the target area and study the spreading of the plume. For the same purpose, water samples were taken for water and gas chemistry analysis (see section water chemistry). A hydrothermal plume in the local background stratification should be marked by negative anomalies in temperature and salinity as well as an increase in turbidity. In addition to the plume mapping, the temperature and density field as well as the vertical shear of the horizontal velocity field was analyzed to determine the strength and distribution of vertical mixing processes in the water column in the rift valley environment.

Instrumentation and Methods

CTD: During the M62/5 cruise a total of 72 conductivity-temperature-depth (CTD) cast were carried out using a Sea-Bird Electronics, Inc. SBE 911plus system additionally equipped with a SBE 43 dissolved oxygen sensor and a Wet Labs C-Star transmissometer. The CTD sensors were calibrated at Sea-Bird Electronics prior to the cruise in September 2004. The underwater unit was attached to a SBE 32 carousel water sampler with 22 Niskin bottles. Two bottles were left out for a lowered ADCP system, hence a maximum of 22 bottles was used. The complete

system worked properly throughout the entire cruise, except for the transmissometer that showed sporadic jumps and large differences between up and downcasts.

Salinity samples, typically four per cast, were analysed onboard using a Guildline Autosal 4 salinometer. After correcting the CTD measurements for a pressure, conductivity, and time dependence, the rms difference of 211 of the 255 samples was 0.0022 mS/cm for conductivity, corresponding to 0.0025 in salinity. Oxygen samples were analyzed with traditional Winkler titration. Here typically five samples were taken every other cast plus double samples on some stations. The oxygen sensor data were corrected for oxygen, pressure, and time dependence, resulting in an rms difference of 0.18 ml/l, for 162 of the 176 samples that were taken.

LADCP: All of the hydrographic stations with were accompanied by current measurements with a lowered acoustic Doppler current profiler (LADCP) system attached to the CTD and water sampling carousel. Two RDI 300 kHz Workhorse Monitor instruments were used in the setup in a synchronized Master-and-Slave mode, with the upward looking (SN 2161) as Slave and the downward looking (SN 1973) as Master. During six of the stations, only one (downward looking) instrument was used, because the other instrument was mounted on the ROV for navigation purposes. The instruments were powered by an external battery supply, consisting of 35 commercial quality 1.5V batteries assembled in a pressure resistant Aanderaa housing.
The system was set to a ping rate of 1 ping/s and a bin length (= vertical resolution) of 10 m when working in the Master-and-Slave mode and 12 m when only the single instrument was used.

An inverse method, which incorporates the bottom track velocities was used for the post processing of the raw data. This resulted in high quality velocity profiles, even for profiles with very weak current velocities (<0.05 m/s) and zero mean. The overall performance of the two instruments was very good; the range of each instrument was typically 150 m in the upper parts of the water column and 60 to 70 m at depth larger than 1500 m, with drops to 50 m where the water was particularly lacking in backscatterers, at depths larger than 3000 m. Thus, the total range of the package reached from 100 to 300 m. With lowering and heaving velocities of 1 m/s of the instrument package, this range amounted to 100 to over 200 shear estimates per depth bin in the deep water, and more in the shallow layers, depending on the abundance of backscatterers. For the casts with the single instrument, the reduction of range lead to a decrease of shear estimates per bin, but for depths shallower than 2000 m, the resulting current data were still of acceptable quality.
For two hydrographic profiles (1227 &1228), a loose plug in the battery unit lead to sea water leakage into the battery housing and subsequent data loss.Additionally, shipboard ADCP (75 kHz Ocean Surveyor) data were recorded. The configuration and calibration were identical to cruise leg M62/1.

First results
After the exploration of possible plume sites with CTD casts on the grounds of the TOBI and MAPR data from the first leg, the most promising signals in terms of turbidity, temperature variability, and most of all methane, were found in the non-transform fault area between

segments A1 and A2 (Figure 5-11). The hydrography as well as the velocity field in this target area shows considerable variability.

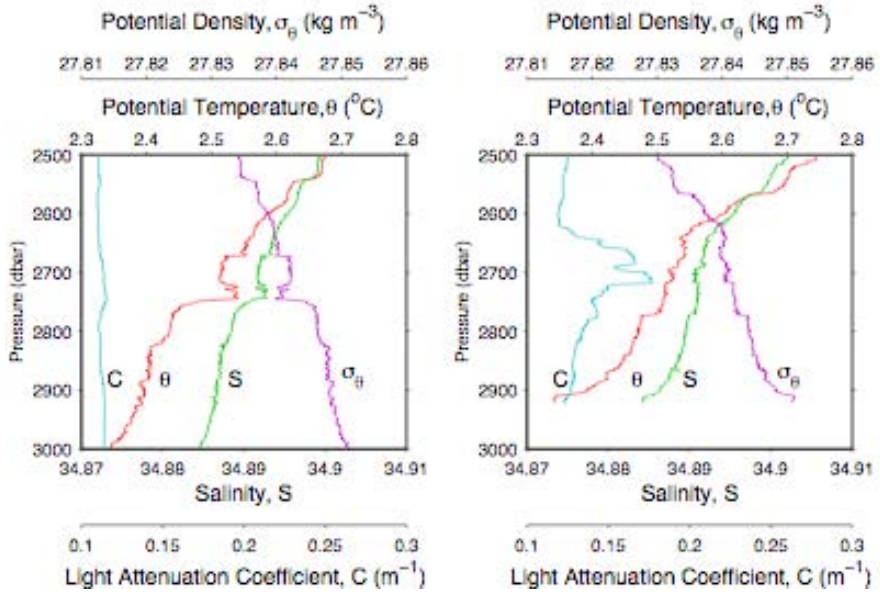

Figure 5-20: Profiles of potential density, temperature, light attenuation and salinity at CTD profiles 1227 (left) and 1230 (right).

Figure 5-20 shows two profiles, one (left) in the vicinity of the strongest plume signal (> 100 nmol/l in CH4), and one (right) directly at the location of this maximum signal. While profile 1227 exhibits only a modest increase in the light attenuation coefficient in the plume depth range between 2650 m and 2900 m, there is a strong signal in temperature and salinity which might be of hydrothermal origin, or caused by vertical mixing. Directly in the plume, however, there is a strong signal in the turbidity and only a somewhat heightened variability in T and S.

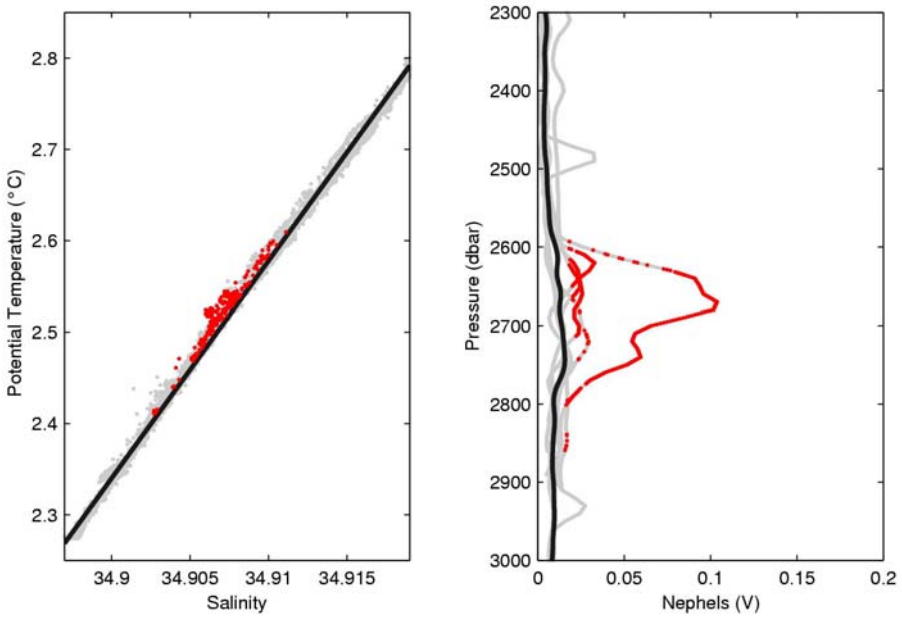

Figure 5-21: (left) T-S diagram from the target area. T-S anomalies in the plume depth range are shown in red, background in gray. (right) Turbidity in nephels of the same profiles.

A comparison of several profiles which showed the largest plume signatures in methane (Figure 5-21) shows that there seem to be some sort of correlation between strong signals in the turbidity and anomalies in the T-S relationship in this depth range. The magnitude of the temperature anomalies is in the order of 0.01 – 0.04°C. However, the variability in T and S between different CTD casts (even on very small temporal and spatial scales) is so large that it is very difficult to detect the plume on grounds of T and S alone: The T-S relation of all profiles in the target area is shown as the background in Figure 5-22, with the superimposed profile with the plume signature (1230), and a cast with almost no methane above background level taken at almost the same position (~150 m apart) two weeks later (1276). Throughout the water column below 2000 m, the water during the second cast was warmer and fresher than the original. This was caused either by advection of a different water body, or a vertical excursion of density surfaces, or a mixture of both. In any case, the apparent anomaly in T and S in the first profile falls exactly on the T-S relation of the second one, and both profiles are well in the range of the natural variability in this small area.

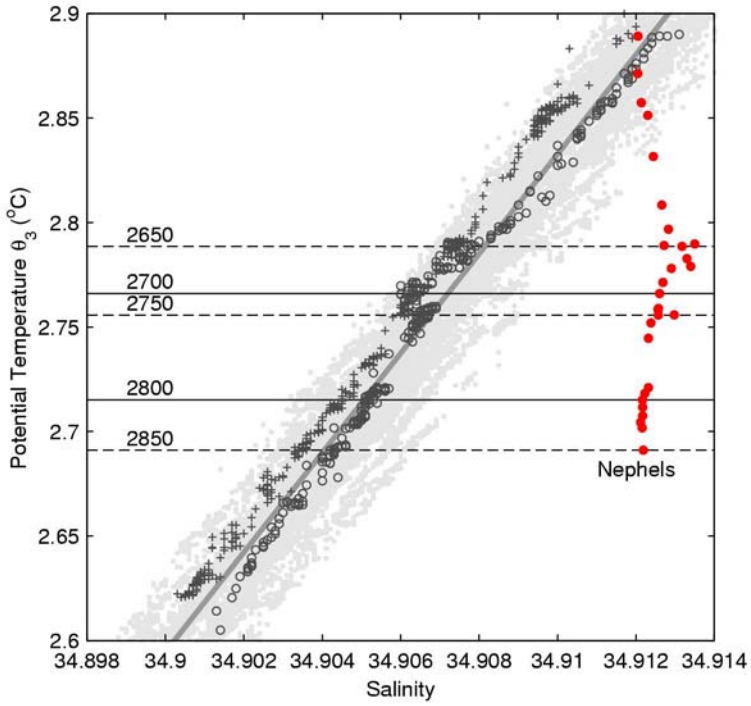

Figure 5-22: Potential Temperature vs. Salinity diagram. Light gray: background of all CTD stations; medium gray line: average T-S relationship; dark gray circles: CTD profile 1230; dark gray crosses: CTD profile 1276. Added are depth lines and scaled nephels (MAPR) plotted against temperature.

To study the temporal and small scale horizontal variability of the plume properties in more detail, 3 yoyo CTD casts (1257, 1265 & 1287) were performed in the target area while the ship drifted with up to 0.5 kn. Additionally, one cast (1279) was taken with the CTD constantly hanging at 2700 m depth, the core of the plume signal, for approximately two hours while drifting. These casts showed considerable variability on very short temporal scales.

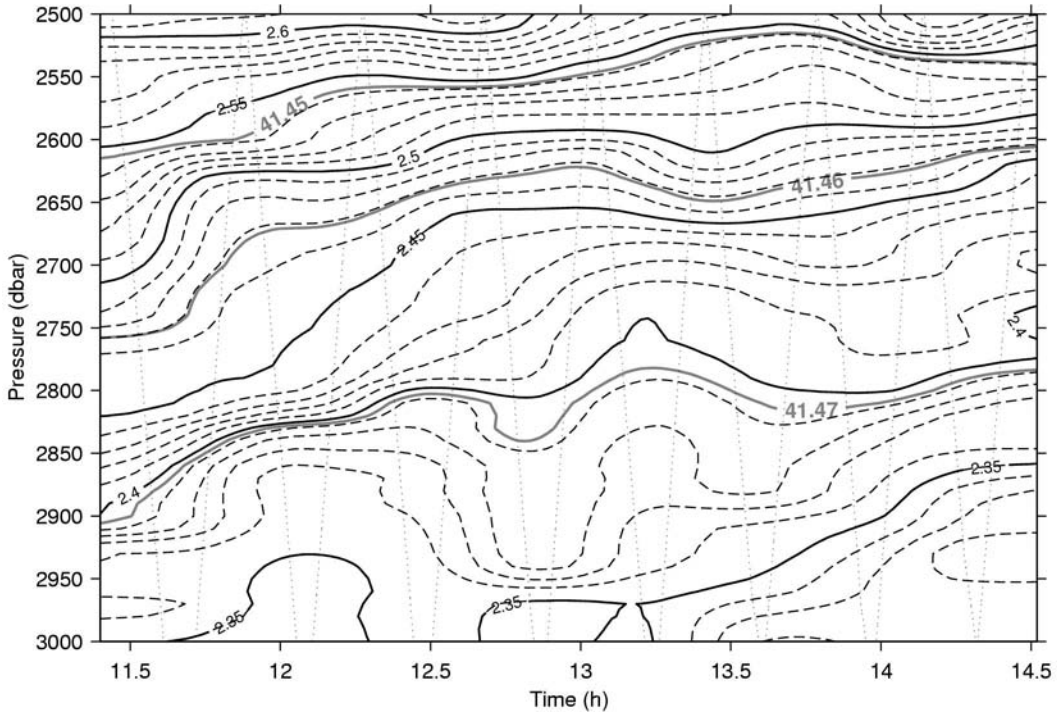

Figure 5-23: Temporal evolution of potential temperature in °C during the yoyo CTD cast 1287. Grey lines denote potential density relative to 3000 m (σ_3) in kg/m^3.

Figure 5-23 depicts the changes in potential temperature on cast 1287 over a time of 3 hours during which the ship drifted approximately 1 nm. Especially in the lower part of the plume, there is extreme variability in the depth of the isothermals, pointing towards strong internal wave activity above the complicated topography. Internal waves are triggered by a interaction of tidal or mean currents with the underlying topography, and can cause vertical excursions of density surfaces of tens to hundreds of meters, which is obviously the case at the yoyo site, where a step-like structure of the topography was observed. The breaking of internal waves causes enhanced turbulent mixing in the water column, and thus accelerates the eroding of an existing plume signal.

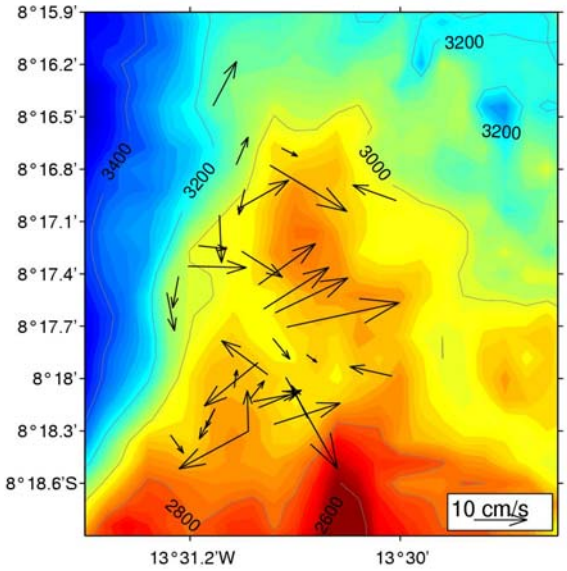

Figure 5-24: LADCP currents in the lowest depth bin above the seafloor.

Locating the source was hampered by this changes in the plume signal and by the complicated current structure in the area. The near-bottom currents as measured by the LADCP are shown in Figure 5-24. Again, the strong differences in speed and direction in small horizontal distances deem it likely that the local flow field is dominated by internal tides. For the short period of the hydrographic survey, no average flow direction could be detected in the target area.
Despite the failure to find the source of the hydrothermal signal in the water column, the horizontal spreading of the plume was satisfactory mapped in both along and across rift valley direction. Virtually no traces of elevated turbidity and methane were traced at the outer edges of the station grid, thus the calculation of inventories is possible.
To study the larger scale flow in the rift valley with the use of the LADCP measurements, velocities below 2000m along three sections are considered. Figure 5-25 shows the northernmost section at the southern exit of segment A1, which includes stations 1281-1286. Over most part of this section velocities are northward (positive) with strengths up to 10 cm/s around station 1283. Southward velocities reach only values of up to 3 cm/s and are mainly located in the eastern part of the valley below 2900m. From the velocities, transport below 2000m has been calculated to be 0.60 Sv (±0.16 Sv) in northward direction. The error of ±0.16 Sv has been determined by means of first order error propagation using an error of ±5 cm for the single velocity measurement. This relatively high deviation includes unknown properties such as tidal currents. In the same way transports and their corresponding errors have been calculated for sections farther south in the rift valley. Through the section along stations 1256, 1255, 1226, 1254, 1259, 1233 and 1234 a south-northeastward transport of 0.20 Sv (±0.10 Sv) has been found below 2000m. For the section along stations 1222, 1212, 1211, 1224, 1230 and 1231 the transport below 2000m is 0.36 Sv (±0.12 Sv) in northward direction. Within the error bars this means an increase of the transport along the rift valley towards the north.

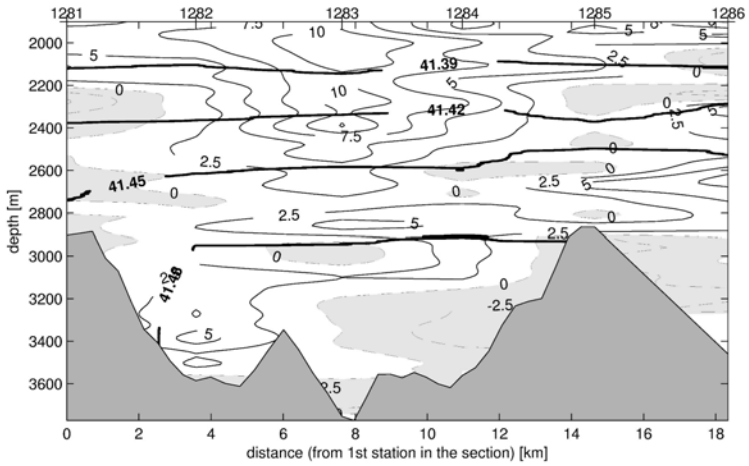

Figure 5-25: LADCP velocities in the rift valley at 8°10' S below 2000m. Velocities are given in cm/s. Contour interval is 2.5cm/s. Southward velocities are shaded. Strong solid lines indicate σ_3 contours. Profile numbers are given at the top.

5.4.6 Methane, Hydrogen and Helium

(O. Schmale, J. Sültenfuß, K. Stange, P. Wefers, T. Mosch, P.Günnewig)

Hydrothermal activity leads to an enrichment of several key tracers such as Mn, Fe, CH_4, H_2, He-isotopes and ^{222}Rn relative to the typical ocean deep waters. These tracers are used for the detection of hydrothermal plumes and the discovery of hydrothermal vent sites (Baker et al., 1995). The chemical compositions of these vent fluids is strongly influenced by the geological setting, geochemical reactions and biological activities at the sea floor and water column. On board analyses of methane were aimed on the enclosure and discovery of a new hydrothermal vent site. The measurements of dissolved hydrogen and the offshore analyses of C1-C4 hydrocarbons as well as the stable carbon isotopic signature in methane will help to identify the methane generating processes (thermogenic, biogenic, basalt degassing and serpentinization).

Abiotic methane with high $^{13}C/^{12}C$ ratios was originally found in association with ^{3}He emanating from fast spreading ridges, and it was thought that this methane was released from basalts as they cooled and cracked. However, methane plumes have been subsequently discovered in slow spreading centers such as the Mid-Atlantic Ridge (MAR) that are not associated with ^{3}He or manganese. It appears that this methane is produced by serpentinization of ultra-mafic rocks brought up by extensional tectonics and that this process may supplement the supply of abiotic methane due to basalt degassing. A goal of this project is to estimate the flux of methane coming from the MAR and to assess how much of the flux may be because of the serpentinization process. We attempt to do this from a combination of tracers, such as ^{3}He, CH_4 and Rn, in association with current measurements within the rift valley.

The primodial components of helium isotopes are ideal tracers for large scale distribution of vent fluids in the water column also in the South Atlantic (Rüth et al. 2000). Samples of this cruise should provide a picture of a more regional distribution of dispersing vent fluids in the water column leading to an estimate of its volume. $CH_4/^{3}He$ ratios separate CH_4 of hydrothermal fluids from other sources. The short scale aging of the hydrothermal plume can be determined by evaluating the $^{222}Rn/^{3}He$ ratio in the plume as it disperses (Kadko et al., 1990). A correlation between plume age and methane concentration can be used to estimate microbial methane oxidation rates in the plume related water mass.

In addition from these main goals we used the transit times between Recife-Ascension and Ascension-Walvis Bay for continues measurements of methane in surface water and in the atmosphere. The present results will help to evaluate the contribution of the Atlantic ocean as a methane source or sink to the atmosphere. These investigations will help to enlarge the rather incomplete dataset for this region.

Methane measurements of the surface water and the overlaying atmosphere

The methane concentration of the surface water and the overlying air was continuously measured during the two transits between Recife-Ascension and Ascension-Walvis Bay. A total of 877 water samples and 357 air samples were taken during the M62/5 cruise. A semi-continuous seawater-air equilibrator system based on gas chromatography was used. Technical describtion and physical principles of this equilibrator are described in detail elsewhere (Rehder and Suess, 2001). Surface waters were pumped at high flow rate from 5 m water depth through a tubing system, which was exclusively installed for this purpose to avoid contaminations from the ship

seawater system. The sea surface temperature, conductivity and pressure were recorded at the same time using the Thermosalinograph. For a later temperature correction between surface water and equilibrator, the water temperature inside the equilibration vessel was measured continuously (Thermometer P650, Dosmann). The air samples were sucked in at the front of the ship. Meteorological data, such as wind speed, temperature, wind direction, air pressure and relative humidity, were provided by the DWD (Deutscher Wetterdienst) weather station. We will calculate the flux of methane based on the sea-air gas exchange models of Liss and Merlivat (1986) and Wanninkhof (1992).

Measurements of dissolved gas species in the water column

A number of 71 CTD (Table 5-4) and 7 ROV (Table 5-5) stations were performed for the investigations of dissolved gases in the water column. Water samples were obtained by the use of a CTD/Rosette system equipped with 22 *10l Niskin bottles. For the recovery of water samples during the ROV dives we used 3 5l Nisikin (MPI Bremen) bottles which were mounted at the front of the ROV drawer. The CH_4, H_2, ^{222}Rn and O_2 concentration were analysed on board while samples for $\delta^{13}C$, CH_4, He-isotopes and the concentrations of higher dissolved hydrocarbons (C1-C4) were taken for analyses in home laboratories.

Water column methane measurements

For CH_4 analysis aboard, a modification of the vacuum degassing method described by Lammers and Suess (1994) was used (Rehder et al., 1999). 1600 ml of water were injected into pre-evacuated 2200 ml glass bottles, which leads to almost quantitative degassing. The gas phase was subsequently recompressed to atmospheric pressure and the CH4 concentration of the extracted gas was determined by gas chromatography. 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.

Samples for the determination of dissolved H_2 were obtained by the above mentioned degassing method. The H_2 concentration of the extracted gas was determined using a gaschromatograph (TRACE Ultra, Thermo Electron) equipped with HaySep Q, HaySep N and Molecular Sieve 5A columns. The eluted gas was detected via PDD (pulsed discharge detector).

Subsamples were taken from each gas sample for further measurements in home laboratories. These analyses will include the determination of C1-C4 hydrocarbons and the stable carbon isotopic signature in methane. These subsamples were sampled into pre-evacuated crim cap glass vials sealed with a butyl rubber septum. 2 ml of degassed milipore water, poisoned with mercury chloride, was added into each vial and the sample stored upside down to protect it for contamination from atmospheric gases during the storage.

He measurements

For measurements of the He concentrations and isotopic signature, water samples were taken from Niskin bottles of the rosette and the ROV and sealed head space free and gastight in copper tubes (sample volume 40 ml). Special containers for sampling fluid on a vent are tested for handling by the ROV pilots. The sampling containers can keep a pressure of more than $3 \cdot 10^7$ 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. The sample preparation includes gas extraction in a controlled high vacuum system. He and Ne are separated from permanent gases in a cyro system at 25 K. A split of the sample is analysed for ^{4}He, ^{20}Ne and ^{22}Ne with a quadrupole mass spectrometer. At 14 K He is separated from Ne and released into the sector field mass spectrometer for analysis of ^{3}He and ^{4}He. The facility achieves about ± 0.2 % precision for $^{3}He/^{4}He$ ratios, and ± 0.5 % or better for helium and neon concentrations (for details see Sültenfuß et al. 2004).

^{222}Rn measurements

Water samples for ^{222}Rn measurements were taken in the near plume area by using 10 and 5 liter Niskin bottles of the CTD/Rosette and the ROV respectively. Samples were filled into 1 liter PE-bottles and the analyte was extracted into a water-immiscible scintillation cocktail (MaxiLight). The sample were shaken 1.5 hours and the organic phase was transferred into low diffusive LS-vial which was stored for isotope equilibration for three hours. For ship board analyses a portable, single tube LS-counter (Triathler) was used. Samples were counted for six hours. Final calibration of the procedure and calculation of specific activities will be performed in the home lab.

Oxygen measurements

The oxygen concentration in the water column was measured using the Seabird oxygen sensor (SBE 43). For the calibration of the oxygen sensor representative water samples were taken and the oxygen concentration analyzed in addition by the method developed by Winckler as described in Grasshoff et al. (1997).

Measurements of trace metal speciations and concentrations

For speciation and trace metal concentration analyses a number of 368 water samples were taken during 42 CTD and 7 ROV stations. The samples were filled directly into 250 or 50 ml PE-bottles and fixed with HCL. Offshore analyses, will be performed by the IU Bremen (Fachbereich Geosciences and Astrophysics) using the electrochemical method of voltammetry.

Table 5-4: Water sample list for CTD-stations

Station	Profile	Long. S	Lat. W.	CH4	$\delta^{13}CH4$	He	H2	^{222}Rn	O2	Mn
1181	001	13°26.18	7°52.89	20	20	18			21	
1184	002	13°8.39	10°30.07	21	21	7		1	21	18
1204	003	13°36.4	8°26.46	3	3				4	
1205	004	13°33.35	8°27.43	4	4				4	
1206	005	13°34.55	8°30.31	3	3				4	
1207	006	13°36.71	8°26.36	3	3				4	
1208	007	13°30.22	8°47.51	3	3					
1209	008	13°30.53	8°48.79	3	3					
1210	009	13°29.52	8°49.2	4	4					

1211	010	13°34.42	8°17.97	5	5				6	
1212	011	13°36.02	8°18.03	6	6	2			2	
1213	012	13°34.54	8°20.27	6	6					
1214	013	13°34.53	8°20.73	5	5					
1215	014	13°34.47	8°19.94	6	6					
1216	015	13°34.18	8°20.22	6	6	4				6
1217	016	13°34.8	8°20.2	6	6	4				
1219	017	13°18.07	9°13.2	5	5	5			6	
1220	018	13°17.97	9°13.84	5	5	5				4
1221	019	13°17.26	9°13.76	4	4	4				
1222	020	13°38.08	8°18.01	6	6	5			5	
1223	021	13°35.04	8°19.01	5	5	5			4	
1224	022	13°32.01	8°18	7	7	6				
1225	023	13°34.07	8°17	7	7	7				
1226	024	13°34.02	8°15.99	6	6	4			4	5
1227	025	13°31.21	8°16.97	10	10	8			6	10
1228	026	13°31.43	8°17.97	9	9	8				
1229	027	13°32.02	8°18.68	8	8	7			5	8
1230	028	13°30.77	8°17.98	11	11	9				11
1231	029	13°30.09	8°18	4	4	4			4	4
1233	030	13°30.74	8°17.78	7	7	6				7
1234	031	13°30.52	8°17.85	7	7	7			4	7
1237	032	13°30.54	8°18.22	9	9	8			4	9
1238	033	13°30.94	8°18.29	8	8	7				8
1239	034	13°31.08	8°18.21	12	12	12				12
1240	035	13°29.22	8°19.51	16	16	13				13
1243	036	13°8.73	9°44.08	10	10			1	4	8
1244	037	13°6.76	9°42.25	8	8				3	
1245	038	13°9.82	9°41.12	10	10				4	
1246	039	13°10.94	9°38.27	7	7				4	
1247	040	13°49.9	9°35.5	5	5	5				5
1248	041	13°12.69	9°34.94	3	3				3	
1249	042	13°13.97	9°34.93	5	5				3	
1253	043	13°31.92	8°17.21	19	19	12	4		5	6
1254	044	13°32.87	8°16.58	19	19	10	4			6
1255	045	13°35.14	8°15.24	17	17	10	4		6	6
1256	046	13°36.12	8°14.84	16	16	10	4			6
1257	047	13°30.49	8°18.04	20	20	20	5	3		20
1259	048	13°31.91	8°17.2	13	13	10	3		4	6
1260	049	13°31.93	8°16.6	15	15	8	2			6
1261	050	13°31.9	8°15.25	19	19	10	3			6
1262	051	13°31.91	8°14.81	18	18	11	3		4	6
1265	052	13°30.52	8°18.46	18	18	17	3	3		18
1266	053	13°32.28	8°19.78	11	11	8	2			5

Station	Profile	Long. S	Lat. W.	CH4	δ^{13}CH4	He	H2	^{222}Rn	O2	Mn
1267	054	13°31.2	8°19.05	14	14	9	4		5	5
1269	055	13°29.99	8°15.99	16	16	8	3		6	6
1270	056	13°28.29	8°15.02	17	17	8	2			6
1271	057	13°27.12	8°16.4	14	14	8	4		6	5
1273	058	13°32.05	8°12.73	14	14	10	2			8
1274	059	13°34.68	8°12.73	12	12	5	3		5	6
1275	060	13°33.4	8°14.31	14	14	7	2			4
1276	061	13°30.82	8°17.91	15	15	5	4		3	6
1279	062	13°30.52	8°18.56	21	21	14	3	3		21
1281	063	13°30.07	8°9.96	13	13	10	3		5	6
1282	064	13°28.04	8°10	13	13	10	3			
1283	065	13°25.84	8°9.98	17	17	12	3		5	6
1284	066	13°24.03	8°9.97	17	17	15	4			
1285	067	13°21.99	8°9.98	16	16	11	4			
1286	068	13°19.99	8°9.95	16	16	9	4		4	3
1287	069	13°31.4	8°17.6	21	21	21	5			21
1289	070	13°30.03	8°17.01	15	15	10	3		6	10
1290	071	13°31.33	8°18.22	14	14	8	5		6	10

Table 5-5: Water sample list for ROV-stations

Station	ROV	CH4	δ^{13}CH4	He	H2	^{222}Rn	O2	Mn
1252	028	3	3	3	3	1		3
1268	030	3	3	3	2	1		3
1272	031	3	3	3	3	1		3
1280	032	3	3	3	3	2		3
1288	033	2	2	4	2	1		3
1291	034	2	2	2	2			2
1296	035	3	3	3	3	3		3

Results

Targets for water column investigations were chosen on the base of TOBI images, MAPR and CTD anomalies observed on side scan sonar tracks during M62/5A. Only a few CTD casts provided clear indications of hydrothermal plumes (temperature, salinity and transmission anomalies). Therefore online information for the selection of water samples were not available during most hydrocasts. In addition backscattering and temperature were recorded using a MAPR (Miniature Autonomous Plume Recorder) mounted on the CTD frame. MAPRs provide no online information but were useful for a later correlation between light backscattering and concentrations of dissolved methane (see chapter 5.4.5).

Water column investigations were carried out along the ridge axis between Ascension and the Bode Verde fracture zones. Low concentrations of methane have been found in segment A3 and A4 (between 0.3 and 0.8 nM). We observed elevated methane concentrations in the entire rift valley located in segment A1 and in the northern part of A2. Highest concentrations of methane (up to 115 nM at station 1230, see Figure 5-26 and 5-27) have been found at the border between segment A1 and A2 which is indicated by a non transform fault. This site is located at the northern end of a N-S striking ridge and forms a bay called "Cheating Bay" which is open to the NW (see chapter 5.4.2). A near bottom water sample taken with the ROV in this area show CH_4 concentrations of 26.7 nM (station 1268).

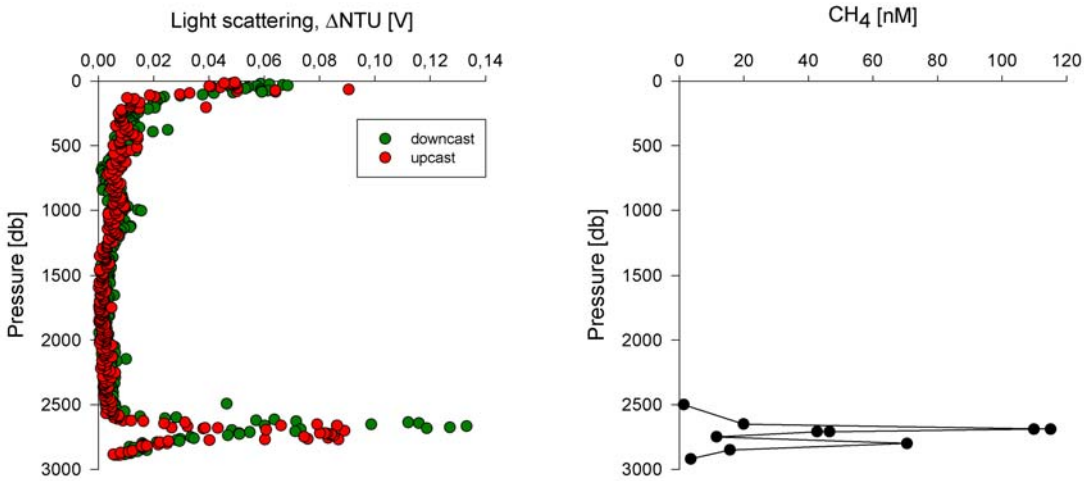

Figure 5-26: Light backscattering and methane concentrations of station 1230.

However, results for concentrations of dissolved methane obtained from later water column investigations in the "Cheating Bay" show temporal variation. Hydrocast 61 (station 1276) which was taken on nearly the same position as station 1230 revealed only slightly enriched methane concentrations of around 6 nM in 2700 m water depth compared to previous investigations. These temporal variations can also be seen on the MAPR profiles (see chapter 5.4.5).

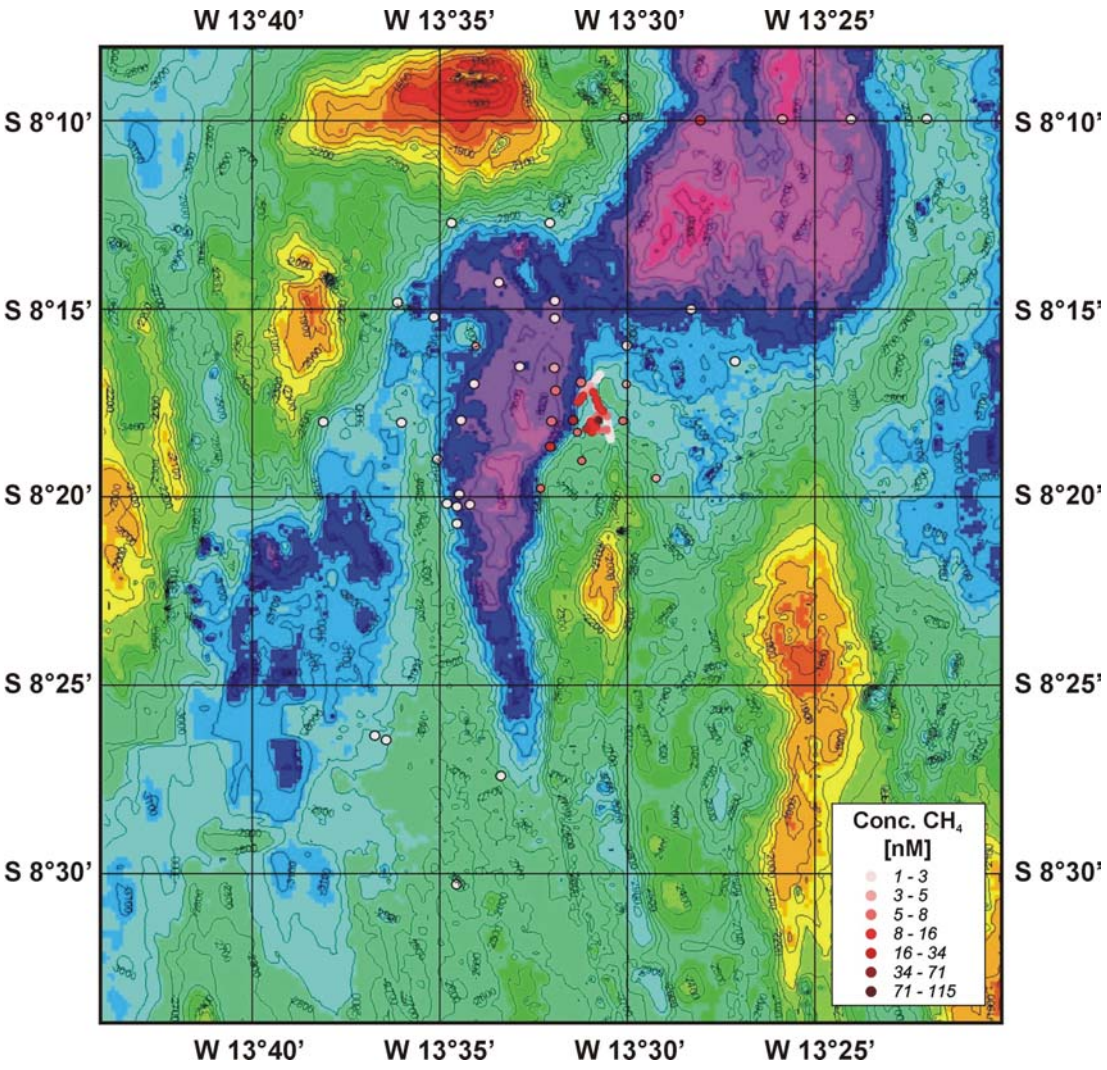

Figure 5-27: CTD positions and there concentration maxima of dissolved methane

For most methane profiles of this region, we could observe two methane maxima in around 2700 and 2800 m water depth (e.g. station 1230 Figure 5-26 and 5-29). These maxima appear in the same depth as the light backscattering maxima recorded by the MAPR and can be interpreted as two different methane sources located in different depth. Station 1282 revealed a distinct concentration maxima of 9.7 nM at 1880 m (Figure 5-28) indicating an additional source located at the western slop of the rift valley.

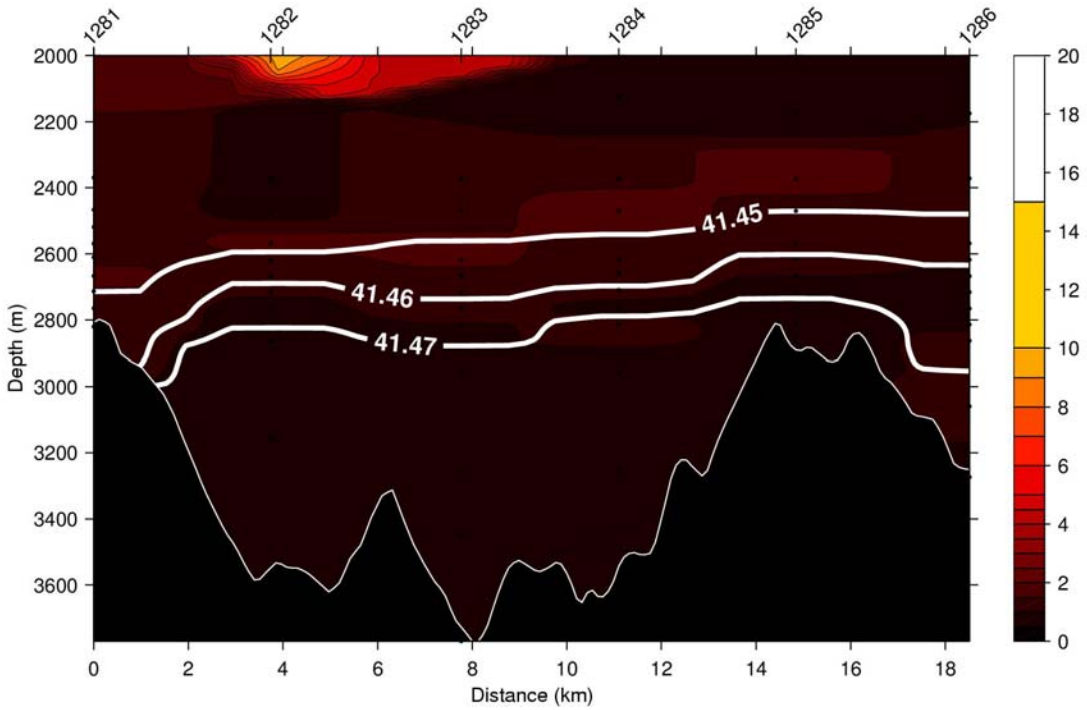

Figure 5-28: Section 1, CH4 concentration [nM] and density [σ3]

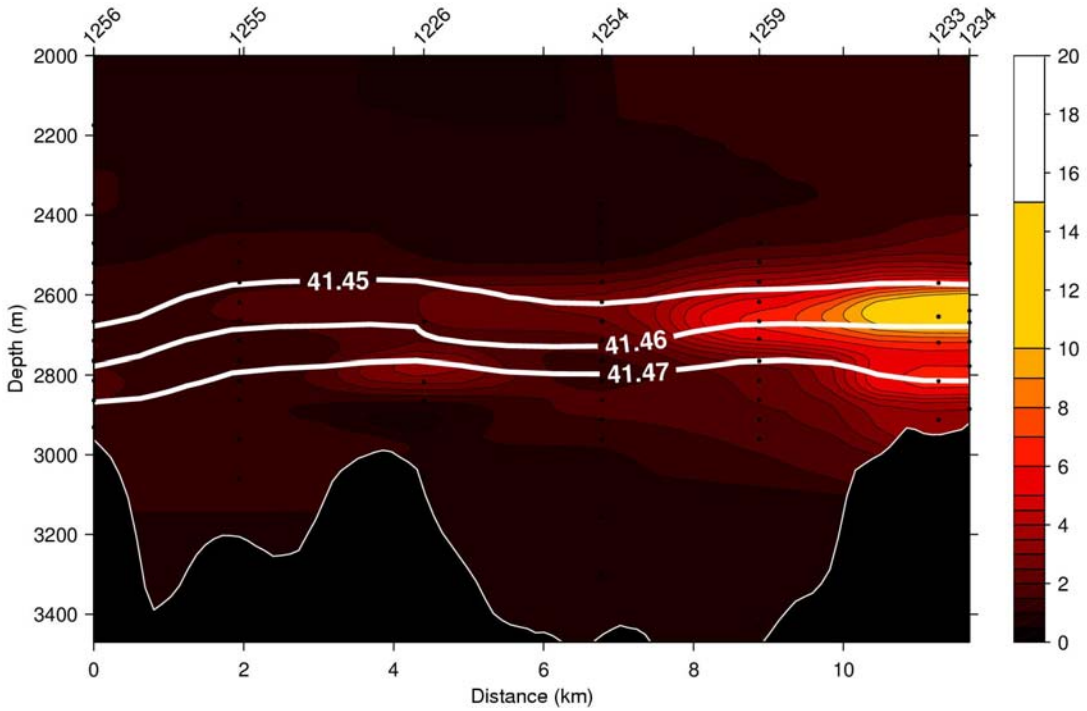

Figure 5-29 Section 2, CH4 concentration [nM] and density [σ3]

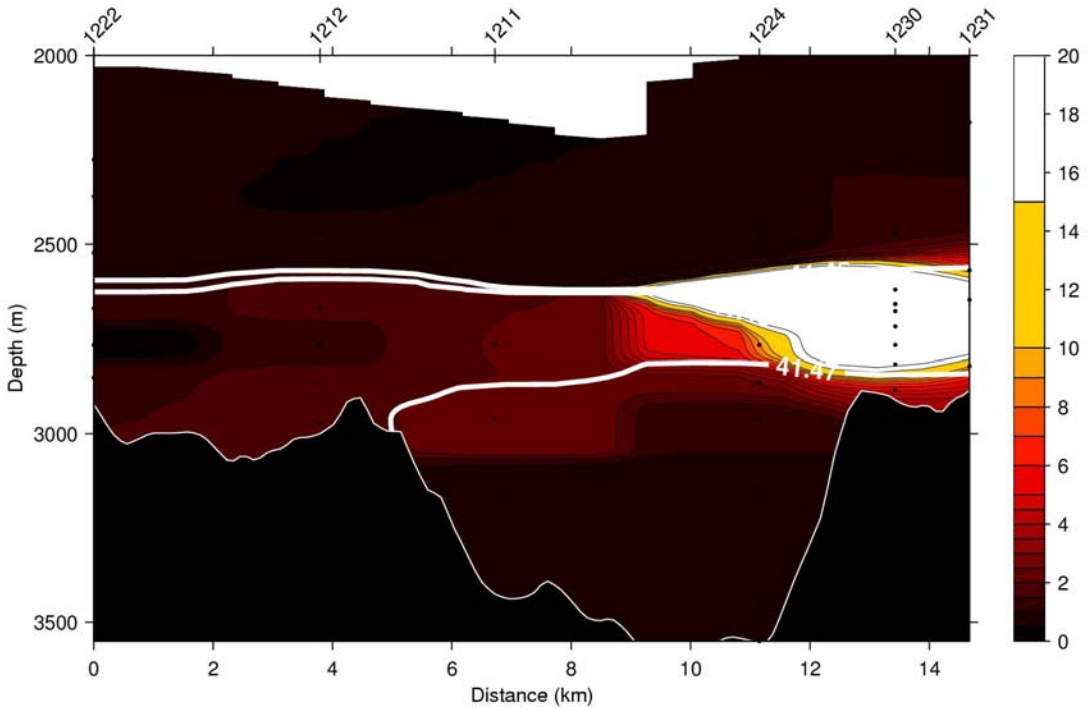

Figure 5-30: Section 3, CH4 concentration [nM] and density [σ3]

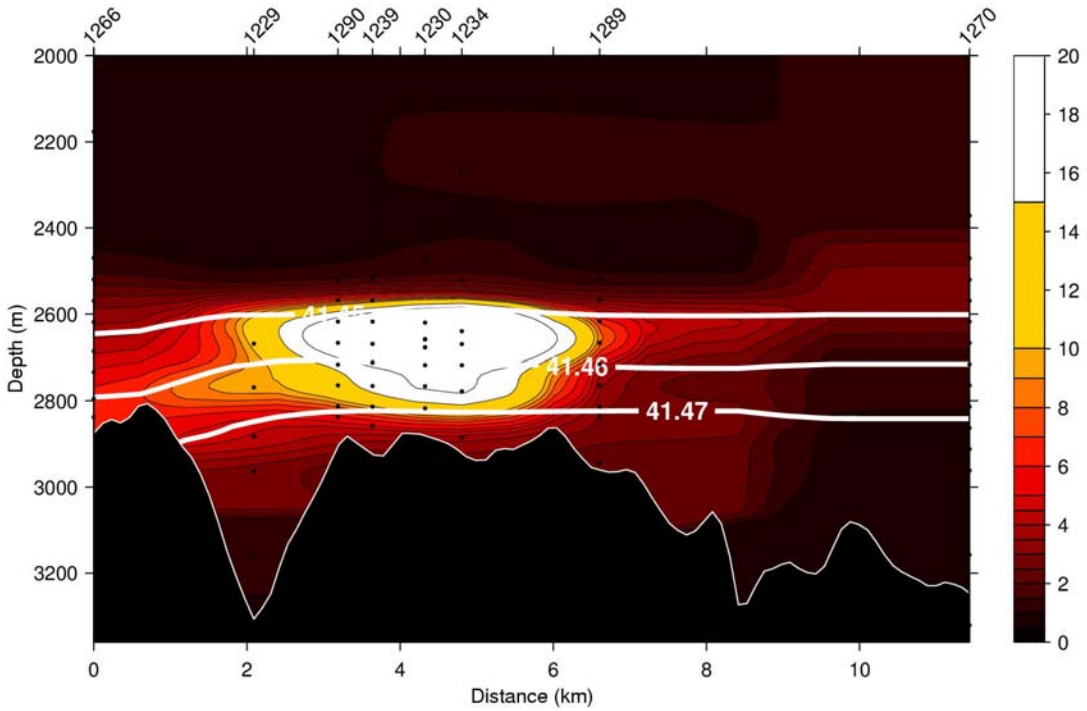

Figure 5-31: Section 4, CH4 concentration [nM] and density [σ3]

5.4.7 Ecofaunist Studies

(Jens Stecher, Abigail Knee, Frank Zielinski)

Observations were conducted via the Remotely Operated Vehicle (ROV) Quest (University of Bremen, Marum) and the Ocean Floor Observation System (OFOS, IFM-GEOMAR, Kiel). The ROV observations were made using a LWL-cable with three video cameras and a high-resolution digital still camera. The angle of observation was 84˚ with a maximum view of 15 m. Over the course of nine ROV tracks, bottom time totaled 75 h 40 min.

The OFOS observations were made with a PAL black and white video camera, communicating images via coaxial cable. Additionally, a DV-camcorder was installed and configured to record two-second video sequences every 30s. For detailed faunal mapping, a 35 mm analog still camera equipped with an underwater housing and water-corrected lens was used. These still photographs were not processed prior to this report and are thus not included in the preliminary results. During OFOS tracks, total bottom time was nine hours 43 min. The camera altitude for observations by both ROV and OFOS was held between 1.5 m and 3 m.

Twelve tracks surveyed the main study area—a large basin named Cheating Bay and two plateaus in its northwest corner. An additional western track followed the basin's adjacent rift valley.

Results and Discussion

Over the course of all ROV and OFOS tracks, a grand total of 85 h 23 min resulted in 1593 faunal records spanning 22 taxa. The dominant taxa are holothurians (n = 720), gorgonians (n = 303), deep-sea shrimp (n =223), and fish (n = 118). With 1364 counts, these taxa represent 85.6% of the total observed fauna (Table 5-6). As each track's bottom time differed, their total observations were divided into 15 min intervals for comparison.

Table 5-6: Total observations during of OFOS and ROV dives on M62/5B.

Taxa / Station observation time	OFOS 1236	ROV 1242	ROV 1252	OFOS 1258	ROV 1263	OFOS 1264	ROV 1268	ROV 1272	OFOS 1277	ROV 1280	ROV 1288	ROV 1291	ROV 1296	Total
PORIFERA				1				1		2	8	7	8	27
CNIDARIA														
Hydromedusa	6						2				2	2	4	16
Polyp				2		1				1	1			5
ANTHOZOA														
Gorgonaria (stalked)	1	7	17	15	1	2	11	6	8	59	106	22	48	**303**
branched		1								6	1	1	1	10
dead				1		4	1	2	1	1	5	4	1	20
Pennatularia										1		1		2
Actinaria			1	1			3	1	1	10	9	7	1	34
Cerianthidae				2						2	1	1		6
CTENOPHORA					1					3				4
PLATHELMINTHES		2	2								1			5
ANNELIDA														0
Polychaeta													1	1
tubes			1										2	3
MOLLUSCA														0
Cirroteuthidae										1		1	1	3
CRUSTACEA														0
Shrimps		2	3	2	2	1	7	19		74	24	52	37	**223**
ECHINODERMATA														0
Ophiuroida				1		1		1	1	5			1	10
Asteroida									1			1		2
Holothurida		16	51	9	2	4	37	7	3	219	153	196	23	**720**
Crinoida				1						5	5	1	3	15
Brisingida				1				1		9	5	2	3	21
CHORDATA														0
Bythitidae							2				10	5	22	39
Macrouridae										1	3	4	1	9
Chaunacidae										2				2
Chimaeridae										1				1
"Fish" total							8	5		37	20	17	31	**118**

In general, Cheating Bay is dominated by holothurians (Fig. 5-32). Two exceptions, as seen in tracks ROV 1272 and ROV 1288, are correlated with special morphological structures. Whereas each other track covered a varying terrain, the ROV 1272 track was limited to the southeast depression of Cheating Bay. Particular to this spatial feature, holothurian dominance is replaced by that of shrimp. The second exception is exhibited in track ROV 1288, where both gorgonians and holothurians are dominant on the face of a steep cliff.

Within Cheating Bay, fauna is associated with two distinct morphological structures: the cliff face dropping down to the rift valley and the steep slopes of channels oriented in a southeast-northwest direction (see faunal "hotspots" in Fig. 5-33). On the cliff face, the diversity of fauna is greatest. The high abundance of sponges (Porifera), corals (Gorgonaria), sea feathers (Pennatularia), asterid seastar (Bresingida), and sea lilies (Crinoida) is apparent. These fauna are especially present in localities where increased turbidity and particulate flow indicate deep-water upwelling from the rift valley. Across the plateau east of the cliff, the degree of holothurian dominance increases. In fact, despite their relative low numbers on the cliff face, holothurians form the characteristic taxon of Cheating Bay.

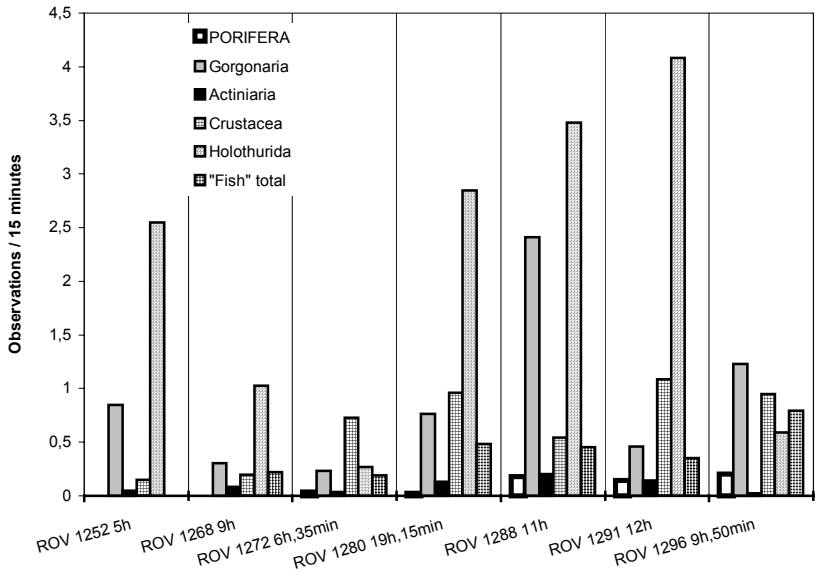

Figure 5-32: Observations in 15 minutes intervals of selected ROV stations during M62/5B cruise.

Channels crossing Cheating Bay exhibit a shift in the faunal composition from that of the cliff. While the steep slopes of these channels display similar taxa, the abundance and diversity of fishes increase. The bythitid (Bythitidae) and grenadier (Macrouidae) fish are quite common within the channels. Additionally, a few anglerfish (Chaunacidae) and chimera (Chimaeridae) individuals are present.

In addition to these living fauna, shells of Thecosomata are widespread in sediment ripples throughout Cheating Bay. Particularly, a large thecosomatan gastropod shell field extends across the basin's northern boundary. This shelly expanse, averaging 25 cm thick, covers an area 60 m

by 25 m at the base of a steep slope. The shells are well-sorted, and belong to one size class. All sampled species are pelagic members of the family Cavoliniidae. The dominant species found in the shell field is *Cavolinia tridentata* (Forskal in Niebuhr 1775), with fewer specimens of *Cavolinia* c.f *globulosa* (Gray 1850) also present. Additionally *Diacria trispinosa* (Blainville 1821), *C.* c.f *globulosa*, and *Cuvierina columnella* (Rang 1827) are identified from other, less-concentrated shell deposits within the study area. All these species are cosmopolitan and quite abundant between 50°N and 40°S. They live at water depths ranging from the surface down to 2000 m. As Thecosomata are known to have massive die-offs in the deep sea, the hydrodynamic conditions of Cheating Bay appears to have deposited these shells in a sink-like manner.

The decision to extend the seafloor exploration westward into the rift valley was founded upon faunal distribution patterns. Increased observations of suspension-feeding gorgonians indicate an upwelling nutrient supply. Two terraced plateaus in the rift valley were examined: a strongly sedimented larger plateau and a shallower plateau 200 m above the first. Unlike the sediments of Cheating Bay, the unrippled surface of the larger plateau is not dominated by holothurians. Instead, fish and shrimp constitute the main observations. Great talus blocks host a diverse fauna, including sponges, sea anemones (Actiniaria), gorgonians, asterid seastars, and polychaete worm tubes. The pelagic fauna consists of bythitid fish, deep-sea shrimp, hydromedusae, and a single observed deep-water octopus (Cirroteuthidae). Upon ascent to the shallower plateau, holothurian and gorgonian abundances increase. Crinoids and sponges are regularly observed but in relatively low abundances. Geologically, this plateau exhibits yellow sediments and pieces of carbonate upon a mostly talus slope. Polychaete tubes can be seen within the sediment. As a whole, this rift valley west of Cheating Bay displays no taxonomic dominance. The tendency of increased numbers of observed gorgonians and fish, coupled with the marked decrease in holothurian abundance, results in an even representation of all major taxa.

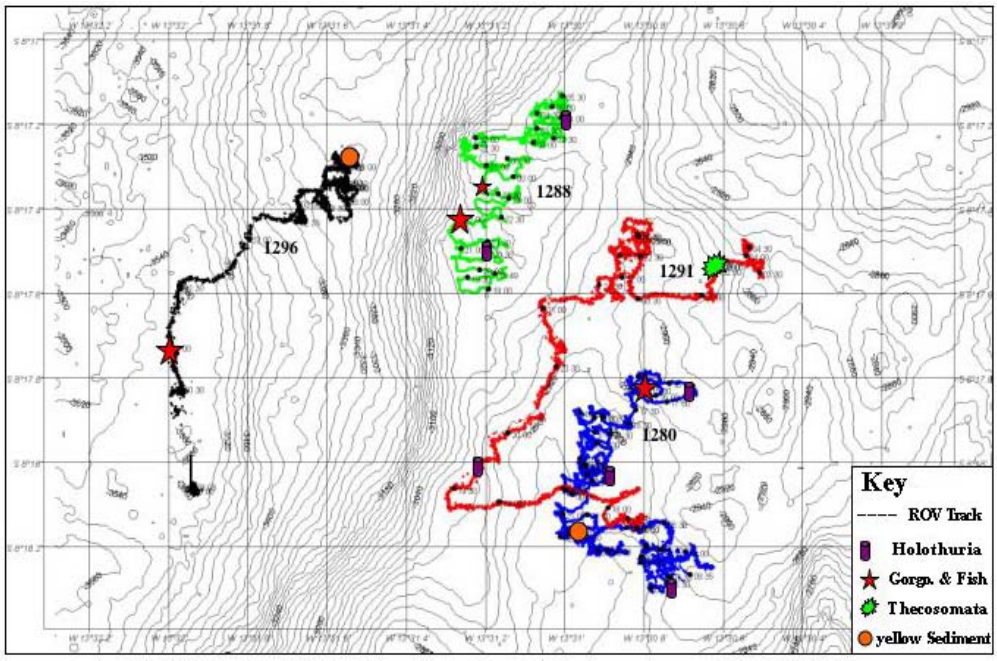

Figure 5-33: Faunal "Hot Spots" during M62/5B cruise.

Conclusions

Typical vent fauna was not observed during M62/5B. However some taxa found in Cheating Bay are well known from the periphery of hydrothermal vents (Cerianthidae, Brachiopoda, Macrouridae, Bythitidae, Chimaeridae). Echinoderma, with six taxa, represents the most diverse group in this study area. Additionally, 1364 counts of holothurians, gorgonians, deep-sea shrimp, and fish account for 85.6% of the fauna. These few groups employ different feeding strategies: grazers, suspension feeders, pipettors, and predators. Therefore, with respect to the typical deep sea, our research area hosts a high ecofaunistic diversity. The highest diversity is found in regions where deep water wells up from the rift valley, as well as in the rift valley itself. Within this valley, no taxon exhibits clear dominance. The well-sorted Thecosomata shell field poses the question of the hydrodynamic conditions of Cheating Bay. In addition to understand the nutrient source of Cheating Bay, further work is needed to analyze the current directions and velocities as well as the interactions with tidal factors.

5.4.8 Rock sample description

(H. Paulick, A. Ksienzyk, S. Storm, S. Tille)

In total, 55 rock samples were obtained by a variety of methods during M62-5 (see Station List). For naming these samples we used the station code and a number that refers to the chronology of sampling activities. Where samples of different lithology were recovered (eg. during ROV operations using a mesh) lower case letters were used to distinguish these sub-samples. Also, when rock samples fragmented during sampling or recovery we added lower case letters to the sample numbers.

Using a small wax-corer attached to the bottom alarm of the Rosette water sampler, it was possible to recover some rock fragments from the seafloor at most CTD stations. The 37 WC_CTD samples consist of volcanic glass and biogenic sediment in variable proportions and variable stages of alteration.

At four stations (1292, 1293, 1294, and 1295) we applied a gravity coring device designed for volcanic rocks that was also equipped with a wax-corer (VSR: Vulkanitstossrohr). These stations were targeted at young lava flows at the morphological axial valley that was mapped by TOBI between 8°30.00’S and 8°33.10’S (cf. image 3 in Chapter 5.4.1 TOBI Sea-Floor) and recoverd fresh volcanic glass. In the TOBI images these flows have a smooth topography suggestive of sheet flows and they onlap and cover tectonic escarpments (faults) indicating a relatively young age.

In total, 14 rock samples (including basalt lava, sediment and biogenic detritus) were recovered during the operation of observational equipment on the sea floor (ROV and OFOS) as illustrated in Figure 5-34. We distinguished between material that was accidentally sampled by the equipment when rocks were dislodged due to sea floor contact (ROV_AC; OFOS_AC) and samples that were taken with the manipulators of the ROV at a particular position (ROV_P).

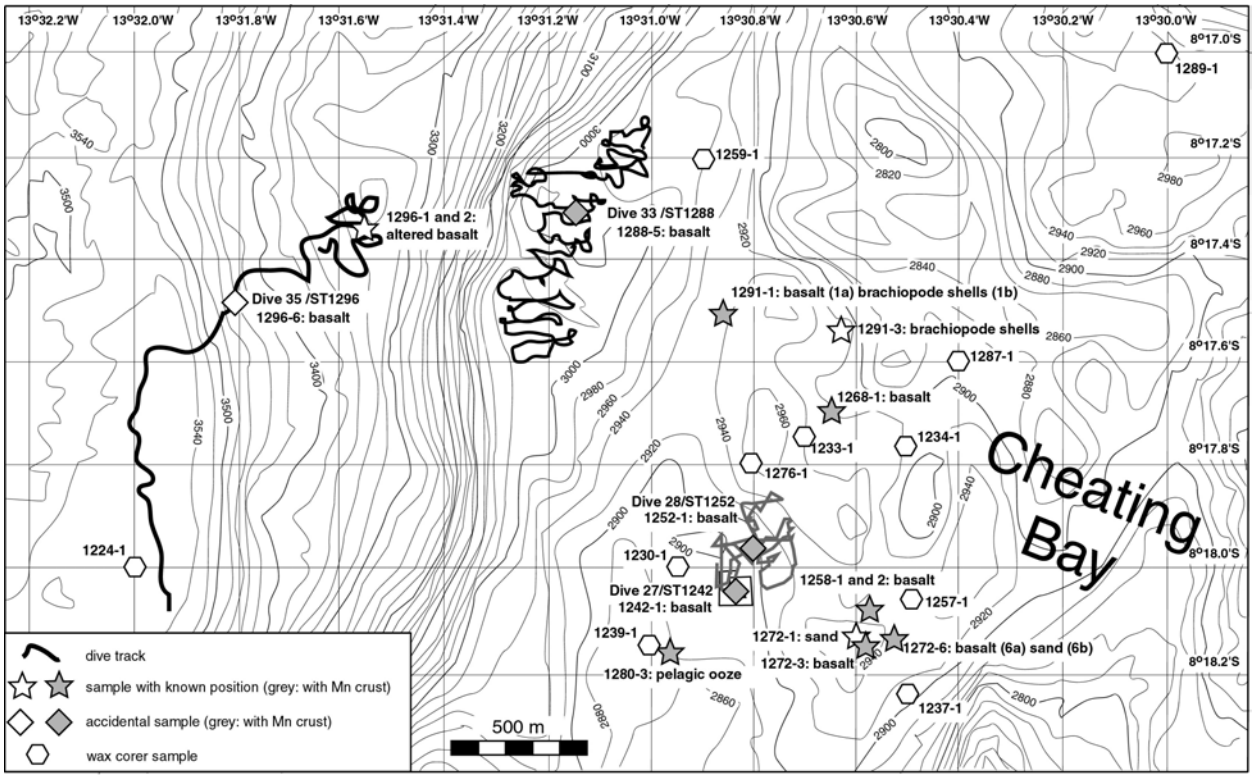

Figure 5-34: Location of seafloor samples obtained during M62-5b in the Cheating Bay area. Note that dive tracks are only shown when accidental samples were recovered.

There are four ROV_AC samples of basalt that were recovered somewhere along the tracks of dives 27, 28, 33, and, 35 . Since sea floor contacts were common during ROV deployments, it is difficult to assign a single position to these samples and therefore it is best to consider the entire ROV track as potential source area for these specimen. At one occasion (station 1258) the OFOS was caught in a steep canyon and was dragged up a ~50 m high tectonic cliff. When the OFOS returned to the deck several rock fragments were discovered on it. In this case a particular position was assigned to the samples (1258-1 and 1258-2) that corresponds to the location of this major sea floor contact.

In total, 9 samples were taken on the seafloor with the manipulators of the ROV. These samples are assigned to particular geographic positions based on the navigational data of the ROV deployments (Figure 5-34). Biogenic detritus was sampled at four localities (samples 1272_1 and 6b, and 1291_1b and 3). Whereas samples 1272_1 and 6b are dominated by shells of pelagic foraminifer, the samples 1291_1b and 3 recovered abundant brown brachiopod shells (see also biology report). The brachiopod samples clarified the identity of wide spread accumulations of brown fragments that were observed frequently along the ROV dive tracks. These were initially inferred to represent accumulations of glass shards (hyaloclastite) since they appeared to be concentrated at the bases of pillow lava flow fronts. This highlights the potential of the direct sampling ability of the ROV to ground truth the interpretation of sea floor observational data.

At one location yellowish pelagic ooze was sampled that had a crust-like appearance on the sea floor. The sample (1280-3) consists of yellow to light brown mud with interspersed sub-mm

foraminifer shells and glass shards. Also, there are semi-continuous dark domains that consist of basaltic glass shards which are coated and/or cemented by Mn oxides.

Overall, Mn crusts are a common phenomenon and they are frequently observed covering the outer, exposed surfaces of basalt samples (Figure 5-35a). They are up to 2 mm thick and their bladed texture is characteristic for Mn-Fe oxides generated by fall out from a hydrothermal plume. Therefore, this observation is further evidence for major hydrothermal activity in the close vicinity of the *Cheating Bay* area.

Overall, the area examined by ROV dive tracks consists of variably sedimented pillow lava flows with some local variations in the morphology of the lava. Typical bulbous pillow shapes with prominent rind textures, such as striations and outbreak features, are common and informally referred to as "spritz-cookie texture". However there are areas with more elongate to lobate flow features that may indicate locally elevated extrusion rates and/or lower viscosities. A common feature of strongly sedimented pillow lavas are collapsed pillow lobes exposing the hollow interior of such structures. Pillow lava flow fronts range in heights from just a few meters to several tens of meters and are generally very steep. There are also abundant tectonic cliffs in the area which should not be confused with margins of constructive pillow mounds. These cliffs are characterized by almost vertical escarpments that may include overhanging areas, and abundant cross sections of pillow lobes defining a comparatively flat.

Most of the basalt samples obtained by ROV and OFOS deployments (8 out of 9) have some preserved glassy crust, which is locally palagonitized (Figure 5-35b). Typically, the specimen show a microcrystalline interior and glassy out margins that in some instances preserve evidence of plastic deformation during flow (Figure 5-35c). One sample (1268-1) shows a particular "spotty" groundmass texture that is interpreted as spherulitic crystallization during high-temperature devitrification (Figure 5-35d). Such textures are commonly described from felsic lavas but are rare in low viscosity basaltic melts. However, the same sample contains some pyroxene quench crystals with typical swallow tail morphology (Figure 5-35e) which indicates that the melt underwent conditions suitable for rapid crystal growth. There is another sample with abundant quench crystals including well-developed skeletal olivine and swallow tail pyroxene (1272-3; Figure 5-35f). All other samples are described as aphyric.

In general, the vesicle content of the basalt samples is <1 vol% and the vesicle size rarely exceeds 1 mm in diameter. Notable exceptions are samples 1288-5 and 1291-1a which contain up to 20 vol% vesicles (up to several cm in maximum extension) that are partially filled by sediment and/or colonized by tube building organisms. Particular horseshoe-shaped features, observed locally in sample 1291-1a, are interpreted as collapsed vesicles where bubble walls caved in and cool melt that was still plastically deformable protruded into the cavity (Figure 5-35g).

Alteration under low-temperature oxidizing conditions is prevalent and generated palagonite from the basaltic glass. Locally, extensive reddish staining on surfaces and in halos along fine cracks is due to the formation of Fe-oxihydroxide-clay alteration assemblages. Locally, euheral calcite crystals have been observed that are attached to the inner walls of cavities in the microcrystalline part of some samples (eg. 1272-3; Figure 5-35h). Some basalt samples from station 1296 (dive 35) are more severely altered showing pervasive brown-yellow staining due to the formation of a hydrothermal alteration assemblage of uncertain mineralogy (clays?).

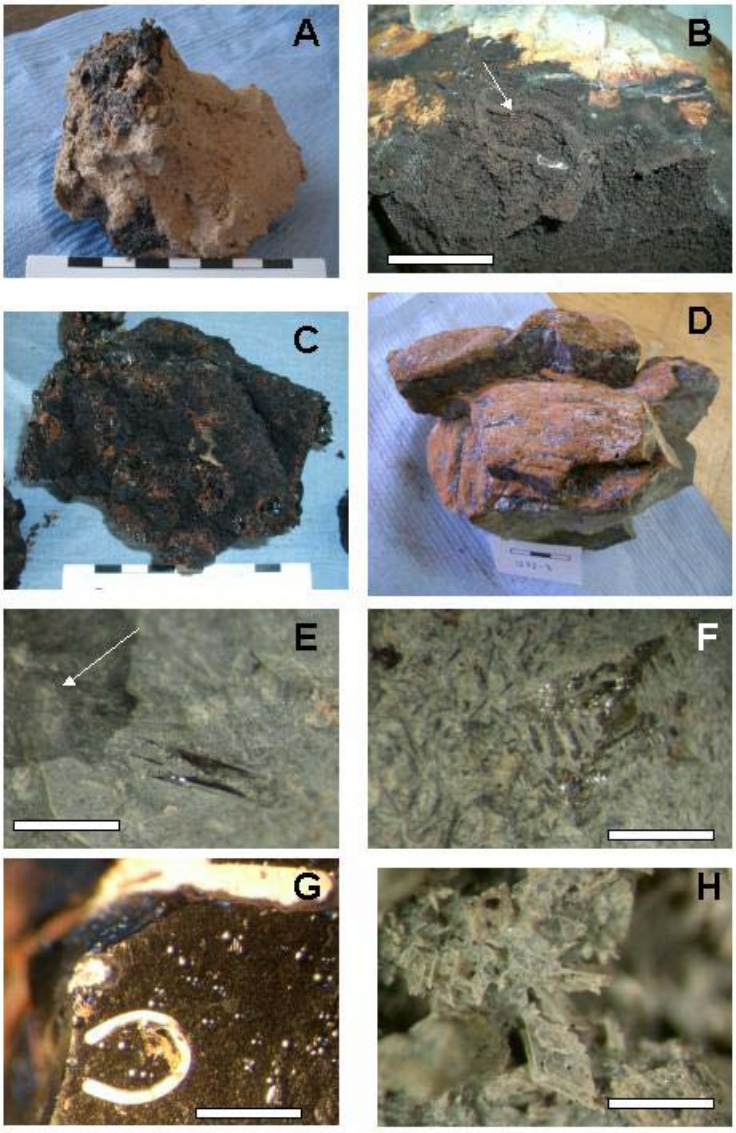

Figure 5-35: Examples of geological samples recovered by the ROV during M62-5b. ***(a)*** *Pelagic ooze (brown) with semi-continous patches of Fe-Mn oxide crusted glass (black; sample 1280-3).* ***(b)*** *Basalt surface covered by Fe-Mn oxides producing a 1 mm thick crust. Note that tube building organisms on the basalt are also coated by this hydrothermal plume fall out (arrow; sample 1268-1a; scale bar is 1 cm).* ***(c)*** *Hand specimen of typical basalt from Cheating Bay with a glassy crust covered by a Fe-Mn-crust. The orange spots are palagonite forming at the expense of basaltic glass (sample 1288-5).* ***(d)*** *Some samples show typical striation marks that form during the emplacement of pillow lava flows. When the melt pressure inside a pillow exceeds the yield strength of the enclosing crust the pillow bursts and a new pillow is generated. During this process the surface of the outflowing melt develops groove marks (striations) when it is squeezed out passing through the crack in the older pillow. This example shows a typical 'multiple rind texture' that forms due to episodes of inflation and deflation of an individual pillow segment (sample 1272-3).* ***(e)*** *Some basalts from the Cheating Bay area contain clinopyroxene phenocrsts with typical swallow tail texture due to rapid crystallization. The dark gray groundmass (arrow) is part of a spherulite which are also common in this sample (sample*

1268-1c; scale bar is 1 mm). ***(f)*** *Olivine phenocryst in a microcrystalline groundmass showing prominent skeletal shape due to quench crystallization (sample 1272-3; scale bar is 1 mm).* ***(g)*** *In general, the basalt samples from Cheating Bay are vesicle-poor. However, some samples are vesicle-rich and show evidence for distinctive stage of degassing. Here, there are numerous small (<1 mm diameter) vesicles and several large (cm-size) vesicles that have partially collapsed when the surrounding melt was still plastically deformable (sample 1291-1; scale bar is 1 cm).* ***(h)*** *Locally, some of the vesicles in the basalt samples are filled with secondary minerals. Here, euhedral calcite crystals formed on the inner walls of a vesicle (sample 1272-3).*

5.5 Ship's Meteorological Station

(G. Kahl, W.-T. Ochsenhirt)

When R.V. METEOR left Recife, Brazil, on November 7th, 2004, the Southeast Trade Winds were there to accompany her. Wind force was 5 Bft, direction being from east to southeast. The next day saw the passage of a squall line, wind being up to 6 Bft before and declining to 4 Bft thereafter. Time and again the wind force would touch 6 Bft during November 8th to 10th, but then wind force declined to what could be expected climatologically. The vessel reached her area of work during November 13th where sampling was carried out until December 20th, the only exceptions worth noting being the visits to Ascension on December 1st and 7th, respectively.

The area of work being situated in the Tropical South Atlantic, some interdiurnal variation of the wind force could be expected due to the wave of barometric pressure with its two peaks per 24 hours. This wave exists in temperate latitudes, too, but there its peaks are less pronounced than in the central tropics, and moreover they will be disguised covered by synoptic developments there anyway.

Everyday experience shows that the Tropical Double Wave is not the ideal sinusoidal line that is depicted in textbooks on Tropical Meteorology, but that it contains plateaus and steep parts. This is the reason why

1) there are times of wind force maxima distributed over all hours of the day, and

2) a marked maximum will often be followed by a minimum immediately, wind force regaining its strength then only during the course of a few hours later.

Experience tells us further that there are a few hours of the day standing out as far as the number of wind maxima accounted to them is concerned. These are:

1) 06 UTC, 2) 09 UTC and 3) 01 UTC, 04 UTC, 13 UTC and 15 UTC.

The hours of 22 UTC and 23 UTC seem to occupy only forth ranks, then, but they are worth mentioning because they mean a prolonged maximum and therefore they have an influence on the state of the sea, too.

So there were two times of day when the state of the sea was at its daily maximum:

1) the early morning hours with maximum wind force occurring at either 04 UTC or 06 UTC, both maxima occurring on some days, and

2) the late evening, maximum wind force being noted at either 22 UTC or 23 UTC, preceded on some days by a maximum at 20 UTC.

So the two daily maxima were long enough apart for the state of the sea to subside again inbetween them. The maxima occurred independently of the wind force being 5 to 6 Bft or 4 Bft then. On the whole, it can be concluded that the weather did not inhibit probing.

As far as the course of the weather was concerned during a typical day it developed as follows: at the time of sunrise, there were overcast conditions. A shower could be seen from afar mostly,

seldom occurring at our position. Near noon, the sun would begin to break through, making for a sunny afternoon. Cloud amount remained high enough for the sun to plunge down beneath them. The author of these lines knows of only two “green flashes” at sundown. During the night, cloud amount was varying but cumulating to form the next maximum amount the next morning.
On December 20th, the time was up for METEOR, but only for this time. Further investigations to the area of work are due to follow next year. So, course was set to Walvis Bay, circumnavigating St. Helena. Up to the vicinity of that island there was little change in the Trades, the order being 4 to 5 Bft.
During the last days of the cruise, the Trades would back somewhat, wind force being dependend upon a coastal low near Walvis Bay developing or not.
The ship called at port on December 29th, 2004.

5.6 Station List M62/5

The complete station list of M62/5 with geographic descriptions and a detailed sample list are presented in the online-version of the cruise report.
Abbreviations:
DR: Dredging; TOBI: TOBI track; CTD: CTD sampling; LADCP: lowered ADCP; HS: HYDROSWEEP survey; VSR: wax corer

Stat.	Date	Type	Latitude	Longitude	Depth (m)	Samples, comments
1177	10.11.04	CTD + LADCP test	7°49.80 S	23°32.51 W	1011	3 water samples taken
1178	11.11.04	TOBI test	7°44.57 S	21°15.71 W	-	failed
1179	12.11.04	TOBI test	7°36.29 S	17°47.37 W	-	successful
1180	13.11.04	TOBI track	7°36.29 S	17°47.37 W	-	abandoned, technical problems
1181	13.11.04	CTD + LADCP	7°52.89 S	13°26.18 W	3409	22 water samples taken
1182	14.11.04 20.11.04	TOBI track, start TOBI track, end	7°31.5 S 10°51.2 S	13°30.2 W 12°57.7 W	-	profiles 1-2B through 29-30
1183	20.11.04	HS mapping			-	
1184	21.11.04	CTD + LADCP	10°30.11 S	13°08.30 W	3271	18 water samples taken
1185	21.11.04 27.11.04	TOBI track, start TOBI track, end	10°43.0 S 7°38.9 S	13°03.2 W 13°25.5 W	-	profiles II-1-2 through II-36-37
1186 - 1203	27.11.04 - 28.11.04	OBS/OBH recovery	7°27.45 to 8°10.05 S	13°25.62 to 13°27.05 W	2593 to 4233	18 OBS successfully recovered
1204	28.11.04	CTD + LADCP	8°26.05 S	13°36.04 W	2918	10 water samples taken
1205	28.11.04	CTD + LADCP	8°27.30 S	13°33.47 W	2830	7 water samples taken
1206	28.11.04	CTD + LADCP	8°30.31 S	13°34.55 W	2899	6 water samples taken
1207	28.11.04	CTD + LADCP	8°26.54 S	13°36.63 W	2955	7 water samples taken
1208	29.11.04	CTD + LADCP	8°47.50 S	13°30.20 W	2224	5 water samples taken
1209	29.11.04	CTD + LADCP	8°48.80 S	13°30.30 W	2193	5 water samples taken
1210	29.11.04	CTD + LADCP	8°49.21 S	13°29.53 W	2163	7 water samples taken
1211	29.11.04	CTD + LADCP	8°18,00 S	13°34.40 W	3414	5 water samples taken
1212	29.11.04	CTD + LADCP	8°18.00 S	13°36.00 W	2996	6 water samples taken
1213	29.11.04	CTD + LADCP	8°20.30 S	13°34.50 W	3375	6 water samples taken
1214	29.11.04	CTD + LADCP	8°20.70 S	13°34.50 W	3165	5 water samples taken
1215	30.11.04	CTD + LADCP	8°19.90 S	13°34.50 W	3385	6 water samples taken
1216	30.11.04	CTD + LADCP	8°20.20 S	13°34.20 W	3535	6 water samples taken
1217	30.11.04	CTD + LADCP	8°20.20 S	13°34.20 W	3123	6 water samples taken
1218	30.11.04	MAPR-Profile - start	8°20.00 S	13°34.60 W	3357	
		MAPR-Profile - end	8°20.40 S	13°34.00 W	3507	
1219	02.12.04	CTD + LADCP	9°13.30 S	13°18.00 W	2663	6 water samples taken
1220	02.12.04	CTD + LADCP	9°13.80 S	13°18.00 W	2512	5 water samples taken
1221	02.12.04	CTD +LADCP	9°13.80 S	13°17.30 W	2716	4 water samples taken
1222	02.12.04	CTD + LADCP	8°18.00 S	13°38.10 W	2912	6 water samples taken
1223	02.12.04	CTD + LADCP	8°19.00 S	13°35.00 W	3138	5 water samples taken
1224	03.12.04	CTD + LADCP	8°18.00 S	13°32.00 W	3576	7 water samples taken
1225	03.12.04	CTD + LADCP	8°17.00 S	13°34.00 W	3437	7 water samples taken
1226	03.12.04	CTD + LADCP	8°16.00 S	13°34.00 W	3129	5 water samples taken
1227	03.12.04	CTD + LADCP	8°17.00 S	13°31.00 W	3196	10 water samples taken
1228	03.12.04	CTD + LADCP	8°18.00 S	13°31.04 W	3260	9 water samples taken
1229	03.12.04	CTD + LADCP	8°18.70 S	13°32.00 W	3342	8 water samples taken
1230	03.12.04	CTD + LADCP	8°18.00 S	13°30.80 W	3122	11 water samples taken
1231	03.12.04	CTD + LADCP	8°18.00 S	13°30.10 W	2887	4 water samples taken
1232	04.12.04	GAPS-test with transponder	8°7.50 S	14°7.70 W	3358	successful
1233	05.12.04	CTD + LADCP	8°17.80 S	13°30.70 W	2963	7 water samples taken
1234	05.12.04	CTD + LADCP	8°17.90 S	13°30.50 W	2928	7 water samples taken
1235	05.12.04	ROV dive	8°18.00 S	13°30.75 W	2929	failed, technical problems
1236	05.12.04	OFOS track	8°18.50 S	13°31.20 W	3034	
		OFOS bottom view	8°18.40 S	13°30.90 W	2879	
		OFOS off bottom	8°17.90 S	13°30.70 W	2961	
1237	05.12.04	CTD + LADCP	8°18.20 S	13.30.50 W	2940	9 water samples taken
1238	06.12.04	CTD + LADCP	8°18.30 S	13°30.90 W	2880	9 water samples taken
1239	06.12.04	CTD + LADCP	8°18.20 S	13°31.10 W	2897	12 water samples taken
1240	06.12.04	CTD + LADCP	8°19.50 S	13°29.20 W	2923	16 water samples taken
1241	06.12.04	ROV dive 26	8°17.80 S	13°31.00 W	2923	failed, navigation problems
1242	06.12.04	ROV dive 27	8°17.90 S	13°30.80 W	2946	1 rock accidentially sampled
		ROV on bottom	8°18.10 S	13°30.90 W	2915	
		ROV off bottom	8°18.10 S	13°30.80 W	2912	abandoned, technical problems
1243	08.12.04	CTD + LADCP	9°44.10 S	13°80.70 W	1551	10 water samples taken
1244	08.12.04	CTD + LADCP	9°42.30 S	13°60.80 W	1609	8 water samples taken
1245	08.12.04	CTD + LADCP	9°41.10 S	13°90.80 W	1563	9 water samples taken
1246	08.12.04	CTD + LADCP	9°38.30 S	13°10.90 W	1527	7 water samples taken
1247	08.12.04	CTD + LADCP	9°35.50 S	13°05.00 W	2300	5 water samples taken
1248	08.12.04	CTD + LADCP	9°34.90 S	13°12.70 W	1497	4 water samples taken
1249	08.12.04	CTD + LADCP	9°34.90 S	13°14.00 W	1630	5 water samples taken
1250	09.12.04	OBS recovery	9°34.00 S	13°18.10 W	2100	failed
1251	09.12.04	HS profile 1, start	8°26.00 S	13°26.00 W	2392	
		HS profile 1, end	8°24.00 S	13°24.00 W	2370	

5.7 Acknowledgements

We would like to express our gratefulness to Captain Jakobi and his crew for their professionality and the pleasurable working atmosphere during the cruise, which contributed to the success of the expedition. No research equipment was lost during the cruise undoubtedly due to their skillful control of the research vessel, cranes, winches and other systems.

Furthermore we acknowledge the financial support through the German Science Foundation (DFG, grant De572/21-1), professional patronage of the German Ministry of Foreign Affairs as well as Captain Berkenheger at the Leitstelle (control station) METEOR.

5.8 References

Baker, E. T., C. R. German, and H. Elderfield (1995), Hydrothermal plumes over spreading-center axes: global distribution and geological inferences, in *Seafloor hydrothermal systems*, edited by S.E. Humphris, R.A. Zierenberg, L.S. Mullineaux, and R.E. Thomson, pp. 47–71, American Geophysical Union, Washington.

Bruguier, N.J., Minshull, T.A. and Brozena, J.M., 2003. Morphology and tectonics of the Mid-Atlantic Ridge, 7°-12°S. J. Geophys. Res., 108(B2).

German, C.R., Connelly, D.P., Evans, A.J., Parson, L.M. (2002): Hydrothermal Activity on the Southern Mid-Atlantic Ridge. Eos Trans. AGU, 83(47), Fall Meet. Suppl., Abstract V61B-1361.

Grasshoff, K., Ehrhardt, M., and Kremling, K. (1997). "Methods of seawater analysis." Verlag Chemie.

Kadko, D. C., N. D. Rosenberg, J. E. Lupton, R. W. Collier, and M. D. Lilley (1990), Chemical reactions and entrainment within the Endeavour Ridge hydrothermal plume, *Earth and Planetary Science Letters*, *99*, 315–335.

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

Liss, P. S., and L. Merlivat (1986), Air-sea exchange rates: Introduction and synthesis, in *The role of air-sea exchange in geochemical cycling*, edited by P. Buat-Menard, pp. 113–127, Reidel, D., New York.

Rehder, G., R. S. Keir, and E. Suess (1999), Methane in the northern Atlantic controlled by microbial oxidation and atmospheric history, *Geophysical Research Letters*, *26* (5), 587–590.

Rehder, G., and E. Suess (2001), Methane and pCO2 in the Kuroshio and the South China Sea during maximum summer surface temperatures, *Marine Chemistry*, *75*, 89–108.

Rüth, C., Well, R., Roether, W., (2000). Primordial ^{3}He in South Atlantic deep waters from sources on the Mid-Atlantic Ridge. Deep-Sea Research I 47, 1059–1075.

Sültenfuß, J, Roether W., Rhein M., (2004), The Bremen Mass Spectrometric Facility for the Measurement of Helium Isotopes, Neon, and Tritium in Water, International Symposium

on Quality Assurance for Analytical Methods in Isotope Hydrology, IAEA CN 119/7, in press.

Van Dover, C.L., F. Grassle, and M. Boudrias. 1990. Biota of Gorda Ridge hydrothermal vent communities. *In* G.R. McMurray (ed.). Gorda Ridge: A Frontier in the United States Exclusive Economic Zone. Springer-Verlag, New York, pp. 285-287.

Wanninkhof, R. (1992), Relationship between wind speed and gas exchange over the ocean, *Journal of Geophysical Research*, *97* (C5), 7373–7382.

APPENDIX

Appendix 1: Fluid sampling list

Appendix 2: List and petrographic description of rock samples

Appendix 3: ROV dive protocols

Appendix 4: GTV station protocols

Appendix 1:

Fluid sampling list

Fluid samples taken for tracer analysis during M62/5.
For sampling equipment see station list

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
1181	1	-7.882	-13.436	3399.5	x	x					x
	2			3399.7	x	x	x				x
	3			3159.9							
	4			3158	x	x	x				x
	5			2962.8	x	x					x
	6			2961	x	x	x				x
	7			2766.3	x	x	x				x
	8			2766.9	x	x					x
	9			2667.6	x	x	x				x
	10			2569.6	x	x	x				x
	11			2471.7	x	x	x				x
	12			2373.5	x	x	x				x
	13			2274.7	x	x	x				x
	14			2177.8	x	x	x				x
	15			2080.6	x	x	x				x
	16			1686.1	x	x	x				x
	17			1387.6			x				x
	18			991.2	x	x	x				x
	19			743.4	x	x	x				x
	20			496.1	x	x	x				x
	21			93.1	x	x	x				x
	22			10.1	x	x	x				x
1184	1	-10.501	-13.140	3209	x	x	x		x		x
	2			3060.7	x	x					x
	3			3060.1	x	x	x		x		x
	4			3012.1	x	x			x		x
	5			2961.8	x	x			x		x
	6			2914.2	x	x			x		x
	7			2865.2	x	x			x		x
	8			2816.3	x	x	x		x		x
	9			2767.7	x	x			x		x
	10			2718.3							
	11			2668.2	x	x	x		x		x
	12			2619.1	x	x			x		x
	13			2570.9	x	x			x		x
	14			2521	x	x	x		x		x
	15			2471.9	x	x			x	x	x
	16			1879.7	x	x	x		x		x
	17			793.3	x	x			x		x
	18			197.6	x	x	x		x		x
	19			195.9	x	x					x
	20			98.9	x	x			x		x
	21			10.6	x	x			x		x
	22			10.8	x	x					x
1204	1	-8.441	-13.607	2858.8							
	2			2856.9							
	3			2639.1	x	x					
	4			2569.7							x
	5			2442.5							
	6			2304.8	x	x					

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	7			2216.7							
	8			2107.2							x
	9			1839.5	x	x					
	10			396.4							
1205	1	-8.457	-13.556	2836.4							
	2			2836.1	x	x					
	3			2507.9	x	x					
	4			2419.2							x
	5			2000.5	x	x					
	6			1600.6	x	x					
	7			394.3							x
1206	1	-8.505	-13.576	2766.6							x
	2			2766.7	x	x					
	3			2467.8	x	x					
	4			2370	x	x					
	5			1780.4							x
1207	1	-8.439	-13.612	2767							
	2			2767.1	x	x					
	3			2619.6							
	4			2276.3	x	x					
	5			1831.8	x	x					
	6			1831.9							x
	7			793.8							x
1208	1	-8.792	-13.504	2078.7							
	2			2078.8	x	x					
	3			1832.5	x	x					
	4			1684.9	x	x					
	5			743.7							
1209	1	-8.813	-13.509	2079	x	x					
	2			2079							
	3			1931.2	x	x					
	4			1784.2	x	x					
	5			990.8							
1210	1	-8.820	-13.492	2099	x	x					
	2			2098.6							
	3			1980.7	x	x					
	4			1981							
	5			1881.2	x	x					
	6			1783.4	x	x					
	7			198							
1211	1	-8.300	-13.574	3160.3	x	x					
	2			3160.3							
	3			2963.3	x	x					
	4			2766.4	x	x					
	5			2472.1	x	x					x
	6			1487	x	x					
	7			993.4							x
	8			398.3							x
1212	1	-8.301	-13.600	2971.5	x	x					
	2			2865.5	x	x	x				
	3			2766.5	x	x	x				
	4			2668.9	x	x					
	5			2471.1	x	x					

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	6			2373.9	x	x					
	7			1731.8							x
1213	1	-8.338	-13.576	3308.6							
	2			3308.7	x	x					
	3			3157.8	x	x					
	4			2958.7	x	x					
	5			2768.1	x	x					
	6			2570.3	x	x					
	7			1776.5	x	x					
1214	1	-8.346	-13.576	3222.4	x	x					
	2			3222.3							
	3			2962.9	x	x					
	4			2766.4	x	x					
	5			2472.3	x	x					
	6			2176.9	x	x					
1215	1	-8.332	-13.575	3357.5	x	x					
	2			3357.6							
	3			2963.5	x	x					
	4			2768.5	x	x					
	5			2569.5	x	x					
	6			2473.4	x	x					
	7			2275.6	x	x					
1216	1	-8.337	-13.570	3525.4	x	x			x		
	2			3525.2			x				
	3			3149.7	x	x	x		x		
	4			2934.4	x	x	x		x		
	5			2629.6	x	x	x		x		
	6			2619.9	x	x			x		
	7			2078.7	x	x			x		
	8			1584.1							
	9			701.7							
1217	1	-8.337	-13.580	3192.5	x	x					
	2			3192.5			x				
	3			3061.9	x	x					
	4			2767.3	x	x	x				
	5			2471.9	x	x	x				
	6			2276.3	x	x	x				
	7			1979.5	x	x					
1219	1	-9.220	-13.301	2639.1			x				
	2			2639	x	x	x				x
	3			2355	x	x					
	4			2159.7	x	x					x
	5			2029.5	x	x					
	6			1854.8	x	x					x
	7			387.7	x	x					x
	8			12.1							x
1220	1	-9.231	-13.300	2516.7	x	x			x		
	2			2517.1							
	3			2399.8	x	x			x		
	4			2275.6	x	x					
	5			2079.9	x	x			x		
	6			1980.3	x	x			x		
	7			12.2							

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
1221	1	-9.229	-13.288	2688.3							
	2			2688.7	x	x	x				
	3			2474.3	x	x	x				
	4			2277.4	x	x	x				
	5			1980.7	x	x	x				
	6			299.1							
1222	1	-8.300	-13.635	2851.2							
	2			2852.3	x	x	x				x
	3			2766.5	x	x	x				
	4			2669.5	x	x					
	5			2522.1	x	x	x				x
	6			2373.3	x	x	x				
	7			2276	x	x	x				x
	8			395.6							x
1223	1	-8.317	-13.584	3153.7	x	x					
	2			3153.8			x				x
	3			2962	x	x	x				
	4			2962							
	5			2864.4	x	x	x				
	6			2864.7							
	7			2664.9	x	x	x				
	8			2665.3							
	9			2472.6	x	x	x				
	10			2472.7							
	11			794.9							x
	12			795.7							
	13			13.2							
	14			12.9							x
1224	1	-8.300	-13.534	3549.8							
	2			3549.8	x	x	x				
	3			3452.2	x	x	x				
	4			3451.4							
	5			3158.5	x	x	x				
	6			3158.2							
	7			2962.4	x	x	x				
	8			2962.5							
	9			2864.2	x	x	x				
	10			2864.3							
	11			2766.5	x	x	x				
	12			2766.1							
	13			2472							
	14			2472.3	x	x					
	15			795.2							
	16			795.2							
	17			11.1							
	18			11.6							
1225	1	-8.283	-13.568	3432.4	x	x					
	2			3431.8			x				
	3			3159.3	x	x	x				
	4			3159.2							
	5			2963	x	x					
	6			2962.8			x				
	7			2865.6							

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	8			2865.8	x	x	x				
	9			2767	x	x	x				
	10			2767.3							
	11			2570.5	x	x					
	12			2570.6			x				
	13			1980.8							
	14			1980.5			x				
	15			1980.3	x	x					
	16			694.7							
1226	1	-8.267	-13.567	3056.2	x	x			x		
	2			3056.1			x				x
	3			2864.4	x	x	x		x		
	4			2864.3							
	5			2816.6	x	x	x				
	6			2816.3					x		
	7			2667.6	x	x	x				
	8			2667.4					x		
	9			1980.3	x	x			x		x
	10			1980.1							
	11			398.4							x
	12			398.2							
	13			12.2							
	14			12.5							x
1227	1	-8.283	-13.520	3267.7							
	2			3267.5	x	x	x		x		x
	3			3060.2	x	x	x		x		
	4			3060.1							
	5			2962.7	x	x	x		x		
	6			2962.9							
	7			2865	x	x	x		x		
	8			2865.5							
	9			2766.9	x	x	x		x		
	10			2766.3							
	11			2667.9	x	x	x		x		
	12			2668.6							
	13			2471.9			x				
	14			2471.5	x	x			x		x
	15			2700.7	x	x			x		x
	16			2700.3	x	x			x		x
	17			2700.3	x	x	x		x		x
	18			11.8							
	19			11.9							x
1228	1	-8.300	-13.524	3223.7	x	x	x				
	2			3223.2							
	3			3061	x	x	x				
	4			3061.6							
	5			2962.2	x	x	x				
	6			2963.2							
	7			2863.8	x	x	x				
	8			2864.4							
	9			2674.7	x	x	x				
	10			2675.5							
	11			2571	x	x	x				

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	12			2570.9							
	13			2528.5	x	x	x				
	14			2529.2							
	15			2275.2	x	x	x				
	16			2275.3							
	17			795.2							
	18			793.2							
	19			12.8							
	20			12.6							
1229	1	-8.311	-13.534	3354.6			x				x
	2			3354.1	x	x			x		
	3			3160.6			x				x
	4			3160.4	x	x			x		
	5			2963			x				x
	6			2963.4	x	x			x		
	7			2882.4	x	x			x		
	8			2882.4	x	x	x		x		
	9			2768.6	x	x	x		x		
	10			2768.6							
	11			2669.3			x				
	12			2668.9	x	x			x		
	13			2472.9			x				
	14			2473.4	x	x			x		
	15			744.1							
	16			742.6							x
	17			14.5							
	18			14.2							x
1230	1	-8.300	-13.513	2885							
	2			2884.8	x	x	x		x		
	3			2817.2	x	x	x		x		
	4			2816.3							
	5			2766.3	x	x	x		x		
	6			2766.5							
	7			2717.6	x	x	x		x		
	8			2717.1							
	9			2676.8	x	x	x		x		
	10			2677.5	x	x			x		
	11			2678							
	12			2658.8	x	x	x		x		
	13			2658.2	x	x			x		
	14			2657.9							
	15			2620	x	x	x		x		
	16			2620.4							
	17			2472	x	x	x		x		
	18			2471.8							
	19			1782.4			x		x		
	20			1782.6							
	21			11.7							
	22			11.9							
1231	1	-8.300	-13.502	2820.9							
	2			2821.3	x	x	x		x		x
	3			2646.8							
	4			2647.1	x	x	x		x		x

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	5			2569.8							
	6			2569.3	x	x	x		x		x
	7			2176.6							
	8			2176.8	x	x	x		x		x
	9			12.1							
	10			12.2							
1233	1	-8.296	-13.512	2912.1	x	x			x		
	2			2912.1			x				
	3			2815.9			x				
	4			2815.3	x	x			x		
	5			2719.6			x				
	6			2720.2	x	x			x		
	7			2654.9	x	x	x		x		
	8			2654.8	x	x			x		
	9			2570.3	x	x	x		x		
	10			2570							
	11			2374.9					x		
	12			2374.8			x				
	13			791.7							
	14			790.2							
	15			13.1							
	16			13.2							
1234	1	-8.298	-13.509	2884.9	x	x					
	2			2885.1			x		x		x
	3			2777.7	x	x					
	4			2777.5			x		x		
	5			2717.5	x	x					
	6			2717.6			x		x		
	7			2669.7	x	x					x
	8			2669			x		x		
	9			2639.7	x	x	x		x		
	10			2639.7							
	11			2521.7	x	x					
	12			2521.4			x		x		
	13			2275.1	x	x					
	14			2275.2			x		x		
	15			794.7							
	16			792.4							x
	17			397.2							
	18			395.1							x
1237	1	-8.304	-13.509	2908.3							x
	2			2908.3	x	x	x		x		
	3			2865.4	x	x	x		x		
	4			2811.7	x	x	x		x		
	5			2764.9	x	x	x		x		
	6			2716			x		x		
	7			2666.7	x	x	x		x		
	8			2616.9	x	x	x		x		
	9			2571.1	x	x	x		x		
	10			2567.5							
	11			2371.1	x	x	x		x		x
	12			791.8							
	13			391.3							x

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	14			12							x
1238	1	-8.305	-13.516	2844.8							
	2			2846.6	x	x			x		
	3			2813.4	x	x	x		x		
	4			2764.4	x	x	x		x		
	5			2715.4	x	x	x		x		
	6			2668.3	x	x	x		x		
	7			2616.5	x	x	x		x		
	8			2568.7			x				
	9			2470.2	x	x	x		x		
	10			2468.3							
	11			2371.1	x	x	x		x		
	12			792.6							
	13			11.6							
1239	1	-8.304	-13.518	2857.2	x	x	x		x		
	2			2813.3	x	x	x		x		
	3			2765.7	x	x	x		x		
	4			2711.8	x	x	x		x		
	5			2669.1	x	x	x		x		
	6			2617.4	x	x	x		x		
	7			2568.2	x	x	x		x		
	8			2517.4	x	x	x		x		
	9			2469.1	x	x	x		x		
	10			2421.6							
	11			2375.4	x	x	x		x		
	12			2273	x	x	x		x		
	13			1978.7	x	x	x		x		
	14			1740.1							
	15			775							
	16			12.8							
1240	1	-8.325	-13.487	2926.9	x	x			x		
	2			2927			x				
	3			2816	x	x	x		x		
	4			2764.6	x	x	x		x		
	5			2716.1	x	x	x		x		
	6			2665.9	x	x	x		x		
	7			2618.1	x	x	x		x		
	8			2569.6	x	x	x		x		
	9			2516.9	x	x	x		x		
	10			2469							
	11			2468	x	x	x		x		
	12			2420.5	x	x	x		x		
	13			2370	x	x			x		
	14			2271.1	x	x	x		x		
	15			1978	x	x	x		x		
	16			1731.9	x	x					
	17			791	x	x					
	18			13.8	x	x					
1243	1	-9.735	-13.146	1489.3							x
	2			1489.2	x	x			x		
	3			1357.1	x	x			x		
	4			1283.1	x	x			x		
	5			1189.7	x	x			x		x

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	6			1138.8	x	x			x		
	7			1089.4	x	x			x		
	8			1039.6	x	x			x		
	9			1019.5	x	x			x		
	10			979							
	11			973.7	x	x				x	
	12			795.2							
	13			396							x
	14			10.9	x	x					
	15			10.9							x
1244	1	-9.704	-13.113	1574.8							
	2			1574.8	x	x					x
	3			1533.9	x	x					
	4			1485.4	x	x					
	5			1386.5	x	x					
	6			1287.4	x	x					
	7			1228.1	x	x					
	8			1089.4	x	x					
	9			990.1	x	x					
	10			791.6							
	11			789.8							x
	12			124.7							x
1245	1	-9.685	-13.164	1562.8							x
	2			1562.1	x	x					
	3			1535.7	x	x					
	4			1484.4	x	x					
	5			1385.6	x	x					
	6			1287.2	x	x					
	7			1259.2	x	x					
	8			1089	x	x					
	9			971.8							
	10			794.4							
	11			792.1							x
	12			247.4							x
	13			11.7	x	x					
	14			11.9							x
1246	1	-9.638	-13.182	1476.7	x	x					x
	2			1477.1							
	3			1436.2	x	x					
	4			1386.7	x	x					
	5			1284.3	x	x					
	6			1267	x	x					
	7			1090.2	x	x					
	8			986.8	x	x					
	9			793.6							x
	10			198.6							
	11			197.3							x
	12			11.3							x
1247	1	-9.592	-13.083	2275.1	x	x			x		
	2			2274.2			x				
	3			1881	x	x	x		x		
	4			1774.6	x	x	x		x		
	5			1598.6	x	x	x		x		

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	6			1248.3	x	x	x		x		
	7			793.6							
	8			12.9							
1248	1	-9.582	-13.212	1472.2	x	x					
	2			1471.9							x
	3			1287.7	x	x					
	4			1089.3	x	x					
	5			990.5	x	x					
	6			842.1							
	7			346.4							x
	8			12.9							x
	9			12.9							
1249	1	-9.582	-13.233	1615.2							x
	2			1615	x	x					
	3			1524.4	x	x					
	4			1366.9	x	x					
	5			1268.4	x	x					
	6			1169.8	x	x					
	7			782.4							
	8			675.2							
	9			673.6							
	10			349.1							x
	11			347.2							
	12			13.8							
	13			13.5							x
1252	1	-8.300	-13.515	2492.9	x	x	x	x	x		
	2	-8.300	-13.515	2597.2	x	x	x	x	x	x	
	3	-8.300	-13.515	2883.7	x	x	x	x	x		
1253	1	-8.287	-13.532	3480.1					x		x
	2			3480.1	x	x	x				
	3			3303.3	x	x	x				
	4			3158.1	x	x	x				
	5			2960.8	x	x	x				x
	6			2911.5	x	x					
	7			2863.4	x	x	x	x			
	8			2813.8	x	x					
	9			2765.1	x	x	x		x		x
	10			2717.2							
	11			2715.4	x	x	x				
	12			2666.7	x	x	x	x	x		
	13			2617.2	x	x	x	x	x		
	14			2567.7	x	x	x	x	x		
	15			2519.1	x	x	x				
	16			2469.7	x	x					
	17			2420.8	x	x	x				x
	18			2372.2	x	x			x		
	19			1090	x	x					
	20			395.7	x	x					x
	21			11.6	x	x					
	22			11.8							
1254	1	-8.276	-13.548	3463.9					x		
	2			3463.7	x	x	x				
	3			3304.5	x	x					

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	4			3157.2	x	x	x				
	5			2961.5	x	x					
	6			2911.5	x	x	x				
	7			2863.4	x	x					
	8			2814	x	x	x				
	9			2764.5	x	x			x		
	10			2716.2							
	11			2714.8	x	x	x				
	12			2667.2	x	x	x	x	x		
	13			2618.3	x	x	x	x	x		
	14			2568.6	x	x	x	x	x		
	15			2519.6	x	x					
	16			2470.2	x	x	x				
	17			2421.5	x	x					
	18			2372.2	x	x			x		
	19			1089.1	x	x		x			
	20			693.7	x	x					
	21			12.5							
	22			12.2	x	x					
1255	1	-8.254	-13.586	3206.9	x	x			x		x
	2			3206.6			x				
	3			3060.3	x	x					
	4			2960.9	x	x	x				x
	5			2862.7	x	x	x				
	6			2815.2	x	x	x				
	7			2764.4	x	x	x		x		
	8			2714.6	x	x	x				
	9			2664.7	x	x	x	x	x		
	10			2619.2	x	x		x	x		
	11			2616.8			x				x
	12			2568.8	x	x	x	x	x		
	13			2519.2	x	x					
	14			2470.4	x	x	x		x		x
	15			2371.7	x	x					
	16			1978.1	x	x					
	17			1544.8							
	18			1188.7	x	x		x			
	19			792.6	x	x					
	20			395.9							x
	21			13.3	x	x					
	22			13.2							x
1256	1	-8.247	-13.602	2931			x				
	2			2930.8	x	x	x		x		
	3			2863.8	x	x					
	4			2814.1	x	x					
	5			2765.1	x	x			x		
	6			2715	x	x					
	7			2667.1	x	x		x	x		
	8			2618	x	x		x	x		
	9			2569.1	x	x	x	x			
	10			2567.1					x		
	11			2521.2	x	x					
	12			2470.7	x	x			x		

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	13			2372.8	x	x	x				
	14			2174.9	x	x	x				
	15			1978	x	x	x				
	16			1682.2			x				
	17			990.6	x	x	x	x			
	18			396.2	x	x	x				
	19			12.3	x	x	x				
	20			12.7			x				
1257	1	-8.295	-13.511	2909.8							
	2	-8.295	-13.511	2764.6	x	x			x		
	3	-8.295	-13.511	2717.2	x	x			x		
	4	-8.295	-13.511	2666.9	x	x		x	x		
	5	-8.295	-13.511	2617.7	x	x			x		
	6	-8.293	-13.513	2764.9	x	x			x		
	7	-8.293	-13.513	2716	x	x			x		
	8	-8.293	-13.513	2667	x	x		x	x	x	
	9	-8.293	-13.513	2617.6	x	x			x		
	10	-8.293	-13.513	2912.6							
	11	-8.293	-13.512	2765.1	x	x			x		
	12	-8.293	-13.513	2716.4	x	x			x		
	13	-8.293	-13.513	2666.1	x	x		x	x	x	
	14	-8.293	-13.513	2618.2	x	x			x		
	15	-8.291	-13.514	2764.2	x	x			x		
	16	-8.290	-13.514	2715.5	x	x			x		
	17	-8.290	-13.514	2666.9	x	x		x	x	x	
	18	-8.290	-13.514	2617.9	x	x			x		
	19	-8.287	-13.515	2765.9	x	x			x		
	20	-8.287	-13.515	2715.6	x	x			x		
	21	-8.287	-13.515	2667.2	x	x		x	x		
	22	-8.287	-13.515	2615.8	x	x			x		
1259	1	-8.287	-13.532	3431.3	x	x			x		x
	2			3431.8							
	3			3206.3							
	4			2960.2	x	x	x				
	5			2912.2	x	x					
	6			2862.6	x	x	x				
	7			2813.8	x	x	x				
	8			2765.3	x	x	x		x		x
	9			2710.7	x	x	x				
	10			2704.5							
	11			2666.4	x	x	x	x	x		
	12			2617.7	x	x	x	x	x		
	13			2568.6	x	x	x	x	x		
	14			2518.5	x	x					
	15			2469.1	x	x	x		x		x
	16			2370.3							
	17			1977.6	x	x	x				
	18			792.7							
	19			396.1							x
1260	1	-8.277	-13.532	3557.7	x	x			x		
	2			3557.5							
	3			3206.5							
	4			2960.9	x	x	x				

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	5			2911.7	x	x					
	6			2862.7	x	x					
	7			2813.5	x	x	x				
	8			2764	x	x	x		x		
	9			2716.3	x	x	x				
	10			2714.6							
	11			2667	x	x	x		x		
	12			2617.1	x	x	x	x	x		
	13			2569	x	x	x	x	x		
	14			2519	x	x					
	15			2470.3	x	x	x		x		
	16			2371.2							
	17			1978.7	x	x					
	18			693.6	x	x					
	19			13.6	x	x					
	20			13.7							
1261	1	-8.254	-13.532	3430.6			x		x		
	2			3431	x	x					
	3			3326.4	x	x					
	4			3156.6	x	x					
	5			3060.5	x	x					
	6			2960.4	x	x	x				
	7			2911.9	x	x					
	8			2862	x	x	x				
	9			2814.4	x	x	x				
	10			2765.5	x	x	x		x		
	11			2716.2	x	x	x				
	12			2666.4	x	x	x	x	x		
	13			2617.9	x	x	x	x	x		
	14			2567.7	x	x	x	x	x		
	15			2519.2	x	x					
	16			2470.7	x	x	x		x		
	17			2372.3	x	x					
	18			1974.7	x	x					
	19			1287							
	20			793.8	x	x					
	21			13.7							
	22			13.6	x	x					
1262	1	-8.247	-13.532	3429	x	x			x		x
	2			3428.8			x				
	3			3303.7	x	x					
	4			3107.8	x	x	x				
	5			2961.4	x	x	x				
	6			2912	x	x					
	7			2862.8	x	x	x				
	8			2814	x	x	x		x		
	9			2764.6	x	x	x				x
	10			2716	x	x	x	x	x		
	11			2666.1	x	x	x	x	x		
	12			2617	x	x	x	x	x		
	13			2568.4	x	x	x				
	14			2519.1	x	x					
	15			2469.8	x	x			x		

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	16			2371.4	x	x	x				
	17			1978.3	x	x					
	18			1278.5	x	x					
	19			792.1							
	20			390.1							x
	21			11.6	x	x					x
	22			11.6							
1265	1	-8.304	-13.512	2902.3							
	2	-8.304	-13.512	2764.5	x	x	x		x		
	3	-8.304	-13.512	2715	x	x	x		x		
	4	-8.304	-13.513	2666.1	x	x	x		x		
	5	-8.303	-13.513	2726.5	x	x			x		
	6	-8.303	-13.513	2716.5	x	x	x		x		
	7	-8.303	-13.513	2685.8	x	x	x		x		
	8	-8.303	-13.513	2656.8	x	x	x	x	x	x	
	9	-8.302	-13.514	2765	x	x	x		x		
	10	-8.302	-13.514	2715.5			x				
	11	-8.302	-13.514	2667.2	x	x	x		x		
	12	-8.302	-13.515	2765.9	x	x	x		x		
	13	-8.302	-13.515	2716.3	x	x	x		x		
	14	-8.302	-13.515	2666.5	x	x	x	x	x	x	
	15	-8.301	-13.516	2880.9	x	x	x		x		
	16	-8.300	-13.516	2765.3	x	x	x		x		
	17	-8.300	-13.516	2715.8	x	x	x		x		
	18	-8.300	-13.516	2666.4	x	x	x	x	x	x	
	19	-8.300	-13.516	2617.8	x	x	x		x		
	20	-8.299	-13.517	2470.8	x	x	x		x		
1266	1	-8.330	-13.538	2838.8							
	2			2838.1	x	x	x		x		
	3			2795.4	x	x	x				
	4			2733.5	x	x	x				
	5			2686	x	x	x	x	x		
	6			2618.5	x	x	x		x		
	7			2569.1	x	x	x	x	x		
	8			2519.8	x	x	x				
	9			2469.5	x	x	x				
	10			2467.5							
	11			2371.7					x		
	12			2176.6	x	x					
	13			1781.1							
	14			793.5	x	x					
	15			791.6							
	16			12.1							
	17			12.3	x	x					
1267	1	-8.318	-13.520	1999.2							
	2			2758.9	x	x	x		x		x
	3			2725.1	x	x					
	4			2686.3	x	x	x	x			
	5			2655	x	x	x		x		x
	6			2618.2	x	x	x	x	x		
	7			2586.1	x	x	x		x		
	8			2538.3	x	x	x	x			
	9			2489.1	x	x	x				

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	10			2450.2	x	x	x				
	11			2371.9	x	x	x		x		
	12			2173.6	x	x					x
	13			1682.5	x	x					
	14			1090.6	x	x		x			
	15			695.7							
	16			347.2							x
	17			13.6	x	x					
	18			13.4							x
1268	1	-8.297	-13.514	2951.1	x	x	x	x	x		
	2				x	x	x	x	x		
	3				x	x	x	x	x	x	
1269	1	-8.267	-13.500	3168.1							x
	2			3167.6	x	x			x		
	3			2960.9	x	x	x				
	4			2911.5	x	x					
	5			2862.6	x	x	x				
	6			2813.3	x	x					
	7			2764.3	x	x	x	x	x		x
	8			2715.4	x	x	x	x	x		
	9			2666.7	x	x	x		x		
	10			2618.3							
	11			2616.5	x	x	x		x		
	12			2569	x	x	x				
	13			2520	x	x	x				
	14			2470.3	x	x		x	x		
	15			2370.1	x	x					
	16			1977.7	x	x					x
	17			693.4	x	x					x
	18			395							
	19			11.6							
	20			11.7	x	x					
1270	1	-8.250	-13.472	3321	x	x					
	2			3320.9			x		x		
	3			3157.6	x	x					
	4			2961.3	x	x	x				
	5			2911.8	x	x					
	6			2863.1	x	x	x				
	7			2813.5	x	x					
	8			2764.1	x	x	x		x		
	9			2715.7	x	x		x	x		
	10			2713.9							
	11			2667.3	x	x	x	x	x		
	12			2617.7	x	x	x		x		
	13			2568.7	x	x	x				
	14			2519.9	x	x					
	15			2470.3	x	x	x		x		
	16			2371.5	x	x					
	17			1978.4	x	x					
	18			695.5	x	x					
	19			13	x	x					
	20			12.7							
1271	1	-8.273	-13.452	3027.4			x				x

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	2			3028.1	x	x			x		
	3			2968.1	x	x					
	4			2912.1							
	5			2863.3	x	x	x				
	6			2814	x	x					
	7			2765.3			x				
	8			2716	x	x	x				
	9			2668.1			x				x
	10			2666.1	x	x		x	x		
	11			2617.9	x	x	x	x	x		
	12			2568.8	x	x	x	x	x		
	13			2521.2	x	x					
	14			2470.1	x	x	x				
	15			2371.4	x	x			x		x
	16			2175.8							
	17			1780.2	x	x					
	18			792.4	x	x		x			
	19			395.9							x
	20			12.8	x	x					
	21			13							x
1272	1	-8.302	-13.508	2933.1	x	x	x	x	x	x	
	2	-8.302	-13.509	2967.4	x	x	x	x	x		
	3	-8.302	-13.510	2989.3	x	x	x	x	x		
1273	1	-8.212	-13.534	2891.1							
	2			2891	x	x			x		
	3			2864.1	x	x	x				
	4			2814.3	x	x	x	x	x		
	5			2764.7	x	x	x	x	x		
	6			2715.7	x	x	x		x		
	7			2667	x	x	x		x		
	8			2614.9	x	x	x		x		
	9			2568.4	x	x	x		x		
	10			2566.6							
	11			2519.6	x	x	x				
	12			2469.9	x	x	x				
	13			2371.8	x	x	x		x		
	14			1977.9	x	x					
	15			792.8	x	x					
	16			12.7	x	x					
	17			12.8							
1274	1	-8.212	-13.578	2823.3	x	x			x		x
	2			2823.4			x				
	3			2765	x	x			x		
	4			2702.2	x	x	x				
	5			2666	x	x		x	x		
	6			2617.2	x	x	x		x		
	7			2568.4	x	x		x	x		x
	8			2519.8							
	9			2471.4	x	x	x				
	10			2469.5							
	11			2372.9	x	x			x		x
	12			1978.1	x	x	x				
	13			695.5	x	x		x			

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	14			396.4	x	x					x
	15			13.3	x	x					
	16			13.2							x
1275	1	-8.239	-13.557	3441.7			x				
	2			3442	x	x			x		
	3			3126.3	x	x					
	4			2959.4	x	x					
	5			2863.3							
	6			2814	x	x	x				
	7			2764.7	x	x	x				
	8			2715.8	x	x	x				
	9			2667.4	x	x	x	x	x		
	10			2617.7							
	11			2566.5	x	x	x	x	x		
	12			2519.5	x	x					
	13			2470.5	x	x	x				
	14			2360.4	x	x			x		
	15			2174.9	x	x					
	16			1783	x	x					
	17			991.9							
	18			695							
	19			14.3	x	x					
	20			14							
1276	1	-8.299	-13.514	2888.7	x	x	x				
	2			2888.7	x	x			x		x
	3			2863	x	x					
	4			2813.5							
	5			2764.7	x	x	x		x		
	6			2715.9	x	x					
	7			2667.3	x	x		x	x		
	8			2617.7	x	x	x	x	x		
	9			2567.1	x	x		x	x		
	10			2519.7							
	11			2470.3	x	x	x				
	12			2421.2	x	x					
	13			2371.9	x	x	x				
	14			2273.5	x	x			x		
	15			1978.2							x
	16			789.9	x	x		x			
	17			397.5							
	18			395.5							x
	19			12.7	x	x					x
	20			12.6							
1279	1	-8.309	-13.508	1301	x	x			x		
	2	-8.308	-13.507	2669.2	x	x			x		
	3	-8.307	-13.507	2667.2	x	x			x		
	4	-8.306	-13.508	2660.8	x	x		x	x	x	
	5	-8.305	-13.508	2658.4	x	x			x		
	6	-8.304	-13.508	2651	x	x			x		
	7	-8.303	-13.508	2667.6	x	x			x		
	8	-8.302	-13.508	2663.7	x	x			x		
	9	-8.301	-13.508	2666.1	x	x			x		
	10	-8.300	-13.509	2664.3							

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	11	-8.299	-13.510	2650.1	x	x		x	x	x	
	12	-8.298	-13.511	2672.6	x	x			x		
	13	-8.298	-13.511	2683.8	x	x			x		
	14	-8.297	-13.512	2669.4	x	x			x		
	15	-8.296	-13.512	2664.7	x	x			x		
	16	-8.295	-13.512	2664.6	x	x			x		
	17	-8.295	-13.512	2675.6	x	x			x		
	18	-8.295	-13.512	2682.4	x	x			x		
	19	-8.294	-13.513	2675.4	x	x			x		
	20	-8.294	-13.514	2681.6	x	x		x	x	x	
	21	-8.294	-13.513	2686.9	x	x			x		
	22	-8.293	-13.515	2679.8	x	x			x		
1280	1	-8.304	-13.511	2934	x	x	x	x	x		
	2	-8.303	-13.517	2875	x	x	x	x	x	x	
	3	-8.300	-13.516	2889.1	x	x	x	x	x	x	
1281	1	-8.166	-13.501	2820.3	x	x	x		x		x
	2			2820.2							
	3			2765	x	x	x		x		
	4			2713.5	x	x	x				
	5			2667	x	x	x	x	x		
	6			2610.5	x	x	x		x		
	7			2569.1	x	x	x	x	x		x
	8			2519.2	x	x	x				
	9			2466.4	x	x	x				
	10			2464.4							
	11			2368.9	x	x	x		x		
	12			1965.2	x	x	x				x
	13			792.9	x	x					x
	14			446.9	x	x					
	15			3.7	x	x		x			
1282	1	-8.167	-13.467	3584.6	x	x					
	2			3584			x				
	3			3157.1	x	x					
	4			2864.1			x				
	5			2861.9	x	x					
	6			2765.7	x	x	x				
	7			2715.9	x	x	x				
	8			2667.9	x	x		x			
	9			2666.1			x				
	10			2619.2	x	x		x			
	11			2617			x				
	12			2568.6	x	x	x				
	13			2470.4	x	x	x				
	14			2469.5							
	15			2373.9			x				
	16			2371.5	x	x					
	17			1880.5	x	x	x				
	18			793.5	x	x					
	19			14	x	x		x			
	20			13.9							
1283	1	-8.166	-13.431	3769.8	x	x					
	2			3770			x				x
	3			3451	x	x					

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	4			3255.2	x	x	x				
	5			3097.6							
	6			2961	x	x	x				
	7			2814.1	x	x					
	8			2764.7	x	x	x				
	9			2717.1	x	x	x				
	10			2715.3							
	11			2665.7	x	x	x		x		
	12			2617.7	x	x	x				
	13			2469.7	x	x	x				
	14			2372.6	x	x					
	15			1928.9	x	x	x	x	x		
	16			1879.7	x	x	x	x	x		
	17			1830.7	x	x	x	x	x		
	18			1780.4	x	x	x				x
	19			1188.7	x	x			x		
	20			495.6							x
	21			13	x	x					x
1284	1	-8.166	-13.401	3540.2	x	x					
	2			3540							
	3			3254.2	x	x	x				
	4			3108.1							
	5			2960.7	x	x	x				
	6			2813.3	x	x	x				
	7			2764.5	x	x	x				
	8			2709.2	x	x	x				
	9			2658.4	x	x	x	x			
	10			2618.8							
	11			2616.7	x	x	x	x			
	12			2470.5	x	x	x	x			
	13			2372.7	x	x	x				
	14			2125	x	x	x				
	15			1928.5	x	x	x				
	16			1880.2	x	x	x				
	17			1830.3	x	x	x				
	18			1781.4	x	x	x				
	19			1189.5	x	x	x	x			
	20			793.9							
	21			13	x	x					
1285	1	-8.166	-13.367	2931.7			x				
	2			2931.6	x	x					
	3			2862.5	x	x					
	4			2861.2			x				
	5			2814.5	x	x					
	6			2766.2			x				
	7			2764.8	x	x					
	8			2715.7	x	x	x				
	9			2667.7			x				
	10			2665.3	x	x		x			
	11			2616.7	x	x	x	x			
	12			2570.2			x				
	13			2568.1	x	x		x			
	14			2470.2	x	x					

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	15			2372.8	x	x	x				
	16			2176.3	x	x					
	17			1978.4	x	x	x				
	18			1928.5	x	x	x				
	19			1879	x	x	x				
	20			1781.6							
	21			782.1	x	x		x			
	22			11.9	x	x					
1286	1	-8.166	-13.333	3273.5	x	x					x
	2			3273.9			x				
	3			3059.5	x	x					
	4			2863.9			x				x
	5			2862.4	x	x					
	6			2813.7	x	x					
	7			2765.5	x	x	x		x		
	8			2715.8	x	x	x				
	9			2667.7	x	x		x	x		
	10			2665.8			x				x
	11			2617.7	x	x	x	x			
	12			2568.5	x	x	x	x			
	13			2371.9	x	x					
	14			2174.9	x	x					
	15			1978	x	x	x				
	16			1879.8	x	x	x		x		
	17			1780.7	x	x					
	18			990.4	x	x		x			
	19			645.2							x
	20			12.7	x	x					
	21			12.9							
1287	1	-8.292	-13.522	2862.8	x	x	x		x		
	2	-8.292	-13.522	2765	x	x	x		x		
	3	-8.291	-13.522	2666	x	x	x		x		
	4	-8.290	-13.521	2863	x	x	x		x		
	5	-8.290	-13.521	2765.1	x	x	x	x	x		
	6	-8.290	-13.521	2666.7	x	x	x		x		
	7	-8.289	-13.520	2863.4	x	x	x		x		
	8	-8.289	-13.520	2764.5	x	x	x	x	x		
	9	-8.289	-13.520	2665.7	x	x	x		x		
	10	-8.287	-13.519	3006.6	x	x			x		
	11	-8.287	-13.519	2862.7	x	x	x		x		
	12	-8.287	-13.519	2765	x	x	x	x	x		
	13	-8.287	-13.519	2667.9	x	x	x		x		
	14	-8.284	-13.517	2863.4	x	x	x		x		
	15	-8.284	-13.516	2765.3	x	x	x	x	x		
	16	-8.284	-13.516	2666	x	x	x		x		
	17	-8.282	-13.514	2862.9	x	x	x		x		
	18	-8.281	-13.514	2765.1	x	x	x	x	x		
	19	-8.281	-13.513	2664.7			x				
	20	-8.279	-13.512	2862.5	x	x	x		x		
	21	-8.279	-13.512	2765	x	x	x		x		
	22	-8.279	-13.512	2666.5	x	x	x		x		
1288	1	-8.286	-13.517	2692.5	x	x	x	x	x		
	2	-8.286	-13.517	2985.2	x	x	x	x	x		

Station No.	Niskin Bottle	lat S	lon W	depth [m]	CH4	d13C CH4	He	H2	Mn	Rn	O2
	3	-8.286	-13.517	2987.2	x	x	x	x	x	x	
1289	1	-8.284	-13.500	2944.9	x	x			x		
	2			2944.6							x
	3			2835	x	x	x		x		
	4			2813.4	x	x			x		
	5			2764.4	x	x	x	x	x		x
	6			2715.2	x	x	x		x		
	7			2666.5	x	x	x	x	x		
	8			2616.7	x	x	x	x	x		
	9			2567.5	x	x	x		x		
	10			2520.7	x	x			x		
	11			2518.7			x				
	12			2469.2	x	x	x		x		x
	13			1977.3	x	x	x				
	14			1188.8	x	x	x				x
	15			792.7	x	x					
	16			395.5							x
	17			11.6	x	x					x
1290	1	-8.306	-13.522	2942.3	x	x	x		x		
	2			2942.1							x
	3			2838	x	x			x		
	4			2813	x	x	x		x		
	5			2764	x	x			x		x
	6			2715.9	x	x	x		x		
	7			2666.7	x	x	x	x	x		
	8			2617.5	x	x	x	x	x		
	9			2567.7	x	x	x	x	x		
	10			2520.7	x	x			x		
	11			2518.7			x				
	12			2470.4	x	x			x		
	13			1978.5	x	x	x				
	14			1188.6	x	x		x			x
	15			789	x	x					
	16			395.7							x
	17			11.3	x	x		x			x
1291	1	-8.292	-13.509	2868	x	x	x	x	x		
	2	-8.292	-13.510	2959.5	x	x	x	x	x		
1296	1	-8.289	-13.527	3356.2	x	x	x	x	x	x	
	2	-8.290	-13.527	3361	x	x	x	x	x	x	
	3	-8.289	-13.526	3363.2	x	x	x	x	x	x	

Appendix 2:

List and petrographic description of rock samples

Samples taken, where, what and how. And where are they now.

Abbreviations for sampling equipment	
OFOS_AC	Accidentially sampled material during OFOS dive due to seafloor contact
ROV_AC	Accidentially sampled material during ROV dive due to seafloor contact
ROV_P	Sample taken on position with ROV manipulators
VSR	Vulkanit Stossrohr (wax-corer for volcanic rocks)
WC_CTD	Miniature wax-corer attached to bottom alarm of CTD

Abbreviations for scientists taking samples/subsamples:	
AK	Abigail Knee
FZ	Frank Zielinski
HP	Holger Paulick
JS	Jens Stecher
KL	Klas Lackschewitz
ST	Stefanie Tille
TK	Thomas Kuhn

Sample ID			Information about station										Sample description			Sampling record (end of cruise)	
Cruise#	Station#	Sample#	Sampling equipment	Start station		End station		Sample Position				Size	Rock type	Comments	**Where** is the sample	**Subsample** taken by
				Date	Time	Date	Time	Lat Deg. S	Lat Min.	Long Deg. W	Long Min.					
M62/5a	1207	1	WC_CTD	28/11/04	21:45:00	29/11/04	00:05:45	8	26.54	13	36.63	very few, very small glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5a	1208	1	WC_CTD	29/11/04	03:19:00	29/11/04	04:57:20	8	47.50	13	30.20	few glass chips	volcanic glass, sediment	glass palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5a	1209	1	WC_CTD	29/11/04	05:34:00	29/11/04	07:15:00	8	48.80	13	30.30	very few glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5a	1210	1	WC_CTD	29/11/04	07:40:00	29/11/04	09:14:30	8	49.21	13	29.53	glass chips	volcanic glass, sediment	glass palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1219	1	WC_CTD	2/12/04	04:58:00	2/12/04	06:54:50	9	13.20	13	18.10	possibly one glass chip ...	volcanic glass, sediment	... and a foraminifer or two	sample box to IfM GEOMAR, Kiel	
M62/5b	1220	1	WC_CTD	2/12/04	07:40:00	2/12/04	09:29:30	9	13.80	13	17.90	few, very small glass chips	volcanic glass, sediment	glass heavily palagonitized	sample box to IfM GEOMAR, Kiel	
M62/5b	1222	1	WC_CTD	2/12/04	19:17:00	2/12/04	21:22:30	8	18.00	13	38.00	few glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers, shell fragment	sample box to IfM GEOMAR, Kiel	
M62/5b	1223	1	WC_CTD	2/12/04	22:19:00	3/12/04	00:27:48	8	19.02	13	35.04	few glass chips	volcanic glass, sediment	glass palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1224	1	WC_CTD	3/12/04	01:15:00	3/12/04	03:42:42	8	18.00	13	32.00	glass chips	volcanic glass, sediment	glass fresh or only slightly palagonitized, few foraminifers	IfM GEOMAR (KL)	
M62/5b	1225	1	WC_CTD	3/12/04	04:33:00	3/12/04	06:57:30	8	17.00	13	34.00	traces	sediment	few foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1226	1	WC_CTD	3/12/04	07:45:00	3/12/04	09:53:00	8	15.99	13	34.04	glass chips	volcanic glass, sediment	glass palagonitized, foraminifers	IfM GEOMAR (KL)	
M62/5b	1229	1	WC_CTD	3/12/04	17:30:00	3/12/04	19:51:00	8	18.70	13	32.00	few glass chips	volcanic glass, sediment	glass fresh to slightly palagonitized, few foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1230	1	WC_CTD	3/12/04	20:52:00	3/12/04	22:55:30	8	18.00	13	30.75	5mm, glass chips	volcanic glass, sediment	glass slightly to heavily palagonitized, foraminifers	IfM GEOMAR (KL)	
M62/5b	1233	1	WC_CTD	5/12/04	05:16:00	5/12/04	07:18:10	8	17.75	13	30.70	glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1234	1	WC_CTD	5/12/04	08:01:00	5/12/04	09_57:30	8	17.85	13	30.50	glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1237	1	WC_CTD	5/12/04	22:07:00	6/12/04	00:09:00	8	18.22	13	30.50	glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1238	1	WC_CTD	6/12/04	00:51:00	6/12/04	02:53:00	8	18.45	13	30.80	glass chips	volcanic glass, sediment	glass heavily palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1239	1	WC_CTD	6/12/04	03:46:00	6/12/04	05:53:34	8	18.15	13	31.00	glass chips	volcanic glass, sediment	glass heavily altered (perlite?) and palagonitized, foraminifers, shell fragments	sample box to IfM GEOMAR, Kiel	
M62/5b	1240	1	WC_CTD	6/12/04	06:46:00	6/12/04	08:49:30	8	19.50	13	29.20	traces	sediment	foraminifers, shell fragments, one snail	Senckenberg (JS)	
M62/5b	1242	1	ROV_AC Dive 27	6/12/04	13:30	6/12/04	19:11	8	17.90	13	30.80	12cm rock sample	basalt with glass and hydrothermal manganese crust	extensively altered and biologically colonized	sample box to IfM GEOMAR, Kiel	TK (Mn crust), KL (volc. glass)
								8	18.40	13	30.60					
M62/5b	1243	1	WC_CTD	8/12/04	09:01:30	8/12/04	10:05:30	9	44.10	13	8.70	very small glass chips	volcanic glass, sediment	glass badly altered	sample box to IfM GEOMAR, Kiel	
M62/5b	1246	1	WC_CTD	8/12/04	14:56:00	8/12/04	16:02:48	9	38.20	13	10.80	very few glass chips	volcanic glass, sediment	glass slightly palagonitized, hardly any foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1247	1	WC_CTD	8/12/04	17:01:00	8/12/04	18:42:27	9	35.50	13	5.00	few glass chips	volcanic glass, sediment	glass badly altered, foraminifers, shell fragments	sample box to IfM GEOMAR, Kiel	
M62/5b	1249	1	WC_CTD	8/12/04	21:39:35	8/12/04	22:50:00	9	34.93	13	13.98	few glass chips	volcanic glass, sediment	glass fresh or only slightly altered, abundant biological detritus (forams, snails, etc.)	sample box to IfM GEOMAR, Kiel	
M62/5b	1252	1	ROV_AC Dive 28	9/12/04	10:33	9/12/04	19:28	8	18.00	13	31.00	10cm rock sample	basalt with glass and hydrothermal manganese crust	some alteration	sample box to IfM GEOMAR, Kiel	TK (Mn crust)
								8	18.40	13	30.70					
M62/5b	1255	1	WC_CTD	10/12/04	02:59:00	10/12/04	05:13:24	8	15.25	13	35.10	glass chips	volcanic glass, sediment	glass heavily palagonitized, few foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1257	1	WC_CTD	10/12/04	09:26:00	10/12/04	13:57:25	8	18.05	13	30.50	5 mm, glass chips	volcanic glass, sediment	glass slightly to heavily palagonitized, foraminifers	IfM GEOMAR (KL)	
M62/5b	1258	1	OFOS_AC	10/12/04	14:46:00	10/12/04	21:06:00	8	18.08	13	30.58	5 cm rock sample	basalt, glassy	minor alteration, traces of Mn crust, partially colonized by tube building organisms; position is single ground contact incident	sample box to IfM GEOMAR, Kiel	TK (Mn crust)
M62/5b	1258	2	OFOS_AC	10/12/04	14:46:00	10/12/04	21:06:00	8	18.08	13	30.58	two pieces about 1 cm diameter each	basalt	some alteration and Mn crusts; position is single ground contact incident	sample box to IfM GEOMAR, Kiel	TK (Mn crust)
M62/5b	1259	1	WC_CTD	10/12/04	21:41:00	10/12/04	23:57:20	8	17.20	13	31.90	glass chips	volcanic glass, sediment	glass slightly to heavily palagonitized, some badly altered (perlite?), foraminifers	IfM GEOMAR (KL)	
M62/5b	1261	1	WC_CTD	11/12/04	04:13:00	11/12/04	06:37:44	8	15.25	13	31.80	glass chips	volcanic glass, sediment	glass slightly palagonitized, few foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1262	1	WC_CTD	11/12/04	07:31:00	11/12/04	09:55:00	8	14.80	13	31.80	one glass chip	volcanic glass, sediment	fresh glass, some foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1265	1	WC_CTD	11/12/04	22:42:00	12/12/04	02:00:10	8	18.50	13	30.50	few glass chips	volcanic glass, sediment	glass palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1267	1	WC_CTD	12/12/04	05:40:00	12/12/04	07:39:46	8	19.00	13	31.20	very few glass chips	volcanic glass, sediment	glass slightly palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	

Petrographic description of basalt samples.

Sample ID			Sample description					
Cruise#	Station#	Sample #	Size	Sample type/ Rock type	Description: overall lithology, rock shape, texture	Matrix, vesicularity	Phenocrysts (type and vol%)	Alteration (grade, crystals, vesicles, ...)
M62/5b	1242	1	12cm rock sample	altered and biologically colonized basalt with glass and hydrothermal manganese crust	this is a small protrusion (diameter: 5 cm max) consisting of black glass; a quenched glass crust is 0.5cm thick	aphyric	none	crust is extensively altered to orange-brown clay-FeOx minerals; the alteration is covered by 1 mm black to brown Mn crust that is colonized by tube building organisms (similar serpulina)
M62/5b	1252	1	10cm rock sample	altered basalt with glass and hydrothermal manganese crust	basalt with a quenched glass crust (0.5 cm thick)	micro-crystalline	pyroxene, <1mm, <1%	some orange-brown clay-FeOx alteration on the crust; the alteration is covered by 1 mm black to brown Mn crust, cauliflower shapes on one side of the sample
M62/5b	1258	1	5 cm rock sample	basalt, glassy	nodular glassy basalt fragment lacking glass crust (lost due to collision with OFOS?)	aphyric	none	minor reddish-brown alteration, one side dusted by Mn crust, partially colonized by tube building organisms
M62/5b	1258	2	two chips about 1 cm diameter each	basalt	basalt partially with thin quenched crust	glassy to micro-crystalline	none	reddish-brown alteration and some Mn crusts
M62/5b	1268	1a	30cm rock sample	altered and biologically colonized pillow basalt talus fragment with glass and hydrothermal manganese crust	locally 0.5-1 cm glass crust (preserved in some places); spherulites up to 0.3 cm are concentrated in a zone 5 cm below and parallel to the glassy crust; interior is light grey and microcrystalline; Mn-crust on one side on glass glass and on the other side directly on the microcrystalline basalt => deposited on talus fragment	vesicles: <1 vol%, concentrated close to margin, < 1 mm diam.; Matrix aphyric	none	glass is palagonitized, glass and matrix altered to orange-brown clay-FeOx minerals along cracks and surfaces underneath Mn-crust; 1mm black Mn crust with individual bladed crystals; colonized by tube building organism, tubes are Mn-dusted
M62/5b	1268	1b	17cm rock sample	altered and biologically colonized pillow basalt talus fragment with glass and hydrothermal manganese crust	locally 0.5-1 cm glass crust (preserved in some places); spherulites up to 0.3 cm are concentrated in a zone 1-2 cm below and parallel to the glassy crust; interior is light grey and microcrystalline; Mn-crust on one side on glass and on the other side directly on microcrystalline basalt => deposited on talus fragment	vesicles: <1 vol%, concentrated close to margin, < 1 mm diam.; Matrix aphyric	none	glass is palagonitized, glass and matrix altered to orange-brown clay-FeOx minerals along cracks and surfaces underneath Mn-crust; 1mm black Mn crust with individual bladed crystals; colonized by tube building organism, tubes are Mn-dusted
M62/5b	1268	1c	5 cm rock chip	spherulitic basalt with minor FeOx alteration	spherulitic basalt with minor FeOx alteration; one cpx phenocryst (0.5 mm) with swallow tail texture => quench crystal	<1 vol% vesicles	none; 1 cpx quench crystal	orange-brown FeOx minerals along cracks
M62/5b	1268	1d	several rock chips 1 to 5 cm	basalt with up to 4 mm glassy crust	glass partially palagonitized	<1 vol% vesicles; microcryst. to glassy	none	minor palagonitization
M62/5b	1268	1e	two rock chips 1 to 3 cm	microcryst. basalt with some glassy crust	palagonizitation + <1 mm Mn crust	<1 vol% vesicles; microcryst. to glassy	none	palagonitization + <1 mm Mn crust
M62/5b	1268	1f	several rock chips; 1 to 5 cm	microcryst. to spherulitic basalt	FeOx alteration on surface covered by <1 mm Mn crust, feeding track of worm (?)	<1 vol% vesicles; microcryst	none	FeOx alteration on surface covered by <1 mm Mn crust, feeding track of worm (?)
M62/5b	1272	3	20 cm mostly angular fragment	microcryst. basalt with palagonitized glass crust and Mn-crust with multiple rind structure on one side	microcryst. basalt; mostly angular fragment with glass on one side, possibly pillow fragment; multiple rind structure with scrapemarks from extrusion; glass crust max 0.5 - 1cm strongly palagonitized; only glass covered by thin Mn-crust and microcryst surfaces are devoid of Mn-crusts (fractured during sampling); coalesed angular microcavities in the center of the specimen with euhedral calcite growing along walls (=> fluids infiltrated along cracks)	micro-crystalline	20 Vol.%; cpx-needles (<0.5 mm); quench crystals, some with swallow tails; 5 Vol% ol (<1 mm), skelettal growth common; 5% round Fe-Ti-Ox? (<0.5mm), partly red-stained oxidation; heterogeneous distribution	glass strongly palagonitized; glass and microcryst. basalt show FeOx alteration along cracks; thin Mn-crust covering glass; some foraminifers and tube-building organisms
M62/5b	1272	6a	10 cm nodular fragment	microcryst. basalt; relicts of glassy crust mainly palagonitized, Mn-crust	mainly microcryst. with relicts of glassy crust mainly palagonitized + intense FeOx; 2 vol% microphenocrysts, abundant forams; <1 mm Mn crust	micro-crystalline	<0.5 mm cpx, fsp, ol; 2 vol%	extensively palagonitized glass; microcryt. Basalt has common FeOx alteration; <1 mm Mn crust, abundant forams
M62/5b	1288	5	several fragments total 0.5 kg	aphyric, glassy basalt	blocky to anglular fragments with some nodular shapes after curvy quench fractures; thick glass with abundant elongate to round, bulbous cavities, cm scale; some filled with sediment or inhabited by tube-building organisms; locally some (<1 vol%) sub-mm round vesicles; some palagonitization; thin Mn-Fe-oxide-crust; abundant quench fractures	aphyric	none	palagonitization on outer surfaces, inner walls of cavities and along cracks; thin Mn-Fe-oxide crust = plume fallout
M62/5b	1291	1a	several angular fragments and chips max size 3 cm; total ca 30 g	microcryst. basalt and glassy aphyric basalt	angular fragments and chips of fresh and altered volcanic glass and microcryst basalt pieces from a mesh sample of brachiopod; sampled next to a large pillow (fragments of hyaloclastite?)	vesicular (<0.5 mm) up to 20 vol%	aphyric	Some fragments with Mn crusting; palagonization along cracks and outer surfaces; some fragments also show additional fracture filling by particlar, relatively hard, grey alteration material
M62/5b	1292	1a+b	several fragments and glass chips; approx. 0.8 kg	basaltic glass is about 0.2 kg embedded in vaseline and mud	angular fragments and chips of fresh volcanic glass; some pelagic sediment;	?	aphyric	some palagonitization
M62/5b	1293	1	some minute glass chips in mud and vaseline	fresh glassy aphyric basalt with minor palagonitization		?	none	some redish fragments might by rusty particles from the corer
M62/5b	1294	1	some glass chips in mud	fresh basalt glass with minor palagonitization		?	none	slightly palagonitized
M62/5b	1295	1a+b	0.4 kg of mud, vaseline and some glass	fresh basalt glass with minor palagonitization		?	none	slightly palagonitized
M62/5b	1296	1	12 cm	altered microcryst. basalt	slightly rounded basalt talus fragment with relict glass crust, altered and colonized by tube-building organisms	vesicular (<1mm; <1vol%)	altered Ol (<1mm; <1vol%)	glass heavily palagonitized; Fe-oxide clay alteration on all surfaces around sample
M62/5b	1296	2a	500 g glass chips	basaltic glass (hyaloclastite) and pelagic sediment; this is the host sediment to basalt clasts such as samples 1296-1 and 1296-2b	volcanic glass chips and angular fragments in pelagic sediment (with foraminifers); some rounded fragments <5mm of light gray clayey clastic sedimentary rocks, some with dark cores	glassy; rare vesicles	none	glass slightly palagonitized on outer surfaces
M62/5b	1296	2b	20 cm diameter	altered microcrystalline aphyric basalt	angular altered basalt	microcryst.	none	intense FeOx-clay staining on all surfaces, abundant black spotty alteration of uncertain significance
M62/5b	1296	6	700 g of basalt fragements	aphyric basalt	fragments recovered from sledge after the dive; most likely this sample was derived from the same location as samples 1296-1 and 2. Four different groundmass types: glassy, partially glassy and palagonitized, microcrystalline and severly altered, cavernous	rare vesicles; matrix variable	none	variable from fresh glass to intensely palagonitized, FeOx-clay alteration on some fragments; some biological colonization (thin white wiggly tubes); intensely altered fragments are carvernous with fine needle-shaped crystals growing from walls, groundmass brown-yellow, probably FeOx-clay assemblages

Sample ID			Information about station									Sample description			Sampling record (end of cruise)	
Cruise#	Station#	Sample#	Sampling equipment	Start station		End station		Sample Position				Size	Rock type	Comments	**Where** is the sample	**Subsample** taken by
				Date	Time	Date	Time	Lat Deg. S	Lat Min.	Long Deg. W	Long Min.					
M62/5b	1268	1a	ROV_P Dive 30	12/12/04	09:00	12/12/04	22:18	8	17.69	13	30.63	30cm rock sample	basalt, glass and hydrothermal Mn crust	glass palagonitized, biologically colonized	sample box to IfM GEOMAR, Kiel	TK (Mn crust), KL (volc. glass)
M62/5b	1268	1b	ROV_P Dive 30	12/12/04	09:00	13/12/04	22:18	8	17.69	13	30.63	17 cm rock sample	basalt, glass and hydrothermal Mn crust	glass palagonitized, biologically colonized	sample box to IfM GEOMAR, Kiel	TK (Mn crust), KL (volc. glass)
M62/5b	1268	1c	ROV_P Dive 30	12/12/04	09:00	14/12/04	22:18	8	17.69	13	30.63	5 cm rock chip	spherulitic basalt (<1vol vesicles)	minor FeOxide alteration along cracks	sample box to IfM GEOMAR, Kiel	
M62/5b	1268	1d	ROV_P Dive 30	12/12/04	09:00	15/12/04	22:18	8	17.69	13	30.63	several rock chips 1 to 5 cm	basalt up to 4 mm glassy crust	glass partially palagonitized	sample box to IfM GEOMAR, Kiel	
M62/5b	1268	1e	ROV_P Dive 30	12/12/04	09:00	16/12/04	22:18	8	17.69	13	30.63	two rock chips 1 to 3 cm	microcryst. basalt with some glassy crust	palagonizitation + <1 mm Mn crust	sample box to IfM GEOMAR, Kiel	
M62/5b	1268	1f	ROV_P Dive 30	12/12/04	09:00	17/12/04	22:18	8	17.69	13	30.63	several rock chips; 1 to 5 cm	microcryst. to spherulitic basalt	FeOx alteration on surface covered by <1 mm Mn crust, feeding track of worm (?)	sample box to IfM GEOMAR, Kiel	
M62/5b	1269	1	WC_CTD	12/12/04	23:33:00	13/12/04	01:43:30	8	16.00	13	30.00	glass chips	volcanic glass, sediment	glass fresh to slightly palagonitized, foraminifers	IfM GEOMAR (KL)	
M62/5b	1272	1	ROV_P Dive 31	13/12/04	11:00	13/12/04	22:30	8	18.13	13	30.60	ca 100 g	sand	mainly foraminifers (< 1 mm) but including 1 to 5 mm white flaky fragments of gastropoda and brachiopoda (ca 10 Vol%)	Senkenbreg (JS); WHOI (AK); MPI Bremen (FZ)	
M62/5b	1272	3	ROV_P Dive 31	13/12/04	11:00	13/12/04	22:30	8	18.16	13	30.59	20 cm mostly angular fragment	Ol-px-phyric basalt; multiple rind textures	abundant px and ol quench crystals; vesicles with euhedral calcite on walls	sample box to IfM GEOMAR, Kiel	TK (Mn crust)
M62/5b	1272	6a	ROV_P Dive 31	13/12/04	11:00	13/12/04	22:30	8	18.13	13	30.52	10 cm nodular fragment	microcryst. Basalt; relicts of glassy crust mainly palagonitized	abundant forams; intense FeOx alteration, <1 mm Mn crust	sample box to IfM GEOMAR, Kiel	TK (Mn crust)
M62/5b	1272	6b	ROV_P Dive 31	13/12/04	11:00	13/12/04	22:30	8	18.13	13	30.52	ca 1 kg	sand	foraminifers (<1 mm)	sample box to IfM GEOMAR, Kiel	HP (for Prof. Sander; Uni Bonn); JS; FZ
M62/5b	1275	1	WC_CTD	14/12/04	05:15	14/12/04	07:43	8	14.30	13	33.40	glass chips	volcanic glass, sediment	glass strongly palagonitized, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1276	1	WC_CTD	14/12/04	08:52	14/12/04	10:52	8	17.90	13	30.80	one lonely glass chip (a tiny little one)	volcanic glass, sediment	glass slightly palagonitized, some additional crumbs of palagonite, foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1280	3a	ROV_P Dive 32	15/12/04	12:30	16/12/04	13:00	8	18.17	13	30.98	10 cm	yellowish pelagic sediment (ooze) with crust-like layer of volcanic glass chips, slightly cemented by Mn-oxides	some domains of grey-greenish clay, biogenic tubes filled with Mn-oxides	sample box to IfM GEOMAR, Kiel	
M62/5b	1280	3b	ROV_P Dive 32	15/12/04	12:30	16/12/04	13:00	8	18.17	13	30.98	10 cm	yellowish pelagic sediment (ooze) with crust-like layer of volcanic glass chips, slightly cemented by Mn-oxides	some domains of grey-greenish clay, biogenic tubes filled with Mn-oxides	sample box to IfM GEOMAR, Kiel	
M62/5b	1280	3c	ROV_P Dive 32	15/12/04	12:30	16/12/04	13:00	8	18.17	13	30.98	ca. 5 kg	yellowish pelagic sediment (ooze) with crust-like layer of volcanic glass chips, slightly cemented by Mn-oxides	some domains of grey-greenish clay, biogenic tubes filled with Mn-oxides; subsamples: ca. 200g yellowish pelagic sediment (T.Kuhn); ca. 150g volcanic glass chips, slightly cemented by Mn-oxides (T. Kuhn); ca. 50g grey-greenish clay (T. Kuhn)	sample box to IfM GEOMAR, Kiel	KL (two containers of mud withglass chips); 3 subsamples TK (see comments); JS (sed. Mn crust); AK (sed); FZ (sed)
M62/5b	1283	1	WC_CTD	16/12/04	20:40	16/12/04	23:26	8	10.00	13	25.80	very few small glass chips	volcanic glass, sediment	glass slightly to moderately palagonitized, few foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1285	1	WC_CTD	17/12/04	03:30	17/12/04	05:34	8	10.00	13	22.00	no glass	sediment	some foraminifers	sample box to IfM GEOMAR, Kiel	
M62/5b	1287	1	WC_CTD	17/12/04	10:21	17/12/04	15:30	8	17.60	13	31.40	3 pieces each 1 to 2 cm and some glass chips	volcanic glass, sediment	moderately to heavily palagonitized, foraminiferer	IfM GEOMAR (KL)	
								8	16.60	13	30.50					
M62/5b	1288	5	ROV_AC Dive 33	17/12/04	16:00	18/12/04	08:15	8	17.60	13	31.20	several fragments total 0.5 kg	aphyric, glassy basalt	thick glass with abundant elongate to round, bulbous cavities, cm scale; some filled with sediment or inhabited by tube-building organisms; some palagonitization; thin Mn-Fe-oxide-crust	sample box to IfM GEOMAR, Kiel	TK (Mn crust), KL (volc. glass)
								8	17.20	13	31.00					
M62/5b	1289	1	WC_CTD	18/12/04	08:46	18/12/04	10:49	8	17.00	13	30.00	few glass chips	volcanic glass, sediment	partially palagonitized glass; foraminifers	IfM GEOMAR (KL)	
M62/5b	1291	1a	ROV_P Dive 34	18/12/04	14:00	19/12/04	08:00	8	17.51	13	30.84	several angular fragments and chips max size 3 cm	microcryst. basalt and glassy aphyric basalt	Some fragments with Mn crusting; palagonization along cracks; vesicular (<0.5 mm) up to 20 vol%	IfM GEOMAR (KL)	JS (sediment)
M62/5b	1291	1b	ROV_P Dive 34	18/12/04	14:00	19/12/04	08:00	8	17.51	13	30.84	ca. 1 kg Brachiopod shill	biogenic detritus; abundant intact shells		Senkenberg (JS), WHOI (AK), MPI Bremen (FZ)	
M62/5b	1291	3	ROV_P Dive 34	18/12/04	14:00	19/12/04	08:00	8	17.54	13	30.62	Brachiopod shill	biogenic detritus; abundant intact shells		Senkenberg (JS), WHOI (AK)	
M62/5b	1292	1	VSR	19/12/04	09:07	19/12/04	11:09	8	30.00	13	32.40	approx. 0.2 kg of glass in ca. 0.8 kg of vaseline and mud	glassy aphyric basalt with some palagonitization	same sample in two bags	sample box to IfM GEOMAR, Kiel	ST (volc. glass)
M62/5b	1293	1	VSR	19/12/04	11:40	19/12/04	13:41	8	31.00	13	31.40	some minute glass chips in mud and vaseline	fresh glassy aphyric basalt with minor palagonitization	some redish fragments might by rusty particles from the corer	Uni Bremen (ST)	
M62/5b	1294	1	VSR	19/12/04	14:00	19/12/04	16:00	8	31.60	13	31.20	some glass chips in mud	fresh basalt glass with minor palagonitization		sample box to IfM GEOMAR, Kiel	ST (volc. glass)
M62/5b	1295	1 a+b	VSR	19/12/04	16:22	19/12/04	18:36	8	33.10	13	31.50	0.4 kg of mud, vaseline and some glass	fresh basalt glass with minor palagonitization	same sample in two bags	1a: Uni Bremen (ST)	1b: ST (volc. glass)
M62/5b	1296	1	ROV_P Dive 35	19/12/04	17:00	20/12/04	11:45	8	17.35	13	31.56	12 cm slightly rounded basalt boulder	altered microcryst. basalt with relict glass; colonized by tube-building organisms	glass heavily palagonitized	sample box to IfM GEOMAR, Kiel	
M62/5b	1296	2a	ROV_P Dive 35	19/12/04	17:00	20/12/04	11:45	8	17.35	13	31.56	500 g glass chips and some pelagic sediment	glassy aphyric basalt	rare fine grained clayey pebbles, foraminifers; this is the host to altered basalt fragments such as samples 1296-1 and 1296-2b	sample box to IfM GEOMAR, Kiel	KL (volc. glass)
M62/5b	1296	2b	ROV_P Dive 35	19/12/04	17:00	20/12/04	11:45	8	17.35	13	31.56	20 cm diameter angular altered basalt	altered microcrystalline aphyric basalt		sample box to IfM GEOMAR, Kiel	

Sample ID			Information about station									Sample description			Sampling record (end of cruise)	
Cruise#	Station#	Sample#	Sampling equipment	Start station		End station		Sample Position				Size	Rock type	Comments	**Where** is the sample	**Subsample** taken by
				Date	Time	Date	Time	Lat Deg. S	Lat Min.	Long Deg. W	Long Min.					
M62/5b	1296	6	ROV_AC Dive 35	19/12/04	20:24	20/12/04	11:35	8	18.10	13	31.90	700 g of basalt fragements	aphyric basalt of four different groundmass types: glassy, partically glassy and palagonitized, microcrystalline and severely altered	fragments recovered from sledge after the dive; most likely this sample was derived from the same location as samples 1296-1 and 2.	sample box to IfM GEOMAR, Kiel	KL (volc. glass)
								8	17.50	13	31.60					

Comments:
For WC_CTD stations position at start of station is used.
If two positions are given, they are start and end position of station.
Grey shaded samples are described in more detail in the accompanying table.

Appendix 3:

ROV dive protocols

No	legend
1	pillow lava
2	lLobate lava
3	sedimented older lava
4	pelagic sediment
5	sheet flows
6	ropy lava
7	collapsed pits
8	lava pillar
9	contact of older (i) and young flow (ii)
10	fractures, fissures, larger cleft
11	ledge
12	steep wall
13	ridge
14	flow front
15	pillow, sheet flow talus
16	Fe-, silica-stained talus
17	direction of near-seafloor water
18	sulfide mound
19	sulfide talus
20	hydrothermal sediment
21	sulfide chimney (active / inactive)
22	hydrothermal crust
23	deep-sea-fauna
24	Ventfauna

Station 1242 **M62/5B**
Segment A2 North
6. December 2004
Dive 27

Time (hh:mm:ss)	CODE	Notes
ca. 13:00		begin station
14:21:25		at 1693 m
14:27:39		at 1877 m
14:37:34		at 2137 m
14:47:13		at 2368 m
15:00:12		at 2710 m
15:06:31		30 m above seafloor at 2875 m
15:08:19		seafloor in view; 12 m above ground; 2893 m
15:09:45	3	sedimented pillow flows
15:11:41	4	
15:12:52		3.8 m above seafloor at 2901 m
15:13:55		Contact: sedimented pillow flow and surrounding pelagic sediment
15:14:32		Due north for 25 m
15:15:56	3	
15:16:45		fantastic pillows
15:18:30		Due east for 25 m
15:20:37	3	sedimented pillow flows
15:21:49		steep cliff
15:22:44		Due south for 50 m, gorgonian
15:24:22		Down slope across cliff (probably a pillow flow front)
15:27:09	3	
15:27:37		Heavily sedimented pillow, dark blue holothurian
15:29:34		due West for 50 m; fabulous pillows, dark blue holothurian
15:30:07	4	
15:31:23	4	
15:32:20	15	few pillows on the sediment
15:33:49	15	group of pillows sticking out of the sediments
15:35:20		Due N for 75 m
15:37:01	4	
15:37:47	3	pillow lava talus ridge
15:39:03	23	dark blue holothurian
15:41:12		pillow lava talus ridge
15:42:47	23	dark blue holothurian
15:43:35	3	
15:43:54		Steep volcanic cliff; edge of pillow lava ridge? 2901 m top
15:45:06		Due east for 75 m
15:48:23		down the cliff
15:49:04		sedimented bottom at 2918 m, dark blue holothurian
15:50:20	4	
15:51:03		small outcrop of pillow lava above sediments
15:51:41	23	dark blue holothurian
15:52:25	3	
15:53:13		fabulous pillows with brown fine volcanic ash(?weathering products)) overlying white pelagic sediment, swimming platyhelminth
15:55:01	3	
15:55:37		pillow flow very rugged terrain, abundant protrusions
15:59:32		ROV ca. 120 m north of the Meteor
16:00:29		swimming platyhelminth, holothurian
16:00:56	3	
16:03:44	3	course due south for 75 m
16:05:44	23	gorgonian
16:06:04	1	Limited sediment cover, very rugged pillow flow with abundant protrusions, commonly flow structures preserved on outer margins of pillow *bidies*
16:07:24		cliff going down slope from 2895 m, gorgonian
16:09:38	1	partially sedimented
16:10:46		cliff 2894 m
16:11:21	23	dark blue holothurian
16:12:31	23	gorgonian
16:12:37		Due west for 125 m
16:13:25		Pillow flow with well-preserved surface structures
16:13:51		ROV ca 50 m N of Meteor
16:15:47		volcanic cleft at 2892 m

Time (hh:mm:ss)	CODE	Notes
16:18:42		going down
16:20:41		dark blue holothurian
16:20:46	3	sedimented pillows terrace at 2901 m
16:23:47	4	Base of cliff at 2907 m; Pillow flow ends? Contact to pelagic sediment; following contact, gorgonian
16:25:34		talus breccia on flow front(?); strongly covered by pelagic sediment
16:26:21		gorgonian
16:26:53		following sediment/pillow talus contact; crossing into more sedimented terrain
16:28:16		2 dark blue holothurians
16:28:56		to the N for 125 m
16:29:39		red shrimp
16:29:57		branched gorgonian
16:30:06	15	pillow talus
16:31:56		sedimented pillow slope
16:32:24		volcanic cleft at 2898 m
16:35:58		down into more sedimented area; clear contact of pillow flow to pelagic sediment; base at 2911 m
16:37:27	4	
16:38:29	4	2912 m
16:38:50	3	some strongly sedimented pillows are sticking out
16:40:02	4	
16:40:39	4	2911 m
16:41:32		Fine volcanic ash overlying white pelagic sediment
16:42:23		ditto; large ripple structures
16:43:33		due east for 150m
16:44:39	3	
16:44:56	23	gorgonian
16:45:16	3	2907 m
16:45:34		red shrimp
16:46:16		gorgonian
16:46:25	3	lightly sedimented pillows; 2900 m
16:47:07	1	2896 m
16:48:34	1 + 3	sedimented pillows
16:49:23		cliff; 2897 m
16:49:41	23	5 dark blue holothurians
16:50:03		going down
16:50:38		gorgonian
16:52:46		Trouble with the video monitors and lighting
17:14:41		End of station

Station 1252 **M62/5B**
Segment A2 North
9. December 2004
Dive 28

Time (hh:mm:ss)	CODE	Notes
10:57:25		start of dive
10:59:57		257 m
11:05:36		426 m
12:07:19		2240 m
12:16:24		2375 m; directly at position of elevated CH4 measurement of 1230CTD
12:26:15		0.1 negative T anomaly (at 12:24); conductivity lower
12:34:06		2895 m; seafloor
12:34:36	3	
12:34:56	3	
12:35:38	3	
12:35:49	4	
12:35:52	4	
12:36:35	3	
12:36:46	3	travel along small cleft; lava flow front?
12:38:00	3	
12:39:55	3	
12:40:03		steep cleft; going down; top 2900 m
12:42:23	23	gorgonian on pillow
12:42:41		going down several terraces
12:44:05	4	
12:44:18		base at 2918 m
12:44:35	4	
12:44:53	23	dark blue holothurian
12:45:34	3	strongly sedimented lava (talus?)
12:46:15		hit ground
12:46:29		hit ground
12:46:46		2918; THIS is the base
12:47:23		hit ground
12:47:28		hit ground
12:47:29		hit ground
12:47:52		turbidity; thruster
12:48:16	3	
12:48:22	3	
12:50:55		start moving again
12:51:34		going down: 2922 m
12:52:20		turbidity; thruster
12:53:43	3	
12:53:52	3	
12:54:37	3	2927 m
12:55:39		hit ground
12:56:52		drifted to the SW course correction to reach the CTD anomaly site
12:57:24	3	2933 m
12:58:21	4	sedimented talus(?)
12:58:27	4	
12:59:03	3	facing a cliff going up across pillow lava flow front
12:59:09	3	
13:00:00	3	
13:00:06	3	great pillow structures
13:01:13		Reached CDT point start spiraling; going 25 m due East
13:02:30	3	going down reached 2933 m
13:02:54	4	
13:03:02	3	
13:03:22	4	
13:03:31	4	
13:03:35	4	brown sediment overlying white pelagic sediment
13:04:16	3	
13:04:31	3	
13:04:45	4	
13:04:51	4	
13:05:17	3	climbing again 2928 m
13:05:45	3	
13:06:09		course: 25 m due north

Time (hh:mm:ss)	CODE	Notes
13:06:27	3	
13:06:32	3	
13:06:41		brown sediment overlying white pelagic sediment; front of pillow flow
13:07:54	23	dark blue holothurian
13:08:07	4	
13:08:13	23	dark blue holothurian
13:08:15	4	
13:08:31	3	
13:08:40	3	
13:09:05	3	2940 m
13:09:39		50 m due west
13:09:58	3	fantastic pillows!
13:10:22		some lobate surface structures
13:10:47	3	
13:11:52		thruster causing turbidity
13:12:23	3	moving along lava flow front? Steep slope from right to left.
13:14:00		turbidity anomaly
13:15:55	3	traveling uphill 2921 m
13:16:09	3	
13:16:51	23	gorgonian
13:16:56	3	
13:17:14	3	
13:17:43		Talus
13:18:07	23	gorgonian
13:18:10	4	
13:18:26	23	red shrimp
13:18:44	4	
13:19:04	4	
13:19:30	4	
13:19:40	4	
13:20:07		50 m due west
13:20:15		thruster causing turbidity
13:22:07	3	
13:22:11	3	dark blue holothurian
13:23:01		thruster causing turbidity
13:24:44		ROV is moving to the west
13:25:27	3	heavily sedimented
13:26:40		abundant pillow breccia talus
13:27:02		moving up on a cliff for ca. 10 m
13:27:42	23	red shrimp (13:25)
13:28:10	3	pillow flow top
13:29:05	3	
13:29:42		Lobate flow? Sedimented, dark blue holothurian
13:29:50		going down a cliff; top 2898 m
13:30:32		steep cliff
13:30:53		going 50 m due south
13:32:07		brown sediments in depression of lava flow surface => gastropods (tecosomata)!
13:32:48		hit ground
13:33:06		thruster causing turbidity
13:33:16	3	
13:35:22	23	dark blue holothurian
13:36:01	23	gorgonian
13:36:08		thruster causing turbidity
13:36:25	3	
13:36:41	3	top of pillow lava flow; sedimented; surprisingly smooth area; Lobate flow?
13:37:38	3	
13:38:14		turbidity peak natural
13:38:32		ROV at steep cliff looking down 2898 m
13:39:14	3	going down
13:40:19	3	ROV is moving to the West to get back on the due south track
13:40:25	3	
13:43:07	23	dark blue holothurian
13:43:22		moving down the cliff
13:45:07		?turbidity
13:45:19		75 m due East

Time (hh:mm:ss)	CODE	Notes
13:45:42		thruster causing turbidity
13:45:50	4	
13:45:55	4	
13:47:00		slope downhill
13:47:31	3	
13:49:51		13m deeper
13:50:33	3	
13:51:57	3	scattered basalt field
13:53:18		bottom of steep cliff
13:54:40	23	swimming platyhelminth
13:56:52		slope of rocks uphill
13:57:21	23	gorgonian
13:57:50		volcanic knoll
13:58:55		heading north
13:59:50		depth 2907m
14:00:13	3	
14:02:00	3	
14:02:23	3	sedimented lava flow
14:02:23	3	sedimented lava flow
14:05:51		going downhill, base 2930m
14:06:28	4	
14:07:00	23	dark blue holothurian
14:07:12		depth 2937m
14:07:29	3	
14:07:55	23	dark blue holothurian
14:09:43	4	sediment with pillow talus
14:13:08		ROV pauses because ship needs to catch up
14:14:44		brown sediment covering white sediment
14:20:40		continue to move north ca. 25m
14:21:34		strongly sedimented slope with volcanic talus
14:22:42	3	
14:24:57		100 m West
14:25:56	3	
14:26:06		sedimented lava flow
14:28:00	23	dark blue holothurian
14:28:03	4	
14:28:30	4	pure sediment
14:28:42	23	dark blue holothurian
14:29:08	23	dark blue holothurian
14:29:14		thruster cause turbidity
14:29:29	23	dark blue holothurian
14:29:30	23	dark blue holothurian
14:30:03	3	
14:31:09	4	
14:31:46		collapsed pillow
14:33:18		2899m
14:33:32		cliff right and left
14:33:49		collapsed structure
14:34:01		brown sediment covering pelagic sediment
14:34:25		following contact on the right
14:34:44		lava flow to sediment
14:35:21		going cliff uphill
14:36:19	4	
14:36:40	23	dark blue holothurian
14:36:41	23	dark blue holothurian
14:37:15	23	dark blue holothurian
14:37:16	23	dark blue holothurian
14:37:26	4	
14:38:33	23	dark blue holothurian
14:39:16		thruster causing turbidity
14:39:49	23	dark blue holothurian
14:39:53	4	
14:40:43		brown sediment on white pelagic sediment, dark blue holothurian
14:41:12	3	
14:41:22		old lava left-hand
14:41:51		thruster causing turbidity

Time (hh:mm:ss)	CODE	Notes
14:42:24		at northern rim of first ROV dive
14:42:49	4	2 dark blue holothurians
14:43:03		pure sediment
14:45:02		depth 2900m
14:45:33		thruster causing turbidity
14:46:36	23	dark blue holothurian
14:46:37	23	dark blue holothurian
14:47:56	23	dark blue holothurian
14:47:57	23	dark blue holothurian
14:48:09		200 m North
14:49:39		lava in contact to pelagic sediment right hand side
14:50:10	4	
14:50:17	23	dark blue holothurian
14:50:32	23	dark blue holothurian
14:50:41		brown sediment
14:50:56	23	dark blue holothurian
14:51:20		natural born turbidity (close to 1)
14:51:54	4	
14:51:56	23	dark blue holothurian
14:52:01	23	dark blue holothurian
14:52:37	23	dark blue holothurian
14:52:45	3	dark blue holothurian
14:53:07	4	dark blue holothurian
14:53:38		volcanic ridge
14:54:38		depth 2921m
14:56:16		150m East
14:57:09		brown sediment
14:57:28	23	dark blue holothurian
14:57:36	4	
14:58:23		pure sediment
14:58:54		slope uphill with old lava
14:59:16	3	
15:00:04		pillow with gorgonian
15:00:23		depth 2900m
15:00:40	23	dark blue holothurian
15:01:08		turbidity anomaly
15:02:20	3	
15:02:44		brown sediment
15:03:49		slope downhill
15:04:04	3	
15:05:37	3	
15:06:03		slight temperature change (0.03°C) due to change in depth?
15:06:34		turbidity back to normal
15:06:57		
15:10:13		
15:10:45	23	actinian
15:11:21		thruster caused turbidity
15:13:25		Temperature 2.62°C
15:16:50		ROV pauses
15:18:55		direction NNE
15:19:46	23	gorgonian
15:19:50		cliff downhill
15:20:04		brown sediment
15:20:20		collapse structure ?
15:20:34	4	
15:21:44	23	2 dark blue holothurians
15:23:21	3	
15:24:58		slope downhill
15:25:18		depth 2906m
15:26:07		volcanic ridge
15:30:37		depth 2922m
15:32:46		depth 2929m
15:35:06		depth 2936m
15:36:58		vessel moves 150m
15:38:43	3	
15:41:23		ROV porch hits rock

Time (hh:mm:ss)	CODE	Notes
15:42:46	4	gorgonian
15:44:24		lava front at 2925m
15:45:54		brown sediment, swimming platyheminth?
15:47:05		white sediment
15:47:15	4	
15:50:00	3	
15:50:27	4	
15:50:32	23	dark blue holothurian
15:50:49	23	dark blue holothurian
15:51:09	23	dark blue holothurian
15:51:26	23	2 dark blue holothurians
15:52:29	23	2 gorgonians
15:52:31	23	2 gorgonians
15:53:31		thruster caused turbidity
15:55:20	3	
15:56:11		collapsed pillows
15:56:54	23	dark blue holothurian
15:59:37		direction North ca. 160m
16:01:56	3	
16:07:36	3	going down to 2955 m
16:08:21		thruster cause turbidity
16:09:05	3	2957 m; talus breccia
16:10:15	3	Going back upslope direction W
16:10:42	3	
16:10:43	3	
16:12:56	3	
16:13:58	3	2907 m
16:15:21	3	2900 m, local fissure with sediment fill, dark blue holothurian
16:16:31	3	top at 2896 m
16:20:49	3	natural turbidity 16:18 until 16:20, gorgonian
16:22:06		thruster caused turbidity
16:22:12		thruster hits ground an generates turbidity
16:23:36	3	
16:25:02		turbidity back to normal
16:30:14		course: due SE to SW in order to relocate the turbidity anomaly recorded at around 15:00
16:31:40	23	red shrimp
16:31:49	23	dark blue holothurian
16:32:32	4	strongly sedimented lava (talus?); going downslope
16:32:45	4	
16:37:03	3	2903 m plateau?
16:38:28	3	
16:38:31	4	
16:38:49		thruster caused turbidity
16:38:58		thruster caused turbidity
16:39:06	4	contact sediment covered lava to pelagic sediment
16:39:42	23	dark blue holothurian
16:39:54	4	2911 m; thick white pelagic sediments
16:41:03		brown sediment overlying white pelagic sediment
16:41:43		course still due SW
16:44:28	3	
16:44:53		thruster caused turbidity
16:45:50		thruster caused turbidity
16:46:44	3	volcanic ridge sticking out of the sediments
16:47:48		thruster caused turbidity
16:48:23	4	still at 2900 m
16:48:53	4	
16:49:17	4	with pillow breccia talus
16:49:30		thruster caused turbidity
16:51:57		thruster caused turbidity
16:52:13		change course due S, SE
16:53:07		ROV hits lava
16:53:36		thruster caused turbidity
16:54:14		thruster caused turbidity
16:56:30	3	base of pillow lava wall/cliff at 2900 m
16:57:49		thruster caused turbidity

Time (hh:mm:ss)	CODE	Notes
16:59:07		?natural turbidity anomaly?
16:59:49	23	gorgonian
17:00:01	23	polychaete tubes
17:00:06	3	
17:00:54	23	gorgonian on pillow
17:01:06	4	
17:01:10	4	crossing into sediment plain 2900 m
17:02:09	23	dark blue holothurian
17:02:10	23	dark blue holothurian
17:02:11	23	dark blue holothurian
17:04:24	3	gorgonian on steep cliff
17:04:38	3	going towards lava cliff
17:05:25		course: W, NW
17:07:33	3	edge of pillow flow
17:07:38	3	
17:08:10	23	gorgonian on edge of dark volcanic? sediment
17:08:38		rather fresh looking pillows at 2890m
17:09:49	3	following steep cliff on the right that is apparently 10 m deep
17:11:11		course still due W
17:12:09	3	steep sided volcanic ridge following along crest to the tip where the flow front borders against pelagic sediment
17:17:29	3	
17:17:34	3	rugged terrain
17:18:31	4	brown sediment covering pelagic sediment
17:18:49	4	
17:18:52	3	
17:18:57	3	
17:21:21		Sampling fluid at seafloor 2900 m; container 3
17:23:10	23	dark blue holothurian
17:26:33		End of dive; leaving seafloor
17:32:53		Sampling fluid 2750 m; container 2
17:36:37		Sampling fluid 26760 m; container 1
17:36:41		End of station

Sample: 1 rock sample in ROV frame covered by hydrothermal Mn crust (plume fallout)

Station 1263 **M62/5B**
Segment A2 North
11. December 2004
Dive 29 scheduled landing position: 8°18.05'S 13°30.7'W

Time (hh:mm:ss)	CODE	Notes
11:30:43		ROV at 850 m
12:34:52		ROV at 2438 m
12:55:58		seafloor in sight
13:01:11	3	
13:02:14	3	slope going S
13:04:05	23	swimming animal (ctenophore)
13:04:17	3	going E; ROV at 2940 m
13:06:26	3	sedimented pillows
13:06:49		thruster dust
13:07:18	3	going N parallel to slope (rising to the W)
13:10:00		thruster dust
13:10:45	3	ROV pauses due to change of driving crew
13:13:02	3	ROV in motion following slope that is going uphill to the left; rugged morphology
13:13:59	3	course due N
13:15:18	3	steep slope; start spiraling going 25 m N
13:16:51	4	lava flow front crossing to sedimented area; brown hyaloclastite covering white pelagic sediments
13:17:34	4	
13:17:57	4	ROV at 2944 m, minor lava in sight => flow front
13:19:43	3	crossing into another sedimented pillow lava area
13:20:31	3	
13:26:43	3	return to starting point in order to adjust navigation
13:29:13	3	slope going
13:31:23	3	steep mound of lobate-looking lava
13:31:39	15	volcanic talus on slope
13:32:23	3	some thruster dust
13:32:40	3	going up steep slope, traveling SW
13:33:16	3	ROV at 2925 m
13:33:59	3	steep cliff going down right
13:34:34	3	going up cliff, 2915 m
13:35:30	3	top of cliff, 2915 m; superb pillows on cliff
13:36:36	23	gorgonian
13:37:00	3	going down again; 2921 m; gentle slope
13:39:45	3	going down gentle slope; 2930 m
13:42:42	3	going west for 150 m
13:43:27	4	
13:43:34	4	sedimented plain with 2 sets of ripples at discordant angles
13:44:32	3	traveling parallel to slope of lava front on the right
13:45:01	4	brown sediment overlying white pelagic sediment locally
13:45:34	3	ROV at 2945 m going upslope along gentle slope that is oriented at a shallow angle to the traveling direction
13:47:19	23	holothurian
13:47:31	3	
13:47:51	23	shrimp
13:48:03	3	going upslope gently; 2934 m ROV
13:48:37	15	strongly sedimented pillow talus; however many pillows are intact and appear to be in situ
13:49:41	23	swimming animal
13:49:47	3	2925 m
13:50:58		thruster dust
13:51:02		collision with pillow => rock sample
13:52:02	3	still going up slope 2916 m ROV
13:54:13	3	still going up slope 2905 m ROV
13:55:24	3	only slightly sedimented pillow flow, some lobate shapes
13:56:16	3	top of the ridge! 2890 m immediately going down steeply on the other side
13:57:09	3	ROV traveling down slope 2896 m
13:58:27	3	traveling down slope of peaked ridge 2907 m
14:00:08		end of ROV on the seafloor due to technical difficulties
16:15:00		ROV on deck

Station 1268 **M62/5B**
Segment A2 North
12. December 2004
Dive 30

Time (hh:mm:ss)	CODE	Notes
9:00:00		Begin station
10:30:17		at 2466 m
11:07:54	4	seafloor at 2937 m
11:10:51	4	sediments with basalt talus; T: 2.66°C => anomaly (0.1°C)this is the station 1230CTD (120 nmol CH4 at 2700 m)
11:15:32	3	
11:17:18	3	course due N for 150 m
11:18:18	23	holothurian in sediment
11:21:04	3	elevated particle flow; ROV is moving into this current
11:22:34	3	2929 m traveling up hill
11:25:27	3	going down hill, 2938 m ; just crossed a 5 - 20 m high volcanic ridge (strongly sedimented)
11:26:26		turbidity current coming from W
11:29:32	4	sediments with basalt talus
11:31:25	4	2958 m ROV, holothurian on pelagic sediment
11:32:26	4	2963 m
11:32:55	4	still going N
11:33:47	4	strongly sedimented lava flow, holothurian
11:34:33	4	2970 m Course due East
11:35:15		Thruster dust
11:36:03		Thruster dust
11:36:41	3	slope to the right
11:36:59	12	nice sedimented pillows, little talus
11:37:51	3	Thruster hits ground, holothurian among pillows?
11:41:04	4	Thruster dust
11:46:27	4	Thruster dust
11:48:52	3	course due E for 150 m
11:49:12	3	traveling parallel to lava flow front
11:49:49	3	elevated particle flow thruster related?, beautiful gorgonian
11:52:45	3	small volcanic ridge on lava flow front
11:53:27	4	flat terrain; turbidity back to normal; 2968 m ROV
11:54:39	3	rising
11:55:14	12	sedimented pillows
11:55:32	12	2958 m ROV
11:56:09	2	lobate flow features?
11:56:42	12	2948 m
11:57:11	3	slope 2943 m ROV
11:58:08	3	top at 2942 m
11:59:12	3	rugged flow top
12:00:06	3	edge of down hill slope
12:00:23	12	2948 m going down
12:01:29	12	2953 m at way point
12:02:03	12	turning to course due S 30 m
12:07:03	12	turbidity caused by ROV (hit wall)
12:07:59	12	depth 2959m
12:09:11	12	track goes along cliff
12:11:35	12	ROV starts profile E-W W-E
12:14:30	12	white eel-shaped fish (bythitid) (NOT-vent!) slowly moving at cliff
12:18:53	12	direction S
12:20:46		back on W track
12:24:00		shrimp
12:27:44		depth 2927m
12:29:22		ROV drifted too much South
12:32:15		bottom sight (2965m)
12:33:59	12	steep slope downwards
12:35:14	4	sediment
12:37:06	12	end of west track but to far north -> going south
12:40:07		going uphill 2930m
12:41:12	4	sediment, 2 holothurians in succession
12:43:52	4	sediment, holothurian
12:44:48		slope uphill 2925m
12:48:40		depth 2936
12:49:20		depth 2948

Time (hh:mm:ss)	CODE	Notes
12:50:34	3	GAPS' ROV position varies between 20-30m error from actual position, 2 holothurians
12:51:32	3	ship will be moved, than track into east direction
12:54:33	3	depth 2932m
12:55:15		ROV goes East
12:56:49		downhill slope 2950m
12:58:13		depth 2959m
12:58:58		end of east track -> 30 m south -> west track
13:01:08		cliff
13:02:38	3	depth 2947m
13:03:29	12	on west track
13:05:18		turbidity caused by ROV
13:05:52		depth 2938 m
13:06:59		ROV compass shows N direction
13:08:10		back on W track
13:08:55	12	steep slope 2933m
13:15:11		depth 2936m
13:16:44		from sediment to sedimented pillows, holothurian
13:18:27	4	sediment
13:18:56		ROV fast moving to the North, 2 holothurians in succession
13:20:03		end of west track -> 30m S -> east track
13:26:01		on east track, calcified gorgonian
13:30:41		meanwhile going south
13:32:18	12	slope downhill 2931m
13:34:51		now west direction
13:36:29		2937m
13:37:17	4	hyaloclastite
13:39:52	4	
13:40:44	4	some basaltic talus
13:41:34	12	sedimented pillow talus slope
13:42:03	12	2933 m ROV, gorgonian on pillows
13:42:39		ROV hits ground
13:42:51	12	2926 m
13:43:06	12	steep pillow cliff; flow front
13:44:30	3	
13:44:40	3	shallowing at 2915 m
13:45:28	4	strongly sedimented lava flow top at 2913 m, 2 holothurians
13:46:10	3	
13:46:40	12	on the right has side, white eel-like fish swims by quickly
13:47:44	3	30 m due South; then 150 m to the East
13:48:49	12	southerly track follows lava/sediment contact
13:50:45	15	2912 m; gentle slope of volcanic talus
13:55:52	15	2915 m, terrain is gently sloping to the left
13:59:02		ROV travels 450 m due East to reach the area of elevated turbidity identified during OFOS track 1252
14:00:05	3	2910 m
14:01:19	3	rugged flow top; some brown empty gastropod shells overlying white pelagic sediment in local depressions between individual pillow structures
14:01:31	14	reaching top of a steep slope => lava flow front
14:04:46		ROV hits ground, 2 gorgonians
14:06:11		Flash lights are badly oriented; pictures may be of poorer quality than usual
14:08:33		same position as above
14:09:58		Resuming travel due East high above seafloor
14:13:58	3	seafloor back in view; 2938 m
14:14:42	12	going straight back up again 2923 m
14:15:12	12	pillows 3 dimensional exposed in irregular slope 2903 m
14:16:24	3	2897 m ROV
14:17:09	3	TOP at 2896 m => collapse structure?
14:18:29	3	2890 m ROV
14:19:08	3	rugged top of sedimented pillow lava flow
14:20:45	12	crossing minor but steep cliff
14:22:00		2 gorgonians on weathered pillow
14:24:43	3	
14:26:00	3	2885 m ROV
14:27:55		seafloor not in view

Time (hh:mm:ss)	CODE	Notes
14:30:46	3	seafloor back in view; 2930 m ROV
14:32:05	3	sea floor at 2950 m
14:32:28	4	with some pillow material sticking out of the ground
14:33:40	15	
14:34:48	4	2953 m
14:35:37	15	
14:36:01	12	going up 2944 m
14:36:26		elevated turbidity
14:36:44	12	2927 m
14:39:20	12	steep crevice to the right
14:40:14	3	pillows 3 dimensional exposed in irregular slope 2926 m, 2 gorgonians on steep slope
14:49:32		cliff downhill
14:51:08		end of east track -> 30 m north -> east west profile
14:55:08		ROV hits ground
15:00:34		ROV stays on same position, contact to Meteor lost
15:23:19		ROV has been pausing for maintenance work on data base
15:36:24		dive continues -> 80m south
15:37:21		depth 2900m
15:38:00	12	steep slope (2888m)
15:39:17		depth 2876m
15:43:39		ROV drifted too much North -> correction to South
15:44:33		depth 2920m
15:47:40		steep slope down (2950m)
15:50:03		next cliff down
15:53:55		steep walls to both sides
15:56:59		30 m North
16:02:38		small break because of change of pilots
16:07:04		depth 2947m, holothurian
16:08:42		pelagic sediments with ripples, increasing particle flow
16:11:21		depth 2912m
16:13:51		increasing particle flow
16:14:22		depth 2945m
16:15:52		depth 2960m
16:16:58		sediment 2970m
16:18:00		ROV is facing cliff
16:20:27		Turning east 200m
16:22:54		sediment 2940m
16:24:41		sedimented basalt
16:26:55	14	lava flow front ?
16:27:53	3	sedimented pillows/ pillow fragments
16:29:14		holothurian
16:30:24	3	sedimented pillows
16:31:11	3	going up, 2894 m
16:34:09	3	going up, 2872 m
16:35:48	1	hardly any sediment
16:36:11		purple hydromedusa swimming down across camera view
16:37:07	3	going up, 2851 m
16:39:28		increased particle flow
16:40:09		reached top of hill, next 150 - 200 m W
16:42:44	3	sedimented pillows
16:43:29	12	2871 m
16:45:58	12	going down, 2893 m
16:47:02	3	more gentle slope, going down, 2902 m
16:48:11	3	laser points, 20 cm distance, ripples in sediment
16:50:04	12	going down, 2921 m
16:52:06	3	going down, 2940 m
16:54:40		temperature decreased by 0.07 °C around 16:51, shrimp
16:55:22	3	sedimented pillows, ripples in sediment, 2968 m
16:57:11	3	waiting for Meteor, then 100 m north, 2972 m
16:59:54		talus slope, thruster-dust, 2975 m
17:04:47	1	beautiful elongated pillow, going up
17:05:36	12	nice pillows ! going up, 2945 m
17:06:48	3	temperature increased by 0.06 °C
17:07:47	3	increased particle flow
17:09:55	3	sedimented pillows, 2934 m

Time (hh:mm:ss)	CODE	Notes
17:10:28	12	going down, 2937 m
17:11:48		increased particle flow
17:12:11	3	temperature decreased by 0.06°C, going down, 2977 m
17:14:38	12	going up, 2961 m, small lava tubes, accidental sampling ?
17:16:11	3	going up, 2950 m
17:18:32	12	2946 m
17:21:52	3	sedimented pillows, thruster-dust, 2934 m
17:25:21	3	reached WP, next 200 m east
17:27:44	3	nice pillows !
17:28:05	12	accidental sampling ?
17:28:57	3	2939 m
17:29:52	3	laser points, 20 cm distance, 2945 m
17:32:35		white eel-like fish, dark talus/ hyaloclastite on sediment
17:33:25		laser points: 20 cm distance in between
17:33:56	3	talus, 2961 m
17:35:33		holothurian
17:36:20	12	going up, 2948 m, gorgonian, accidental sampling (ack!), temperature increased
17:37:32	13	very sharp pillow ridge (tectonic?), 2933 m
17:41:14	3	2917 m
17:42:10	1	hardly any sediment
17:42:28	3	2905 m
17:42:57		gorgonian and a beautiful light blue actinian on exposed pillow
17:48:08	3	2891 m
17:52:16	3	going north
17:53:59	12	2896 m
17:58:11	3	
17:59:09	12	2908 m
18:00:25		increased particle flow
18:03:38		sediment 2938m
18:06:31		temperature 2,64°C since 18:04
18:08:32		temperature back to 2,60
18:09:06		sediment with beautiful ripples
18:10:12		pillows everywhere
18:11:10		collapsed pillows
18:12:26		ROV compass shows E direction
18:12:57		ROV is going down cliff 2929m
18:14:38		2940m
18:16:46		ROV hits ground
18:18:45		short break due to catching up of Meteor -> 500m West
18:19:55		turbidity caused by ROV
18:24:47		holothurian, attempt to sample rock
18:26:16		ROV hits rock -> turbidity
18:30:08		turbidity still caused by ROV
18:31:42		rock successfully sampled, shrimp
18:37:03		ROV going west
18:42:51		2940m
18:44:02		2956m
18:44:19		2959m
18:45:37		2984m
18:46:42		2990m
18:47:05		pelagic sediment
18:47:49		2994m
18:49:39		4 holothurians, gorgonian, shrimp
18:50:08		pelagic sediment
18:54:42		slope uphill 2970m
18:56:20		holothurian between pillows on sediment, 2954m
18:57:23		collapsed pillows
18:57:55		end of west track -> 30m S, 2 holothurians and collapse pillows
19:00:05		start east track
19:01:57		slope downhill 2956m
19:03:07		2964m, holothurian
19:04:05		sediment 2970m
19:05:39		track correction to north -> back east
19:06:30		increasing particle flow, holothurian, hydromedusa
19:07:26		sediment 2990m

Time (hh:mm:ss)	CODE	Notes
19:08:00		white eel-like fish
19:08:52		increased particle flow, holothurian
19:10:00		holothurian
19:12:12		ROV tries to track turbidity (and stirs up lots more particles itself)
19:14:00		actinian on exposed pillow
19:20:00		holothurian, thruster dust
19:23:21		going uphill 2986m
19:25:21		2970m
19:32:13		2997 m
19:32:26		holothurian
19:33:17		hyaloclastite
19:37:33	3	nice pillows
19:40:24	3	collapsed pillows
19:43:13	4	holothurian
19:43:35	4	hyaloclastite ridges, holothurian
19:43:58	4	holothurian
19:45:52	4	shrimp
19:46:16	3	2 holothurian
19:47:42		increased particle flow
19:48:25		eel-like white fish
19:48:47		shrimp
19:49:31		holothurian
19:49:42	3	slightly sedimented pillows
19:51:27	3	nice pillows
19:52:18	3	2 fish
19:52:57	3	increased particle flow
19:53:42	12	accidental sampling ?, holothurian
19:56:16	3	increased particle flow
19:56:36	3	2965 m
19:57:30	3	shrimp
20:00:30	3	holothurian, actinian
20:02:19	3	fish
20:03:18	3	thruster-dust
20:04:37		end of dive
20:07:01		water sample, container 1
22:18:34		ROV on deck

Station 1272 **M62/5B** NOTE: "hyaloclastites" are most likely empty gastropod shells

Segment A2 North
13. December 2004
Dive 31

Time (hh:mm:ss)	CODE	Notes	Sample #
ca. 11:00		ROV leaves deck	
13:27:50		seafloor in sight, steep slope	
13:33:07	3	sedimented pillows	
13:35:42		going W, 2922 m	
13:38:02		going E	
13:39:35		going SW	
13:44:06	23	holothurian	
13:44:22		no navigation data, waiting	
13:44:59	3	strongly sedimented pillows	
13:45:19	4	some talus blocks and gravel	
13:46:30	4	fine grained talus/ hyaloclastite?	
13:47:11		2958 m	
13:49:37	23	shrimp	
13:51:34	3	slightly sedimented pillows, 2935 m	
13:52:30		W of OFOS-hole, going S to first WP	
13:53:04	15	sedimented talus, shrimp	
13:54:13	14	sedimented pillows	
13:57:13	12	slightly sedimented pillows, 2914 m	
13:57:20	23	gorgonian (branched and partially calcified, dead)	
14:01:00	12	small, slightly sedimented pillows	
14:03:38	13	slightly sedimented pillows or lobate flows, thruster-dust	
14:04:29	10	deep, narrow fissure	
14:06:32	3	slightly sedimented lobate flows/ pillows	
14:07:25		increased particle flow coming towards vehicle	
14:09:59	3	pillows/ lobate flows, hardly any sediments	
14:10:32	10	fissure (same as last one?), approx. 10 m deep	
14:13:07	10	close-up of fissure, beautiful cross-cuts of pillows	
14:15:40	2	hardly any sediment	
14:16:20	12	going down, 2912 m	
14:20:04	12	talus slope, 2930 m	
14:20:33	4	dark/ brown sediment (hyaloclastite?) on pelagic sediment	
14:21:43	15	sedimented talus	
14:22:11		going up, 2916 m, no view of seafloor	
14:27:50		going down	
14:28:17		seafloor in sight again, 2920 m	
14:28:46	15	strongly sedimented talus	
14:31:54	23	shrimp	
14:33:00		close to first WP, going N approx. 200 m (following Meteor)	
14:35:13	4	dark/ brown sediment (hyaloclastite?) on pelagic sediment	
14:35:32	3	small sedimented pillows	
14:37:06		hornitos?	
14:37:23	12	going down, 2030 m	
14:39:08	1	hardly any sediment	
14:39:47	12	going down, 2938 m	
14:40:04	3	small sedimented pillows	
14:41:42		going E	
14:42:23	23	shrimp	
14:43:09		increased particle flow coming towards vehicle	
14:44:02	23	shrimp	
14:44:09	3	small sedimented pillows	
14:45:53		2926 m	
14:46:56	1	small pillows, hardly any sediment, 2933 m	
14:47:39	3	small sedimented pillows	
14:47:50	12	2941 m	
14:49:41	1	hardly any sediment, 2946 m	
14:50:42		minifilm switched from 30 to 5 sec.	
14:52:12		increased particle flow	
14:52:42		dark/ brown sediment (hyaloclastite?) on pelagic sediment	
14:53:52	3	small sedimented pillows	
14:55:49		increased particle flow left to right	
14:56:19	12	small slightly sedimented pillows, 2962 m	

Time (hh:mm:ss)	CODE	Notes	Sample #
14:58:01	4	dark/ brown sediment (hyaloclastite?) on pelagic sediment	
14:58:52	12	2973 m	
14:59:16	23	brisingidae on edge of cliff	
15:00:06	3	sedimented pillows/ talus, ripples in sediment	
15:02:12	3	strongly sedimented pillows, ripples in sediment	
15:04:02	4	darker (brownish) sediments	
15:04:26	3	sedimented pillows, 2981 m	
15:08:48		white clastic material accumulated in areas close to rocks sticking out of sediment and ripple crests	
15:12:23		trying to get close to white material for photograph (is a nice pillow shot, too), thruster-dust	
15:22:45		preparing for sampling white material (with net)	
15:26:57		sampling; 8°18.126'S; 13°30.595'W	**1272-1**
15:33:56		end of sampling	
15:35:14		closed niskin bottle 3; 8°18.126'S 13°30.595'W	**1272-2**
15:40:45		trying to sample rocks, unsuccessful	
15:45:19		looking for better place for rock sampling	
15:47:23		going up 10 m for a sonar scan	
15:50:05		ridges of dark/ brown sediment (hyaloclastite?) on pelagic sediment	
15:52:49		2973 m	
15:54:49		first sonar scan finished	
		vehicle is located in sedimented basin, slopes seem to be terraced, next wall 20 m ahead	
16:06:31		back to seafloor	
16:07:32	4	light colored pelagic sediment, ridges of dark/ brown sediment (hyaloclastite?), white clastic material along ripples, some talus	
16:09:49		rock-sampling 8°18.155S; 13°30.593'W	**1272-3**
16:10:03	23	2 holothurians	
16:11:52	2	lobate flow/ pillows	
16:13:18	23	actinian	
16:14:45	23	shrimp	
16:19:07	23	porifera	
16:26:00		rock sample taken; 8°18.152'S; 13°30.590'W	
16:28:40		end of sampling	
16:31:36		leaving sampling site	
16:33:06	23	fish	
16:37:24	3	slightly sedimented lava	
16:40:17	23	shrimp	
16:41:30	12	slope, small diameter pillow and lobate flows in outcrop; 2973 m; unsedimented	
16:43:15	12	traveling up steep cliff, 2967 m	
16:45:11	12	2961 m; small scale lobes	
16:47:14	12	2957 m	
16:48:15	12	possibly this is an tectonic escarpment; cross section of lobes	
16:50:05	12	we are traveling along the escarpment course due NE	
16:50:48	3	slope shallows, lightly sedimented, 2966 m	
16:52:19	12	going down the escarpment, 2971 m	
16:56:29	12	temperature elevated: 2.64°C	
16:57:40	12	traveling parallel to escarpment	
16:59:14	3		
16:59:23	23	eel-like fish	
16:59:29	23	eel-like fish	
17:00:12	23	holothurian	
17:01:42	23	shrimp	
17:01:56	3	2980 m	
17:04:02	3		
17:06:17	23	shrimp	
17:06:28	3	perfect pillows	
17:09:40	3	Temperature is going down to 2,59°C; ROV is turning around to relocate elevated temperature and site with fish occurrences	
17:12:33	3		
17:12:47	23	Ophiuroid?	
17:14:20	23	shrimp	

Time (hh:mm:ss)	CODE	Notes	Sample #
17:14:38	3		
17:14:50	14	pillow flow bordering to white pelagic sediment with prominent ripples	
17:16:22	3	pillows are heavily sedimented and	
17:16:42	23	fish	
17:16:58	23	shrimp	
17:17:22	23	holothurian	
17:18:57	12	2981 m; going down in southerly direction	
17:21:02		Thruster induced turbidity	
17:25:28	23	holothurian	
17:26:23		sudden end of turbidity event; thruster related?	
17:28:38	3	Back into the turbidity signal; T=2.61°C; 2978 m	
17:31:24	12	pillow sections exposed; small diameter protrusions	
17:32:18	23	shrimp	
17:33:44	12		
17:34:37		2980 m; turbidity event is over	
17:35:40	2	pillowed (small diameter) to lobate flow elements	
17:38:23	12	lava lobe with ropy texture oriented vertically to the steep wall; small "lava fall" on steep flow front?	
17:42:38	23	gorgonian	
17:42:53		Thruster induced turbidity	
17:43:05	12	traveling up steep wall => lava flow front; 2958 m	
17:44:07	2	small scale pillows and lava lobes forming steep and rugged terrain, 2950 m minor sediment cover	
17:48:22	1	small pillows/ lobate flows, hardly any sediment, 2955 m	
17:49:57	12	2954 m, waiting for …	
17:56:50		going N	
17:57:11	3	small sedimented pillows	
17:57:36	14	small pillows/ lobate flows, little sediment	
17:58:39	3	small sedimented pillows/ lobate flows	
17:59:29	23	gorgonian ? (lying in sediment)	
18:00:46	12	following channel with sediments at base of steep slope of pillows and talus/ flow front ?	
18:02:58		now talus slopes on both sides of little sediment channel (interesting ripples)	
18:04:43	4	dark/ brown sediment (hyaloclastite?) ripples on pelagic sediment	
18:05:25	23	shrimp	
18:05:43		Thruster induced turbidity	
18:05:56	3	slightly sedimented pillows/ lobate flows	
18:06:21		going up (2969 m)	
18:06:45	23	gorgonian on lobate-pillow cliff	
18:06:58	1	nice pillows !	
18:08:11	23	gorgonian	
18:08:32	1	perfect pillows	
18:09:14	12	2950 m	
18:10:21	1	small pillows/ lobate lava flow, lava fall?	
18:11:29	23	ophiuroid on pillow-lobate flow front	
18:11:41	12	going up, 2936 m	
18:14:12	12	going up, 2933 m , small pillows/ lobate flow, slope could be lava flow front but is very steep and fairly high	
18:16:01	1	no sediment at all	
18:16:20		increased particle flow	
18:17:49	12	going down again, 2939 m	
18:20:15	12	going down, 2951 m, micropillows, slightly sedimented	
18:22:13	3	base of slope, 2960 m, sedimented talus	
18:24:40	14	base of slope = flow front, dark brownish sediment/ hyaloclastite on pelagic sediment	
18:27:05		accidental sampling ? ROV induces turbidity	
18:27:19	23	gorgonian	
18:27:32	1	flow front, nice pillows !	
18:30:16	1	perfect protrusions	
18:31:39	1	very limited sediment coverage	
18:33:29	12	traveling along escarpment to the East	
18:35:21	12	2961 m	
18:36:08	23	shrimp	
18:36:41	3	2971 m	

Time (hh:mm:ss)	CODE	Notes	Sample #
18:37:55	3	2969 m	
18:38:13	23		
18:38:46	23	shrimp	
18:40:12	3	2975 m; course due East	
18:41:27	3	2979 m; very rugged terrain	
18:41:42	23	swimming animal?	
18:42:09	4	abundant brown sediment covering white pelagic sediment in between pillow flow outcrops	
18:44:33		Giving up on looking for the smokers around here… change course to 300 m due East	
18:45:11	12	cool pillows	
18:45:38	3	2963 m	
18:45:46	12	micropillows	
18:46:29	3	2950 m	
18:50:17	23		
18:52:10		water sample container number 2; 8°18.134'S 13°30.554'W; 2961 m; T=2.61 to 2.62 °C	**1272-4**
18:54:50		waiting for ship to reposition	
18:58		sedimented basalt slope, 2936 m	
19:01:00		red shrimp?, 2.645°C; water sample bottle 1.8°18.164'S 13°30.505'W	**1272-5**
19:04		down steep pillow slope	
19:08		at bottom of slope/cliff, 2942 m	
19:09:33	1	fantastic pillows, holothurian	
19:11:31	23	eel-like fish on top of ridge	
19:11:38	13	top at 2927 m	
19:12:30	23	holothurian	
19:13:03	12	steep tectonic cliff exposing pillow cross sections; some are hollow !	
19:16:59	23	shrimp	
19:17:17	1	pillow have fabulous rind textures (wrinkles, cracks…). Diameter: 15 to 2.5 m	
19:20:55	23	gorgonian	
19:22:37	23	shrimp	
19:22:43	1	particular pillow has a sheep profile shape	
19:23:13		There is a T-anomaly in this area (2.65°C) probably due to diffusive hydrothermal discharge. No visible signs for hydrothermal activity	
19:23:50	12	2926 m	
19:24:43	4	2947 m base of cliff	
19:29:24	4	sampling sediment with a net	
19:38:56	23	shrimp	
19:50:25		sediment sample 2: 8°18.126'S 13°30.518'W: pelagic sediment + white "shell-like" hydrothermal material + rock	
19:53:27		Niskin bottle 3 was opened slightly during positioning of the sediment sample in the middle container	
20:02:00		ROV leaves seafloor	**1272-6a (rock) 6b (sediment)**
ca. 22:30:00		ROV on deck	

Station 1280 **M62/5B**
Segment A2 North
15. December 2004
Dive 32

Time (hh:mm:ss)	CODE	Notes	Sample #
12:30:00		start of station	
13:25:30		732 m	
15:15:49		seafloor in view, 2944 m	
15:16:31	4	some pillows or big talus blocks sticking out	
15:16:50	23	holothurian on sediment	
15:18:44		records by HP	
15:20:02		8°17.489S 13°30.630'W 2960 m ROV	
15:23:35	3	still on the same position (close to holothurian) looking to the south there are some massive pillows sticking out of the pelagic sediments	
15:24:48	3	great pillow textures! With "spritz-cookie textures" (=scratch marks) breakout features	
15:25:00		2 gorgonians on sediment, holothurian on sedimented pillow	
15:26:19	4	some volcanic talus	
15:26:56	3	going up slope 2950 m	
15:27:20	14	going up for ca. 5 m	
15:27:50	3	top of flow is heavily sedimented	
15:28:44	4	with some pillows, 2 holothurians	
15:29:30	4	big pillow with particular white "shell-like" detritus at its base (similar to sample 1268-1)	
15:30:06	3	2960 m	
15:30:56	3	going down: 2963 m	
15:31:55	15	2974 m	
15:32:51	12	slump structures in the sediments	
15:33:31	14	great pillow surface rind textures.	
15:33:47	23	fish	
15:34:43	3	big pillow some truncated exposing cross sections with jointing	
15:35:11	23	red deep-sea shrimp	
15:35:37	14	traveling more or less parallel to the flow front; fantastic pillow outbreak textures fabulous scratch marks!!	
15:37:20	4	base of flow front; 2990 m ROV	
15:38:48	4	interesting mix of brown hyaloclastite (?) pelagic sediment + some white patches; prominent ripples	
15:41:22	4	very interesting observation regarding brown sediment and pelagic sediments: brown sediment is forming big dune-like features whereas areas consisting exclusively of pelagic sediments show diverse ripples	
15:43:04	23	two holothurians	
15:43:22	3		
15:43:28	14	going up: 2989 to 2981 m; pillow cross cut nicely exposed	
15:44:02	15	actinian on talus slope	
15:44:45	14	2968 m	
15:45:17	3	intact pillows exposed on flow front wall; 2966 m	
15:46:07	3	top at 2966 m; turning S and going down again	
15:46:53	15	2971 m	
15:48:13	12		
15:48:29	4	base of flow front; 2980 m ROV; abundant ripples	
15:48:37	23	shrimp	
15:49:36			
15:50:14	3	nice pillows exposed on flow front; superb rind textures	
15:50:55	23	gorgonian on pillow	
15:51:06	23	actinian on pillow	
15:51:17	23	another gorgonian on pillow	
15:51:25	3	more fantastic pillows 2969 m	
15:51:40	23	shrimp	
15:52:03	14		
15:52:27		ROV hits ground; accidental sampling?	
15:53:07	15	traveling uphill; minor pelagic sediment	
15:53:40	12	steep cliff; top at 2951 m	
15:54:24	12	going down the slope	

Time (hh:mm:ss)	CODE	Notes	Sample #
15:58:21		150 m due West towards 30 nmol methane anomaly	
16:00:46	4	Boring pelagic sediment with ripples; 2952 m	
16:01:06	23	gorgonian on pillow	
16:01:44	4	with minor fine grained volcanic talus	
16:02:11	3		
16:02:32	12	traveling up a flow front; 2949 m	
16:03:09	3		
16:03:51	23	holothurian on sediment	
16:03:59	3	abundant collapsed pillow tubes	
16:04:38	11	2943 m; going up over strongly sedimented pillow (talus?)	
16:06:37	4	2941 m	
16:08:18	4		
16:08:44	4	some pillow and/or pillow fragments sticking out of the ground	
16:09:32	4		
16:09:56	4	some white spots	
16:10:12		8°17.866'S 13°30.711'W 2941 m	
16:10:54	23	holothurian	
16:11:05	15	with abundant sediment	
16:11:30	11	gently going up 2937 m	
16:12:30	3	abundant collapsed pillows => feeder pillows	
16:14:46	23	holothurian	
16:14:55	23	holothurian	
16:15:18	23	holothurian	
16:15:54	23	holothurian	
16:15:56	23	holothurian	
16:16:15	3	pillows with rind textures	
16:16:42	4	thruster dust	
16:17:52	3		
16:19:59	3	nice pillows with rind structures	
16:21:09	3	2954 m	
16:22:07		thruster dust	
16:22:18	12	2966 m; well-preserved pillows with scrape marks	
16:22:58	23	holothurian	
16:23:11	3	fantastic pillow tubes exposed on the steep wall mostly unfragmented	
16:24:38	23		
16:24:46	15	2985 m	
16:25:08	4	Brown sediment concentrated on base of the flow front; forming steep "dune-like" structures; oriented at various angles to the ripples of the white pelagic sediments	
16:25:59	4		
16:26:32	12	very nice pillows; in-situ fragments	
16:27:07	11	top of ledge; more sediment that pillows => old flow; 2977 m	
16:27:55	12		
16:28:17	3		
16:28:21	23	gorgonian, actinian on pillow at top of ridge	
16:28:25	12	steep cliff; top at 2962 m	
16:29:06	3	base of steep cliff at 2970 m => ridge on top of flow	
16:29:38	3		
16:30:03	12	going up hill: 2961 m	
16:30:36	23	shrimp	
16:30:50	13		
16:35:11	3	base of ridge at 2962 m	
16:36:28	14	Base of flow front? Contact of pillows to pelagic sediment	
16:37:18	14	traveling up 2962m; strongly sedimented pillow, in-situ	
16:39:06	14	2954 m	
16:40:31		8°17.864'S 13°30.557'W	
16:41:16		notes: Sonja	
16:41:43	23	holothurian and shrimp	
16:42:10	23	sponge	
16:42:38	23	fish, crinoid	
16:43:00		actinian	
16:44:26	23	shrimp	

Time (hh:mm:ss)	CODE	Notes	Sample #
16:44:37	12	strongly sedimented pillows somewhat smaller diameter than previously observed, 2960m	
16:49:17	4	some volcanic material sticking out of the ground, 2970m	
16:50:00	23	gorgonian on exposed pillow on steep slope	
16:50:23	3	slope	
16:51:23	12	going downhill	
16:52:40	3	2979m	
16:53:03	4	brown sediment at the foot of the lava flow front forming dune like shapes overlying pelagic sediment	
16:54:20	3	approaching wall, 2984m	
16:54:55	3	going up wall abundant truncated pillows, tectonic escarpment?	
16:56:05	3	pillows intact	
16:56:21	12	steep wall, holothurian	
16:57:03	3	top of wall, 2969m	
16:58:09	4	ripples	
16:58:15	23	holothurian	
16:59:39	23	holothurian	
17:01:43	23	holothurian	
17:02:43	3	pillow ridge, nice rind textures	
17:03:29	23	gorgonian	
17:05:30	4	2952m	
17:06:21	3	pillows sticking out of sediment, 2954m	
17:07:41	12	steep wall, 2948m	
17:08:08	12	going downhill	
17:08:54	3	2949m	
17:11:40	23	ceranthus?, 2951	
17:12:02	23	2 gorgonians, brisingidae	
17:13:03	4	sediment with some pillows, 2948m	
17:13:34	3	collapse structures of pillows, shrimp	
17:16:45	3	pillows sticking out of sediment, brachiopod-shells	
17:17:38	4	2947m	
17:18:23	15	talus sticking out of sediment	
17:21:47	23	shrimp,2942m	
17:22:21	23	gorgonian	
17:22:36		thruster dust	
17:23:02	3	pillows/talus	
17:25:46		thruster dust	
17:26:59		thruster dust	
17:27:11	15	strongly sedimented talus	
17:27:55	23	polyp on pillow	
17:28:17	12	steep wall, pillows	
17:29:20	23	holothurian on steep slope, thruster dust	
17:30:19	12	going uphill, 2918m	
17:31:17	3	ridge? 2912m	
17:32:47	3	going downhill, 2905m	
17:33:16	3	pillows sticking out of sediment, 2903m	
17:34:38	3	pillows sticking out of sediment, ripples, 2900m	
17:35:24	3	strongly sedimented sedimented lava	
17:36:28	2	2901m	
17:36:49	23	actinian	
17:37:18	12	steep slope, 2899m	
17:38:10	23	shrimp	
17:38:59	3	2897m	
17:39:29	23	actinian on lava block surrounded by sediments	
17:42:46	3	strongly sedimented pillows	
17:43:10	3	pillow cliff	
17:44:01		seafloor not in sight, 2907m	
17:44:23	3		
17:46:03		records by AK	
17:46:18		turbidity caused by ROV	
17:47:36	3	2912 m	
17:49:31		thruster dust	
17:51:16	12	medium sized pillows	
17:51:28	23	ophiuroid? on pillow	
17:52:54		turbidity caused by ROV	

Time (hh:mm:ss)	CODE	Notes	Sample #
17:53:31	23	friendly squid (cirroteuthus) (approx. 50 cm length)	
17:59:12	23	shrimp	
18:01:13	23	holothurian ?	
18:01:31	14	contact sediments to sedimented pillows	
18:05:26		BLUE, BLUE, blue, blue, blue, … (2895 m)	
18:06:55		only very distant (and dim) view of seafloor, seems to be sedimented pillows though	
18:08:05		no view of seafloor (2890 m)	
18:09:43		slowly rising temperatures (2,65 °C), still no view of seafloor, 2894 m	
18:11:21	3	seafloor in view, 2900 m	
18:12:15	12	hovering on top of slope (2905 m)	
18:14:42	4	some talus in sediments (2919 m)	
18:15:34	23	holothurian	
18:15:47	4	some dark sediment (hyaloclastite?)	
18:16:39	14	contact sediments to sedimented pillows	
18:17:19	3	nice medium sized pillows	
18:17:45	12	crossed little pillow ridge?	
18:17:50	23	holothurian	
18:18:25	4	some pillows sticking out	
18:18:54	14	contact sediments to sedimented pillows	
18:20:02	3	nice pillow crosscuts	
18:20:30	3	nice big pillows	
18:20:42	23	shrimp	
18:21:05	23	shrimp	
18:21:14	3	beautiful rind textures	
18:21:26	23	shrimp	
18:21:44	23		
18:21:50	23	smaller fish	
18:22:35	3	perfect pillows, some collapsed	
18:22:51		thruster dust	
18:23:09	23	holothurian	
18:23:37	3	contact sediments to sedimented pillows/ talus	
18:24:04		ROV hits ground; accidental sampling?	
18:24:50	3	very nice big pillow, rind textures, partly broken	
18:25:26	3	big pillows, some with nice rind structures	
18:25:50	23	holothurian	
18:26:00	12	2900 m	
18:26:50	23	shrimp	
18:27:16		going down, 2906 m	
18:27:42	4	some talus blocks	
18:27:55	23	holothurian	
18:28:06	23	fish	
18:28:35	15	sedimented talus, accidental sampling? Thruster dust	
18:29:00	23	shrimp	
18:29:29		ROV hits ground; accidental sampling?	
18:29:59	3	still lots of thruster dust	
18:31:21	1	hardly any sediment, nice rind textures	
18:32:36		cable is caught on a rock	
18:33:08	3	beautiful pillows with perfect rind textures	
18:33:38	23	two holothurians	
18:34:25		trying to free the cable, thruster dust	
18:35:22	12	2894 m	
18:36:46	3	contact sedimented pillows to sediments	
18:37:58	15	contact sediments to sedimented talus	
18:38:30	23	2 shrimp	
18:39:10	23	very nice ctenophore	
18:39:39	4	boring !	
18:40:01	23	two holothurians	
18:40:09	15	contact sediments to sedimented talus	
18:40:43	4	little sediment channel in talus	
18:41:52	23	two holothurians	
18:42:02	12	terraced slope, some big pillows/ tubes	
18:43:40	23	holothurian, beautiful branched gorgonian, actinian below on lower step	
18:45:18		increased particle flow rising from behind	
18:45:34	23		

Time (hh:mm:ss)	CODE	Notes	Sample #
18:45:51		thruster dust	
18:46:41		particle flow coming out of cracks in the rock behind gorgonian (still thruster dust?)	
18:51:16		still taking photographs of gorgonian, stirring up dust	
18:52:28		checking out area behind gorgonian with rising particle flow	
18:53:17	15	slightly sedimented talus	
18:55:17	13	sedimented talus/ pillows, 2883 m	
18:56:17	3	lobate flows?	
18:57:32	4	dark sediment (hyaloclastite?) at base of slope; little sediment channel between two pillow ridges	
18:58:41	13	small pillow ridge, 2884 m	
18:59:26	12	temperature 2.64°C	
19:00:23	23	shrimp	
19:00:31	12	going down, 2891 m	
19:02:03	4	base of slope, 2899 m	
19:04:37		only very distant view of seafloor	
19:05:33	4	ridges of dark sediment (hyaloclastite?) on pelagic sediment	
19:06:27		thruster dust	
19:10:15	4	thruster dust	
19:12:07	23	holothurian	
19:12:24	4	ridges of dark sediment (hyaloclastite?) on pelagic sediment	
19:12:58	3	contact sediments to sedimented pillows	
19:13:31	3	fish	
19:14:11	3	sedimented pillows	
19:14:43	23	branched gorgonian	
19:15:35	13	pillow ridge	
19:15:52	12	2885 m	
19:16:39		records SSt	
19:17:40	12	terrace, 2885m	
19:19:07	15	contact between sediment and talus, shrimp, holothurian	
19:20:16	12	cliff, 2882m	
19:21:08	13	ridge with some pillows, 2882m	
19:23:57	23	branched gorgonian	
19:24:10	23	2 shrimp	
19:25:17	13	slope, going downhill, 2882m	
19:28:18	3	2884m	
19:30:36		ship goes south, ROV will go up to 8°18S	
19:31:47	23	fish	
19:32:00		seafloor not in sight, 2883m	
19:34:37	4	hyaloclastite, 2901m	
19:37:49	15	strongly sedimented talus, 2903m	
19:40:24	15	sedimented talus, 2894m	
19:42:14	15	sedimented talus, slope, 2893m	
19:42:54		increasing natural turbidity	
19:43:48	23	eel-like fish	
19:44:33	3	2893m	
19:45:43		seafloor not in sight	
19:46:16	4	2905m	
19:51:39		100m to south to WP 18°04, then turnings eastward	
19:53:35	3	slope, 2896m	
19:56:32	4	2900m	
19:56:53	23	holothurian on sediment	
19:57:37	23	holothurian before talus slope	
19:58:03	15	sedimented talus, 2899m	
19:59:05	15	talus slope, 2895m	
20:01:52	12	steep wall, some sedimented pillows and talus	
20:03:24	23	shrimp, 2 gorgonians, 2889m	
20:05:49	15	strongly sedimented talus, 2892m	
20:07:00	4	pillows sticking out of sediment, ripples	
20:07:44	23	holothurian	
20:09:12	23	holothurian, 2892m	
20:10:47	4	2896m	
20:11:10	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
20:12:07	3	pillows and talus sticking put of sediment	
20:12:23	23	holothurian	
20:13:20		WP 18°03, turning eastward	
20:14:13	23	shrimp, ctenophore, 2891m	
20:15:13	23	holothurian, 2892m	
20:15:33	3	pillows sticking out of sediment, 2893m	
20:17:23	23	holothurian	
20:17:44	23	holothurian	
20:18:01	23	2 holothurians	
20:18:50	3	slope, sedimented pillows, 2895m	
20:22:13		200m to north	
20:22:42	4	2909m	
20:23:03	23	holothurian	
20:23:57	15	slope, 2910m	
20:24:44		thruster dust	
20:26:38	15	slope, 2902m	
20:27:51	4	2904m	
20:28:44	23	eel-like fish	
20:28:53		temperature decreased	
20:29:26		contact between sediment and lava flow	
20:30:24	12	steep wall, pillows, 2900m	
20:32:22		5l beer barrel, hooked animal in sediment	
20:33:11	4	2898m	
20:34:15	15	sedimented talus, slope	
20:34:25	23	shrimp, holothurian	
20:35:52	4	2904m	
20:36:52	23	holothurian	
20:38:09	4	slope	
20:38:33	23	holothurian	
20:38:44	3	cliff, pillow with rind texture, 2909m	
20:39:35	4	2911m	
20:40:00	23	holothurian, 2911m	
20:40:18	15	slope, 2911m	
20:41:29	23	Brisingidae	
20:42:41	23	holothurian, 2911m	
20:43:55		Hyaloclastite, 2913m	
20:45:43		Hyaloclastite with ripples	
20:46:14	3	contact between Hyaloclastite and sedimented pillows	
20:46:34	23	ophiuroid on basalt	
20:47:36	23	holothurian, 2898m	
20:47:57	4	ripples, 2897m	
20:48:29	3	contact between pillows and pelagic sediment	
20:49:03	23	gorgonian, holothurian	
20:49:53	15	sedimented talus with broken pillows	
20:50:36		thruster dust	
20:50:47	15	slope, 2888m	
20:51:19	15	sedimented talus, ripples in sediment	
20:51:56	15	base of slope, going uphill on the other side of the valley, 2886m	
20:54:22		thruster dust	
20:54:40	4	darker sediment and talus, slope	
20:55:10	3	sedimented pillows, 2887m	
20:56:10	3	small cliff, 2885m	
20:56:38	4	Hyaloclastite,2888m	
20:57:26	15	slope	
20:57:52	23	3 gorgonians on edge of cliff	
20:58:55	23	holothurian	
21:00:00	15	sedimented talus, 2908m	
21:00:35		100m to south to WP, then turnings	
21:01:02	23		
21:02:50	3	sedimented pillows with stalked crinoid in flow, 2907m	
21:05:18	3	slope, 2905m	
21:05:32	23	holothurian	
21:07:03	3	strongly sedimented pillows, slope, 2905m	
21:10:39	3	sedimented pillows with sediment terraces with ripples, 2903m	
21:11:57	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
21:13:07		seafloor not in sight	
21:13:51	23	ctenophore	
21:14:06	4	2911m	
21:15:52		thruster dust	
21:16:50		seafloor not in sight	
21:17:53	3	2913m, talus and pillows	
21:19:54	4	fine talus	
21:22:12	23	gorgonian	
21:22:34	3	front of lava flow	
21:22:48	23	holothurian	
21:23:31	15	fine to coarse talus, 2906m	
21:24:32	3	sedimented pillows, 2898m	
21:25:14	3	slope, 2892m	
21:25:35	23	holothurian	
21:26:05	13	sedimented pillows	
21:26:50		thruster dust	
21:27:11		seafloor not in sight, 2888m	
21:28:15	15	strongly sedimented talus	
21:28:49	23	gorgonian	
21:29:03	23	shrimp	
21:29:26	4	2913m, talus and pillows	
21:30:21	23	holothurian	
21:30:41	23	holothurian	
21:30:55	23	holothurian	
21:31:07	3	sedimented pillows, collapsed	
21:31:27	23	gorgonian	
21:33:01	3	cliff, sedimented pillows, 2907m	
21:33:31	23	2 holothurians on sediment	
21:33:53	4	sediment with ripples	
21:34:20	23	holothurian	
21:34:45	3	sedimented pillows, slope, 2901m	
21:36:37	3	strongly sedimented lava, 2906m	
21:37:27	23	holothurian	
21:37:37	4		
21:38:57	4	2910m	
21:39:36	15	talus sticking out of sediment, 2910m	
21:40:20		Hyaloclastites with ripples, 2912m	
21:40:55	4		
21:42:33	15	fine talus, slope, 2904m	
21:43:21	3	sedimented pillows, 2892m	
21:44:48	12	sedimented talus, 2891m	
21:46:35	15	sedimented talus on slope, 2885m	
21:49:16	15	sedimented talus, 2885m	
21:51:07	23	shrimp, 2879m	
21:51:32	4	2883m	
21:51:55	23	3 gorgonians on flow front, small dark fish	
21:52:14	14	front of lava flow	
21:52:35	11		
21:53:51	3	slope, sedimented lava	
21:55:08		increased natural turbidity?	
21:56:18	4	2890m,	
21:57:34		seafloor not in sight, 2895m	
21:58:01	4	2899m	
21:58:31	23	3 holothurians	
21:58:48	23	shrimp	
21:59:00	23	2 holothurians	
21:59:45	23	holothurian on pelagic sediment, 2907m	
22:00:46	14		
22:01:07	23	holothurian	
22:01:32	12	cliff, 2899m	
22:02:21	23	branched gorgonian	
22:02:31	12	cliff, 2897m, collapsed pillows	
22:03:03	3	sedimented pillows	
22:03:18	12	contact between cliff and Hyaloclastite, 2895m	
22:04:14	23	fish	
22:05:17		increased natural turbidity?	

Time (hh:mm:ss)		CODE	Notes	Sample #
	22:05:46	3	2892m	
	22:07:38	3	sedimented pillows, 2889m	
	22:09:37		records AK	
	22:09:53	4	dark sediment (hyaloclastite?) at contact between sedimented pillows and pelagic sediment, 2903 m	
	22:10:37	23	tall gorgonian	
	22:12:31		thruster dust	
	22:12:39	23	shrimp	
	22:13:47		ROV hits ground; accidental sampling?	
	22:13:56		8°18.033'S; 13°30.746'W	
	22:14:27		thruster dust	
	22:14:51	3	sedimented pillow and/or talus slope	
	22:14:00		positive temperature anomaly	
	22:15:25	12	sedimented pillows, 2891 m	
	22:16:43	3	strongly sedimented pillows	
	22:17:21	3	big collapsed pillow	
	22:19:11		only dim and distant view of seafloor	
	22:19:47	14	contact between sediments and sedimented pillows	
	22:20:17	13	pillow ridge	
	22:20:46		temperature rising up to 2.65°C, back to anomaly (22:14:00)	
	22:22:08	3	slightly sedimented pillows	
	22:26:47		water sample; Niskin bottle no. 3; sample no. 1280-1; 8°18.048'S; 13°30.782'W; 2888 m; 22:27:00 ship time (offset to computer time 13 s)	**1280-1**
	22:28:31	3	some nice big pillows and tubes	
	22:31:07	3	sedimented pillows and/or talus	
	22:32:08	12	2892 m	
	22:32:48		temperature rising up to 2.64 °C; trying to find source of anomaly	
	22:33:30	23	swimming animal	
	22:33:55		t=2.66	
	22:34:09	4	dark sediment (hyaloclastite?) on pelagic sediment	
	22:34:52		t=2.65	
	22:35:28	3	contact sediments to sedimented pillows	
	22:35:51		t=2.64; 2895 m	
	22:36:40		t=2.63	
	22:37:37	3	sedimented pillows	
	22:38:18		t=2.64	
	22:38:44	23	swimming animal	
	22:39:09	23	shrimp	
	22:39:31	4	dark sediment (hyaloclastite?) on pelagic sediment	
	22:40:03	4	sediment channel between sedimented pillows	
	22:40:21		increased natural turbidity	
	22:40:42		t=2.64	
	22:40:53	3	sedimented talus and some pillows, 2901 m	
	22:42:19		t=2.65	
	22:42:57		temperature down to 2.59°C	
	22:43:30	4	dark sediment (hyaloclastite?) on pelagic sediment; contact between sedimented pillows/ talus and sediment	
	22:45:01	23	holothurian	
	22:45:16	23	shrimp	
	22:45:24	4	2914 m, t=2.60°C	
	22:45:50	23	holothurian	
	22:46:04	15	sedimented talus	
	22:46:33	3	some nice pillows	
	22:46:41	23	fish	
	22:46:58		going up; 2894 m	
	22:47:36		increased particle flow	
	22:48:55	23	holothurian	
	22:49:13	11	sedimented ledge on talus slope	
	22:49:53	3	contact sedimented talus to pillows; perfect pillow crosscut with radial cooling cracks exposed	
	22:50:44	12	sedimented pillows; 2884 m	
	22:51:27	23	holothurian	
	22:52:34	3	small sediment channel in pillows; 2875 m	

Time (hh:mm:ss)		CODE	Notes	Sample #
	22:53:19	23	brisingidae ? on rock	
	22:53:56	3	2870 m	
	22:54:39	23	gorgonian	
	22:54:56	15	base of slope?	
	22:56:17	11	small sedimented ledge in talus slope, 2866 m	
	22:56:52	13	pillow and/or talus ridge	
	22:57:07	23	shrimp	
	22:57:51		temperature slowly rising (2.62°C)	
	22:59:05		increased particle flow	
	22:59:27	15	sedimented talus, ripples in sediment	
	23:01:39	12	sedimented talus slope; 2880 m	
	23:02:35	23	shrimp	
	23:03:47	4	2899 m	
	23:05:33	23	holothurian	
	23:05:48	23	holothurian	
	23:06:03	23	swimming animal shadow	
	23:06:27	23	holothurian	
	23:07:05	15	contact sediments to sedimented talus	
	23:07:36	3	2904 m	
	23:08:06	23	shrimp	
	23:08:13	23	eel-like fish	
	23:09:10	12	sedimented talus	
	23:09:49	4	contact talus to sediments	
	23:10:25	23	holothurian	
	23:10:32	3	pillow with nice rind textures	
	23:11:06	3	perfect pillow	
	23:11:22	23	gorgonian	
	23:11:45	4	dark sediment (hyaloclastite?) on pelagic sediment, small sediment channel in pillows	
	23:11:56	23	fish	
	23:12:41	2	lobate flows?	
	23:13:06	12	2891 m	
	23:14:26	13	pillow ridge; 2889 m	
	23:15:59	23	holothurian in sediment channel	
	23:17:21	13	pillow ridge with sediment	
	23:18:11		temperature slowly rising (2.63°C)	
	23:19:01	23	4 holothurians	
	23:19:25	4	some big pillows and pillow mounds sticking out	
	23:20:14		beer bottle	
	23:21:15	23	2 holothurians	
	23:21:52		another beer bottle	
	23:22:07	4	sediment channel, pillows or talus on both sides just out of view when looking ahead	
	23:22:57	23	holothurian	
	23:23:05	3	nice pillows and lava tubes	
	23:23:18	23	3 holothurian	
	23:23:53		t=2.64; 2888 m	
	23:24:52	3	small to medium sized pillows	
	23:25:16	4	ripples in sediment	
	23:25:49	23	holothurian	
	23:26:03	15	base of talus slope ?	
	23:26:36		temperature 2.65°C	
	23:26:56	14	contact sediments to pillows	
	23:27:25	3	nice pillows	
	23:28:13		t=2.63	
	23:29:02	23	holothurian	
	23:29:11	23	shrimp	
	23:29:25	23	holothurian; 2885 m	
	23:29:47	4	dark sediment (hyaloclastite?) on pelagic sediment; small sediment pocket in pillows	
	23:30:33	3	nice pillows	
	23:31:04	4	contact sedimented pillows to sediments	
	23:31:28	23	2 holothurian	
	23:31:44	3	nice pillows	
	23:32:04		50 m N of T-anomaly; temperature 2.64°C	
	23:32:35	23	shrimp	
	23:32:45		8°18.087'S; 13°30.781'W	

Time (hh:mm:ss)	CODE	Notes	Sample #
23:33:10	23	holothurian	
23:33:38		increased particle flow	
23:33:54	3	2881 m	
23:34:13	12	nice pillows; going down	
23:34:41	4	dark sediment (hyaloclastite?) on pelagic sediment; base of talus slope	
23:35:42	15	sedimented talus	
23:36:24		t=2.65°C	
23:36:41	12	perfect pillow crosscuts	
23:38:14	23	gorgonian	
23:39:03	23	shrimp	
23:39:13	13	sharp pillow ridge; 2852 m	
23:40:35		t=2.64	
23:40:58	13	following ridge	
23:42:06		cable in view	
23:43:56	4	some talus sticking out	
23:44:17	23	swimming animal	
23:44:24	15	talus slope; 2876 m	
23:45:23	4	some pillows/ talus blocks sticking out	
23:45:42	23	holothurian at base of pillows	
23:46:15	14	contact sediments to sedimented pillows	
23:46:44		t=2.62	
23:47:49	23	shrimp	
23:48:49	3	strongly sedimented pillows	
23:49:12		2876 m	
23:49:45	14	contact sediments to sedimented pillows, following flow front?	
23:50:18		going W and flying profiles between 13°30.04'W to 13°30.96'W	
23:51:45	23	holothurian	
23:51:57	23	holothurian	
23:52:05	4	some pillows sticking out	
23:52:31	23	holothurian	
23:52:37	14	flow front or pillow ridge, some nice rind textures	
23:54:03	4	small sediment channel in pillows; possibly sediment filled fracture	
23:54:48	3	2880 m	
23:55:15	23	holothurian	
23:55:38	23	3 holothurians	
23:56:08	3	collapsed pillows	
23:56:25		t=2.64	
23:57:12	3	nice pillows, medium sized	
23:58:10	12	sedimented talus	
23:58:56	15	2875 m	
23:59:19	1	contact talus to pillows; hardly any sediment	
0:00:16	12	sedimented pillows; 2847 m	
0:02:16		changing shifts; waiting for new pilots	
0:03:35	3	2865 m; only distant view of seafloor, gorgonian on cliff	
0:05:36	23	shrimp	
0:05:45		t=2.63	
0:06:00	3	8°18.053'S; 13°30.068'W	
0:07:36	3	2870 m, holothurian	
0:09:00	1	nice pillows	
0:09:22	23	branched gorgonian	
0:09:39	13	pillow ridge	
0:10:05	23	branched gorgonian (same one)	
0:10:19	1	steep slope; 2863 m	
0:11:14	12	nice pillow crosscut	
0:11:40	23	taking pictures of gorgonian (still the same)	
0:12:45		t=2.66°C	
0:14:03		!!! Positions written down in the records were cursor position NOT ROV position; correct ROV position from here on	
0:15:23	13	sharp pillow ridge	
0:15:52		t=2.63; 2851 m	
0:17:15	3	going up to 2867 m	
0:17:48	15	going up to 2864 m	

Time (hh:mm:ss)		CODE	Notes	Sample #
	0:18:27	3	some pillows	
	0:18:40		going up to 2858 m, terraced slope	
	0:20:14	3	going down again to 2868 m	
	0:20:36	3	nice pillows	
	0:20:42	14	contact pillows to sediment	
	0:21:38	15	contact sediment to talus; 2873 m	
	0:22:26	3	nice pillows	
	0:22:42		ROV hits ground; accidental sampling?	
	0:24:19		thruster dust	
	0:24:25		start profiles to south; approx position of last OFOS track; going towards CTD methane anomaly	
	0:25:43	3	8°18.050'S; 13°30.998'W; 2870 m	
	0:26:22	12	sedimented pillows, gorgonian	
	0:27:07		turbidity caused by ROV	
	0:28:54	3	2861 m	
	0:29:13	4	dark sediment (hyaloclastite?) on pelagic sediment; small sediment spot or channel in pillows	
	0:29:50	12	pillows; turbidity caused by ROV: 2858 m	
	0:31:16	3	some nice pillows	
	0:32:19	15	sedimented talus	
	0:32:43	12	2860 m	
	0:34:18	12	going down; 2871 m; t=2.64°C	
	0:34:59	23	holothurian	
	0:35:11	3	2880 m	
	0:37:34		going down; 2886 m	
	0:38:31	3	sedimented pillows and small sediment pockets	
	0:39:07	3	nice pillows, small ridge or peak	
	0:40:36	23	fish	
	0:40:53	4	contact pillows to sediment	
	0:42:22		going down, 2892 m; no view of seafloor	
	0:43:25	4	2900 m	
	0:44:25	23	holothurian	
	0:45:15	23	holothurian	
	0:45:23	4	t=2.64°C, 2902 m	
	0:46:19	4	some pillows sticking out	
	0:46:27	3	contact sediments to sedimented pillows; beautiful rind textures; some collapsed pillows	
	0:47:23	12	2887 m	
	0:47:38	4	dark sediment (hyaloclastite?)	
	0:48:06	3	perfect pillows	
	0:48:55	3	collapsed pillows	
	0:49:03	4	2884 m	
	0:49:22	23	2 holothurian on sediment	
	0:49:41	14	contact sediment to pillows; thruster dust	
	0:50:14	13	pillow ridge in sediment?	
	0:50:54	15	sedimented talus	
	0:51:06	23	holothurian	
	0:51:55	3	ROV hits ground; accidental sampling?	
	0:52:34	23	2 gorgonians	
	0:52:48	3	nice pillows	
	0:53:00	12	2865 m	
	0:53:36	15	sedimented talus	
	0:53:50	12	2863 m; going down	
	0:54:23		t=2.57°C; cold deep water coming from SW?	
	0:58:42	3	sedimented pillows	
	0:59:04		restart CTD-display	
	0:59:20	23	2 holothurians	
	1:00:17	12	2879 m; contact sediments to pillows	
	1:01:07	3	nice pillows	
	1:02:01		going down, 2881 m	
	1:03:06	3	sedimented pillows and/or talus; 2891 m	
	1:03:41	23	fish	
	1:04:04	23	shrimp	
	1:04:23	23	2 holothurians	
	1:04:38	23	shrimp	
	1:04:52	4	2891 m	
	1:05:05	15	contact sediment to sedimented talus slope	

Time (hh:mm:ss)	CODE	Notes	Sample #
1:06:26	23	2 holothurians	
1:06:51		turbidity caused by ROV	
1:08:39	23	holothurian	
1:08:49	4	some talus fragments sticking out	
1:09:12	23	fish	
1:10:01	15	contact sediments to talus/ pillows	
1:10:48	3	nice pillow with rind textures	
1:11:18	14	following contact sediments to pillows	
1:11:53	23		
1:12:17	23	gorgonian	
1:12:28	3	nice pillows	
1:12:56	4	some talus fragments sticking out	
1:13:08	23	holothurian	
1:13:36	4	small step in sediments with yellowish material	
1:13:48	23	ophiuroid, dead gorgonian, actinian	
1:13:56	23	holothurian	
1:18:56		taking lots of photographs	
1:20:40	23		
1:21:02	15	sedimented talus	
1:21:29	4	small sediment channel between talus	
1:21:48	15	small talus ridge	
1:22:16	23	fish	
1:22:26	12	2867 m	
1:23:13	15	2875 m	
1:23:27	4	contact talus to sediments	
1:24:07	3	pillow ridges in sediments, holothurian	
1:24:32	4	dark sediment (hyaloclastite?) in pelagic sediments	
1:24:35	23	fish	
1:25:09	3	nice pillows	
1:25:23	3	collapsed pillows	
1:26:00	3	nice pillows	
1:27:43	23	holothurian; 2890 m	
1:28:10	3	2900 m	
1:28:33	23	2 holothurians, white zigzag traces in sediment	
1:29:02	23	holothurian	
1:29:22	4	2899 m	
1:30:19	23	holothurian	
1:31:09	4	boring sediments, not even ripples	
1:31:31	23	2 holothurians on sediment	
1:31:42	3	small pillow ridge, 2891 m	
1:33:43	3	strongly sedimented pillows; 2893 m	
1:34:17		t=2.63°C	
1:35:10	4	white spots in sediment next to rock sticking out	
1:35:50	4	some pillows/ talus blocks sticking out	
1:36:09	23		
1:37:13	15	small talus ridge in sediments	
1:38:26	23	holothurian	
1:39:24		thruster dust	
1:39:49	23	shrimp	
1:40:32	4	some talus sticking out	
1:40:44	3	nice pillows; 2881 m	
1:42:17	4	crossing sediment channel with ripples	
1:42:35	15	talus at base of slope	
1:43:00	3	pillows, hardly any sediment	
1:43:27	12	slightly sedimented pillows, eel-like fish, 2862 m	
1:45:41		thruster dust?	
1:45:54	3	strongly sedimented pillows; 2873 m	
1:46:48	4	2874 m	
1:47:09	4	dark and yellowish crusts in sediment	
1:47:40	4	dark sediment (hyaloclastite?)	
1:47:53	12	pillows on steep slope	
1:48:12	4	dark sediment (hyaloclastite?) on base of slope	
1:48:40	3	pillows/ talus	
1:48:57	12	2869 m	
1:49:35	4	dark sediment (hyaloclastite?) on base of slope	
1:49:44	15	sedimented talus/ pillows	

Time (hh:mm:ss)	CODE	Notes	Sample #
1:50:19	4	dark and yellowish crusts in sediment	
1:50:27	23	2 holothurian	
1:50:43	15	sedimented talus, 2870 m	
1:51:31	23	gorgonian	
1:51:57		preparing for sampling yellowish sediment	
1:52:50		t=2.57	
1:54:31	23	holothurian	
1:54:47	23	shrimp	
1:55:09	23	3 gorgonian	
1:56:58		thruster dust	
1:57:42		close-up of yellow crusts; taking photographs	
2:05:58		water sample, Niskin bottle no. 2; sample no. 1280-2; 8°18.179'S; 13°30.991'W; 2874 m	**1280-2**
2:11:54	3	still at sampling site	
2:14:36	4	dark sediment (hyaloclastite?) on pelagic sediment, still at sampling site	
2:17:03	23	holothurian	
2:26:37	4	contact sediment to sedimented pillows/ talus	
2:27:24		going back to sampling site (drifted off during preparations)	
2:28:43	3	small ridges and patches old pillows sticking out of sediment	
2:30:29	3	nice pillows with beautiful rind textures	
2:31:31	3	collapsed pillows	
2:33:17	23	holothurian	
2:33:41	23	gorgonian	
2:34:13	4	small sediment channel between pillows/ talus slopes	
2:35:03		cable in view	
2:35:40		turbidity caused by ROV	
2:36:10	23	gorgonian	
2:37:20	3	perfect pillows	
2:37:52	23	2 gorgonian, actinian	
2:38:12	3	very nice rind textures	
2:38:30	12	2876 m	
2:40:47	4	dark and yellowish crusts in sediment	
2:40:54	23	holothurian	
2:43:37	23	beautiful brisingidae on yellow crust	
2:44:50	23	holothurian	
2:47:00		sampled yellow crust; sample 1280-3; 8°18.166'S; 13°30.984'W; 2881 m	**1280-3**
2:53:48		finished sampling, trying to follow yellow crusts	
2:55:27	23	shrimp, holothurian	
2:55:51		turbidity caused by ROV	
2:57:09	3	pillows/ lobate flows?	
2:57:37	12	2880 m	
2:57:48	23	holothurian on slope	
2:58:02	4	yellow crust in view again	
2:59:12	3	pillows with rind textures	
2:59:31	12	accidental sampling? of small pillow wall; nice rind textures	
3:00:28	4	ripples in sediment	
3:01:22	4	area with yellow precipitates has approx. length of 40 m, approx. thickness 25 cm	
3:04:58	4	2878 m, holothurian	
3:05:20	4	some pillows sticking out	
3:06:10	4	wriggly tracks in sediment	
3:06:36	23	holothurian	
3:07:04	23	shrimp	
3:07:56	4	nothing else to be seen…	
3:08:10	23	holothurian	
3:08:46	23	holothurian	
3:08:53	3	some pillows sticking out; collapsed pillows and some pillows with rind textures	
3:10:43	23	holothurian	
3:11:05	12	small pillow wall	
3:11:22	23	2 holothurian	
3:11:36		thruster dust; 2874 m	

Time (hh:mm:ss)	CODE	Notes	Sample #
3:12:27	23	shrimp	
3:12:47		going up, 2859 m	
3:13:51		2857 m, no view of seafloor	
3:14:50		going back down, 2862 m	
3:17:33	4	2878 m	
3:17:50	4	dark sediment (hyaloclastite?) on pelagic sediment; 2883 m	
3:18:57	15	talus and/or pillow slope at right edge of field of view	
3:19:18	23	2 holothurian	
3:20:04		GAPS doesn't work	
3:27		holothurian	
3:28:04	3	sedimented pillows; crinoid, thruster dust	
3:29:14	23		
3:31:05	3	big pillows	
3:31:30	23	beautiful pennatularia on beautiful pillow	
3:31:38		thruster dust	
3:32:00	23	shrimp	
3:33:47		GAPS back, looking at area around yellow precipitates, then going E	
3:34:57	23	gorgonian	
3:35:08	3	sedimented pillows	
3:35:26	23	holothurian	
3:36:55	23	holothurian	
3:37:54	4	some talus sticking out	
3:38:10		heading E	
3:38:26	4	dark sediment (hyaloclastite?) on pelagic sediment	
3:39:28	23	holothurian	
3:39:40	15	sedimented talus; 2879 m	
3:40:46	4	contact talus to sediments	
3:41:55	15	sedimented talus	
3:42:45	3	sedimented pillows, crinoid on slope	
3:43:08	12	2866 m	
3:43:57	23	swimming animal	
3:45:46	15	contact sediments to talus; 2874 m	
3:46:33	23	holothurian	
3:47:56	15	sedimented talus; 2861 m	
3:49:19	15	sedimented talus slope	
3:51:02	23	holothurian	
3:51:11	4	some talus sticking out, 2874 m	
3:52:08	3	small pillow/ talus ridge in sediment	
3:52:33	4	2885 m; some pillow/ talus sticking out	
3:54:10	23	gorgonian	
3:54:16	3	pillow with nice rind textures	
3:54:34	4	brownish sediment, holothurian	
3:55:35	15	contact sediments to sedimented talus, right edge of view	
3:56:52	4	2882 m	
3:58:50	15	contact sediments to talus slope, ripples in sediments	
3:59:54	15	small talus ridge in sediments	
4:00:48	15	sedimented talus; 2877 m	
4:01:09	3	nice pillows, gorgonian on talus block	
4:01:39	12	slope, 2872 m	
4:02:58	23	2 fish	
4:03:19	15	sedimented talus	
4:04:02	4	2882 m	
4:04:23	23	shrimp	
4:04:33	23	holothurian	
4:04:53	15	contact sediment to talus slope	
4:05:15	23	shrimp	
4:05:27	23	holothurian	
4:05:38	3	sedimented pillows	
4:05:57	3	big beautiful pillows	
4:06:21	23	2 gorgonian	
4:06:34	23	holothurian	
4:06:50	15	talus slope, 2869 m	
4:07:12	1	hardly any sediment, could be flow front	
4:07:29	23	brisingidae	

Time (hh:mm:ss)	CODE	Notes	Sample #
4:08:56		thruster dust	
4:09:21		t=2.62°C	
4:10:24	3	sedimented pillows/ talus slope; 2872 m	
4:12:07	11	small sedimented ledge on talus slope, gorgonian	
4:13:06	23	holothurian	
4:14:11	23	2 holothurians	
4:14:22	14	contact sediments to sedimented pillows	
4:14:46	3	nice pillows; 2894 m	
4:15:39	4	slump structures in sediments ?	
4:16:00	23	shrimp	
4:16:15	4	2899 m	
4:16:25	23	holothurian	
4:17:19	23	fat (and round) red angler fish	
4:17:59	4	2897 m	
4:18:51	23	holothurian	
4:18:52	23	eel-like fish	
4:19:14	15	small talus ridge	
4:19:45	4	boring sediments	
4:20:31	23	holothurian, fish	
4:20:47		thruster dust	
4:20:57	4	boring sediments	
4:21:31	23	eel-like fish, then a shrimp	
4:21:40	14	sedimented pillows	
4:22:17		ROV hits ground; accidental sampling?	
4:23:05	14	contact sediments to pillow slope with talus at base; 2873 m	
4:23:31	1	nice pillows	
4:23:50	12	2867 m	
4:24:33	23	holothurian, branched gorgonian	
4:25:19		thruster dust	
4:26:30		thruster dust	
4:26:46		going down; 2875 m	
4:27:45	3	2876 m	
4:27:57		8°18.207'S; 13°30.917'W; 2873 m	
4:29:18		going 40 m N; then 500 m E, then short profiles to S	
4:31:16		2851 m; no view of seafloor	
4:33:55		2846 m; still no view of seafloor	
4:36:37	23	Macrouridae (grenadier) and seafloor back in view	
4:37:01	4	sediment	
4:37:19	23	swimming animal with 5 arms	
4:37:35	14	contact sediments to pillow slope, some talus at base; left edge of view	
4:38:03	23	holothurian	
4:40:28	4	2883 m	
4:41:03	23	holothurian	
4:41:20	23	holothurian	
4:41:28	4	ripples of dark sediment (hyaloclastite?) on pelagic sediment	
4:42:47	4	some pillows sticking out	
4:43:07	23	3 holothurian	
4:43:23	3	strongly sedimented pillows	
4:44:14	3	collapsed pillow	
4:45:21	23	holothurian on pillow	
4:45:52	23	holothurian	
4:46:09	3	sedimented pillows, holothurian	
4:47:01	23	holothurian; 2891 m	
4:47:39	23	fish (rattail?)	
4:47:44	23		
4:47:54	4	wriggly tracks in sediment	
4:48:07	4	some pillows sticking out	
4:49:41	23		
4:50:30	4	sediments	
4:51:59	23	holothurian	
4:52:08	4	wriggly tracks in sediment	
4:52:22	23	crinoid	
4:52:46		thruster dust	
4:53:15	4	some pillows sticking out	

Time (hh:mm:ss)	CODE	Notes	Sample #
4:53:31	3	sedimented pillows/ talus, 2896 m	
4:54:17	4	wriggly tracks in sediment	
4:54:33		t=2.63°C	
4:54:52	4	single pillows sticking out	
4:55:27	23	holothurian	
4:55:48	3	nice collapsed pillow	
4:56:18	4	ripples in sediment	
4:56:26	3	small pillow ridge or flow front with sedimented top?	
4:57:43	23	2 holothurian	
4:57:58	23	shrimp	
4:58:08	4	2899 m	
4:58:24	23	holothurian	
4:58:38	23	2 shrimp	
4:58:57	4	2903 m	
4:59:08	23	fish	
4:59:27	23	holothurian	
4:59:42	4	white lines in sediment	
5:00:08	14	contact sediments to pillows	
5:00:27	23	holothurian	
5:01:04	23	gorgonian	
5:01:09	3	perfect pillows	
5:02:20	3	collapsed pillow	
5:02:40	3	strongly sedimented pillows, ripples in sediment	
5:03:44	4	white material in sediment close to pillow	
5:04:03	23	shrimp, swimming holothurian	
5:05:11	4	small sediment channel with interesting ripples	
5:05:45	15	talus slope, some pillows	
5:06:13	23	shrimp	
5:07:05		thruster dust	
5:07:41	23	shrimp	
5:09:16	4	white material in sediment close to pillow; 2894 m	
5:10:22	23	shrimp	
5:10:29	3	sedimented pillows	
5:11:29	12	great pillows	
5:12:15	23	Steffi's white star (?)	
5:13:00	3	2901 m, gorgonian	
5:14:52	3	sedimented pillows; 2910 m	
5:15:46		2907, no view of seafloor	
5:17:23	3	2921 m	
5:17:41	23	eel-like fish	
5:18:20		2919 m, seafloor out of view again	
5:19:29	4	2925 m	
5:20:01	23	holothurian	
5:21:20	4	pillow sticking out	
5:21:37		thruster dust, 2921 m	
5:23:05	3	sedimented pillows, still thruster dust	
5:24:56	4	some talus blocks sticking out, 2931 m	
5:25:32	3	steep slope with pillows and some talus	
5:26:32	4	some talus blocks sticking out, 2931 m	
5:27:40	23	shrimp	
5:27:59	4	ripples in sediment	
5:28:18	3	strongly sedimented pillows; white material in sediment next to pillows, swimming echinoderm/ophiuroid?	
5:29:42	15	sedimented talus	
5:30:03	4	2954 m	
5:30:25	15	sedimented talus slope	
5:30:45	23	shrimp	
5:31:16	3	pillow/ talus slope	
5:32:08	12	2952 m	
5:32:23	23		
5:33:02	12	accidental sampling? (of talus slope)	
5:34:03	23	gorgonian	
5:36:01		cable in view	
5:36:17	23	eel-like fish	
5:36:28	15	talus slope	
5:39:22	15	fine talus	

Time (hh:mm:ss)	CODE	Notes	Sample #
5:40:01	15	coarser talus	
5:41:48	15	talus slope; 3930 m	
5:44:36	4	2914 m	
5:45:33	4	some blocks and lots of fine talus on pelagic sediment	
5:46:25	23	branched gorgonian on pillow	
5:46:39	15	talus slope; 2917 m	
5:48:07	12	going up talus slope; 2902 m	
5:48:32	3	top of slope; 2896 m; pillows and talus	
5:49:55	4	ripples; 2905 m	
5:50:19	4	some areas of sediment have ripples, others are without	
5:51:00	3	2897 m	
5:51:09	23	shrimp	
5:51:48	15	sedimented talus	
5:52:43	3	some nice pillows	
5:53:22		t=2.64°C; 2878 m	
5:53:34	23	shrimp	
5:55:16	3	going down, 2884 m	
5:56:11	4	nice ripples	
5:56:52	14	contact sediments to pillows	
5:57:33	3	great pillows	
5:58:40	23	shrimp	
5:58:53	4	sediment channel between pillow slopes (flow fronts)	
6:02:31		thruster dust	
6:03:04	3	sedimented pillows/ talus	
6:03:42	4	dark sediment (Hyaloclastite?) on pelagic sediment at base of slope	
6:04:16	3	2881 m	
6:04:32	23	shrimp	
6:05:18	23	shrimp	
6:05:34	3	sedimented pillows/ talus	
6:06:09		t=2.65°C; 2882 m	
6:06:54	3	thruster dust	
6:07:26	23	gorgonian	
6:07:49	4	dark sediment (hyaloclastite?) on pelagic sediment	
6:08:59	4	boring sediments, not even ripples	
6:09:41	23	holothurian	
6:09:53	3	contact sediments to pillows/ talus	
6:10:20	23	holothurian	
6:11:04	23	shrimp	
6:11:31	4	ripples; 2885 m	
6:12:06	4	8°18.192'S; 13°30.804'W	
6:13:02	4	dark sediment (hyaloclastite?) on pelagic sediment	
6:13:30	3	nice pillow crosscut	
6:14:26	4	contact pillows to sediment, nice ripples	
6:15:19	4	some talus blocks sticking out; 2877 m	
6:15:44	4	seems to be sediment channel between pillows	
6:16:19	23	fish?	
6:16:38	4	ripples	
6:16:56	23	2 holothurian	
6:17:34	3	group of pillows sticking out of sediment	
6:18:25	23	shrimp	
6:18:35	4	2874 m	
6:18:53	23	shrimp	
6:19:04	3	groups or small ridges of pillows sticking out of sediments, some nice rind textures	
6:20:07	23	2 holothurian	
6:20:50	3	sedimented pillows and talus	
6:21:11	3	great pillows, beautiful rind texture	
6:22:48	3	sedimented pillows/ talus slope; 2880 m	
6:23:16	4	sediment with ripples, 2885 m	
6:24:00	23	swimming animal	
6:24:29	3	small step made of pillows	
6:26:02	3	sedimented pillows	
6:26:34	23	shrimp	
6:26:40	4	dark sediment (hyaloclastite?) on pelagic sediment	
6:27:06	3	2900 m	
6:27:18		temperature down to 2.58°C again	

Time (hh:mm:ss)	CODE	Notes	Sample #
6:28:08	4	single pillows sticking out	
6:28:58	23	shrimp	
6:29:11	4	brownish sediment	
6:29:24		t=2.56°C	
6:29:41	12	pillow/ talus slope	
6:30:40	4	ripples	
6:31:23	4	sharp contact between sediments with and without ripples	
6:31:41	23	shrimp	
6:32:01	3	pillow/ talus slope	
6:32:50		t=2.59°C	
6:33:03	23	brisingidae	
6:33:13	23	gorgonian	
6:33:29	3	2901 m	
6:33:53		2903, seafloor out of view	
6:34:23		t=2.62	
6:34:29	4	some fine talus, 2914 m	
6:35:02		t=2.57	
6:35:18	23	small eel-like fish	
6:35:42	4	some talus, still going down, 2921 m	
6:36:03	23	holothurian	
6:37:21	4	two orders of ripples	
6:37:39	23	holothurian	
6:37:56	23	holothurian	
6:38:07	23	brisingidae ?	
6:38:33	4	fine talus	
6:39:43	23	little fish	
6:39:54	23	brisingidae on talus block	
6:40:06	4	2926 m	
6:41:20	23	brisingidae	
6:41:32	4	fine talus	
6:41:59	23	shrimp	
6:42:09	4	brown crusts on sediment?	
6:42:22	3	sedimented pillows	
6:42:31		thruster dust	
6:43:05	23	fat (and round) red angler fish	
6:43:16	3	thruster dust	
6:45:10	15	talus/ pillows	
6:45:54	3		
6:46:14	23	holothurian	
6:46:31	23	2 gorgonians	
6:46:43		accidental sampling?	
6:46:56	23	sponge, holothurian	
6:47:30	3	nice pillows	
6:47:57		t=2.62°C, 2895 m	
6:49:08	23		
6:49:33		t=2.59°C	
6:49:52	3	2891 m	
6:50:14	4	sediment channel between pillows	
6:50:38	3	some big pillows	
6:50:52	4	some talus blocks sticking out	
6:51:33	15	talus and some pillows	
6:52:21	3	pillow/ talus ridge, accidental sampling?	
6:52:51	4	ripples, 2878 m	
6:53:22	4	slump related ripples?	
6:53:38	15	talus/ pillows, holothurian	
6:53:58	12	tectonic wall, some pillow crosscuts	
6:54:21	3	nice pillows, 2868 m	
6:54:45	1	pillow ridge, 2866 m	
6:55:14	4	small sedimented ledge on slope	
6:55:38	3	2867 m	
6:55:58		records SSt	
6:57:40		Hyaloclastite, 2871m	
6:58:25		Hyaloclastite with ripples	
6:59:00	3	pillows sticking out of sediment	
6:59:23	4	2874m	

Time (hh:mm:ss)	CODE	Notes	Sample #
6:59:51	15	sedimented talus, 2869m	
7:01:04	15	slope and ledge	
7:01:24	15	cliff, going downhill	
7:01:49	23	gorgonian	
7:02:00	12	talus ridge with pillows, 2862m	
7:03:11	15	going along the top of the ridge	
7:04:00	3	sedimented pillows	
7:04:03	14	sedimented pillows, lava front?	
7:05:59	15	sedimented talus on slope, 2867m	
7:06:49	11	ledge, talus	
7:07:28	4	2870m	
7:08:09	4	pillows sticking out of sediment	
7:08:53	4	pillows sticking out of sediment, ripples, 2871m	
7:09:39	23	holothurian	
7:09:56	3	sedimented pillows, 2868m	
7:11:35	3	strongly sedimented pillows, black stripe in sediment?, 2868m	
7:12:45	4	ripples	
7:13:02	3	strongly sedimented pillows, 2867m	
7:14:24	23	holothurian	
7:14:55	23	holothurian	
7:15:10	15	strongly sedimented talus	
7:15:43	4	pelagic sediment with ripples, 2872m, holothurian	
7:17:05	11	contact between sediment and lava front	
7:17:45	3	pillows on lava front, 2867m	
7:18:40	12	cliff	
7:19:14	15	going downhill, strongly sedimented talus	
7:19:51	3	going uphill on the other side, pillows	
7:20:33	23	shrimp, 2877m	
7:20:51	15	sedimented talus on slope, 2879m	
7:21:51	15	strongly sedimented talus, 2884m	
7:22:54	15	talus slope, 2886m	
7:24:44	15	strongly sedimented talus, 2892m	
7:25:11	23	shrimp	
7:25:32	15	fine talus, 2897m	
7:25:48	3	pillows sticking out of talus	
7:27:14	3	2905m	
7:28:14		seafloor not in sight	
7:28:39	15	strongly sedimented talus, 2915m	
7:30:19	4	2923m, ripples	
7:31:38	23	holothurian	
7:31:56	4	pillows sticking out of sediment, 2924m	
7:32:34	3	strongly sedimented pillows, ripples, 2924m	
7:33:30	23	holothurian	
7:33:44	4	pillows sticking out of sediment, ripples, 2925m	
7:34:22	4	contact between sediment and talus on slope,	
7:34:56	4	nice ripples	
7:35:12		thruster dust	
7:35:34		thruster dust, talus	
7:35:54	3	contact between lava crust and sediment	
7:36:09	23	holothurian	
7:36:51	23	holothurian 2916m	
7:37:10	4	ripples, 2915m	
7:39:44	4	holothurian, 2905m	
7:40:37	4	no ripples, white ophiuroid	
7:41:24	3	ceranthus, large polyp on block, 2901m	
7:43:47	4	holothurian, 2896m	
7:44:48	3	actinian, 2890,8m	
7:46:08	4	2888m	
7:47:18	4	ripple, 2884m	
7:47:41	3	talus, 2884m	
7:48:48	3	shrimp, 2881m	
7:49:50	15	talus on slope	
7:50:44		thruster dust	
7:50:55	4		
7:51:11	15	talus on steep slope, 2879m	

Time (hh:mm:ss)	CODE	Notes	Sample #
	12	pillows	
7:52:32	3	strongly sedimented pillows, 2872m	
7:53:04	4	ripples, 2873m	
7:53:28	3	pillows sticking out of sediment	
7:53:56	15	strongly sedimented talus on slope, ledge, 2879m	
7:54:48	15	steep slope, 2877m	
7:55:31	15	talus slope	
7:56:00	15	sedimented talus, ripples, 2879m	
7:56:22	23	fish	
7:57:36		seafloor not in sight	
7:58:08		thruster dust	
7:58:40	4	sediment with ripples, 2883m	
7:59:01		8°18,302S; 13°30,782W	
7:59:44		seafloor not in sight	
7:59:57	4	slope, ripples, 2890m	
8:00:22	23	fish	
8:00:55		thruster dust?	
	4	ripples	
8:01:45	4	ripples	
8:02:36	23	fish	
8:03:35	4	slope, 2901m	
8:04:08		seafloor not in sight	
8:04:43		thruster dust	
8:08:30	4	pelagic sediment with ripples, 2913m	
8:10:19	4	sediment with ripples, slope, 2916m	
8:11:36	15	contact between sediment and talus, steeper slope, 2913m	
8:12:27	23	shrimp	
8:13:38	23	holothurian on sediment	
8:13:49	3	lava slope, at base contact between lava and sediment	
8:16:09	4	pillows sticking out of sediment, contact between talus and sediment, 2919m	
8:17:26	4	pillows sticking out of sediment, ripples, 2915m	
8:18:16	3	strongly sedimented pillows, 2911m	
8:20:54	15	sedimented talus, slope,2911m	
8:21:54	4	talus sticking out of sediment, 2913m	
8:22:35	4	pelagic sediment, 2916m	
8:23:05	4	sediment with ripples, 2916m	
8:24:39		200m to north and looking for fissure	
8:25:02	23	2 holothurians	
8:26:06	4	sediment with ripples	
8:26:23	23	holothurian	
8:26:51	23	holothurian	
8:27:07	23	holothurian	
8:27:22	4	pelagic sediment with ripples, 2912m	
8:27:51	23	holothurian	
8:28:00	23	holothurian	
8:28:51	4	pelagic sediment with parallel ripples	
8:30:23	4	pelagic sediment with parallel ripples, 2899m	
8:31:23	23	holothurian	
8:31:31	15	sedimented talus	
8:31:46	3	big pillow in talus	
8:32:20	15	contact between talus and sediment, holothurian	
8:33:17	4	sediment with ripples in small valley	
8:33:58	3	sedimented pillows on slope	
8:34:30	12	cliff, pillows, 2877m	
8:36:38	3	sedimented pillows on top of cliff, 2869m	
8:38:34	4	sediment with ripples, 2872m	
8:39:00	15	contact between sediment and talus, 2871m	
8:39:34	23	gorgonian	
8:39:46	23	gorgonian	
8:39:54	12	steep wall, talus	
8:40:24	13	talus ridge with pillows, 2869m, 2 gorgonians	
8:41:50	13	going down slope, strongly sedimented talus and pillows	
8:43:11	4	pillows sticking out of sediment	
8:43:34	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
8:43:48	15	contact between sediment and talus with pillows, 2877m	
8:45:17	14	lava front, pillows, 2876m	
8:46:53	23	holothurian	
8:47:54	3	sedimented pillows, slope, 2874m	
8:49:11	15	sedimented talus slope, 2873m	
8:51:24	15	sedimented talus slope, 2884m	
8:52:21		seafloor not in sight	
8:53:00	4	pillows sticking out of sediment, 2893m, slope	
8:56:04	3	strongly sedimented talus and pillows, cliff, 2891m	
8:57:44	15	strongly sedimented talus on slope, 2891m	
8:58:30	15	talus slope, going uphill, 2887m	
9:00:57	13	top of talus ridge, 2869m	
9:01:43	15	going down on the other side	
9:02:20	3	pillows	
9:02:35	4	pillows sticking out of sediment, 2875m	
9:03:05	3	strongly sedimented pillows, ripples in sediment, 2872m	
9:03:41	3	sedimented pillows, 2871m, 2 holothurians	
9:04:56		8°18,250; 13°30,787	
9:06:09		stop because of missing navigation data, 8°18,131S; 13°30,764W	
9:17:38		going on, navigation still not working	
9:17:54	4	pillows sticking out of sediment, 2877m	
9:19:09	23	holothurian	
9:19:09	4	sediment with ripples	
9:19:54	14	contact between sediment and flow front	
9:20:56	15	sedimented talus slope, 2872m	
9:22:15	3	sedimented talus and pillows, top of slope, 2870m	
9:24:22	3	strongly sedimented talus	
9:25:49	15	talus slope, 2878m	
9:27:21	15	sedimented talus, 2880m	
9:28:11	15	going down the talus slope, 2885m	
9:30:35	3	steep slope, 2872m	
9:32:19	15	sedimented talus on slope, 2881m	
9:35:35	15	sedimented talus, 2877m	
9:36:47	15	sedimented talus, ripples	
9:37:13		slightly increasing turbidity	
9:38:14	3	sedimented pillows, 2869m	
9:39:15	4	pillows sticking out of sediment, parallel ripples, 2874m	
9:39:59	4	pelagic sediment with ripples	
9:40:47	3	contact between sediment and sedimented pillows, 2868m	
9:41:30	3	sedimented pillows on slope, 2868m	
9:43:26	4	pillows sticking out of sediment, ripples	
9:44:18	4	contact between sediment and flow front, 2871m	
9:45:02	15	sedimented talus	
9:45:30	23	holothurian	
9:46:02	12	steep wall, pillows	
9:46:37	15	sedimented talus, 2866m	
9:49:50	15	sedimented talus, 2874m	
9:51:23	15	steep slope with pillows and talus, 2873m	
9:54:34		seafloor not in sight	
9:55:11	15	strongly sedimented talus	
9:55:54	15	strongly sedimented talus slope, 2880m	
9:56:48	15	strongly sedimented talus, going down slope	
9:58:25	4	pillows sticking out of light and brown sediment, 2895m	
9:59:41	4	contact between sediment and talus	
10:00:02	13	talus ridge, 2901m	
10:00:52	15	strongly sedimented talus and small pillows, 2892m	
10:01:49	15	sedimented talus slope, 2892m	
10:02:14	23	shrimp	
10:03:10	15	strongly sedimented talus with pillows	
10:04:25	4	contact between sediment and talus	
10:04:51	13	talus ridge	
10:05:29	4	sediment with ripples, 2906m	
10:05:51		hyaloclastite	
10:06:13	3	sedimented pillows and talus on slope, 2898m	

Time (hh:mm:ss)	CODE	Notes	Sample #
10:07:04	3	steep slope, sedimented pillows and talus, 2893m	
10:10:04	13	ridge, sedimented pillows and talus	
10:10:56	3	sedimented pillows and talus on slope, 2897m	
10:11:35	13	ridge, pillows and talus	
10:12:33	23	brisingidae on pillow	
10:13:20	15	fine talus	
10:14:14	3	sedimented pillows and talus, 2904m	
10:14:46	12	steep slope, pillows, 2896m	
10:16:11	13	top of ridge?	
10:16:36		seafloor not in sight	
10:18:25		seafloor not in sight, 2918m	
10:18:53	13	top of ridge, 2923m, strongly sedimented talus	
10:19:50		Hyaloclastites	
10:20:20	3	sedimented lava and Hyaloclastites, 2931m	
10:20:56	3	strongly sedimented pillows, 2930m	
10:21:51	15	strongly sedimented talus, slope, 2931m	
10:22:42	15	strongly sedimented talus, pillows and hyaloclastites	
10:24:13		8°18,106; 13°30,754	
10:25:05		water sample, Niskin bottle no 1, 2934m	**1280-4**
10:26:52	3	contact between talus, pillows and hyaloclastites, 2930m	
10:28:42	15	sedimented talus, 2931m	
10:29:32	15	contact between talus and sediment, 2925m	
10:29:58	4	pelagic sediment, 2921m	
10:30:54		ascent begun, leaving the bottom	

Station 1288 **M62/5B**
Segment A2 North
17. December 2004
Dive 33

Time (hh:mm:ss)	CODE	Notes	Sample #
17:27:53		ROV at 1171 m	
18:49:46		ROV at bottom, 3045m, 8°17,555; 13°31,178; holothurian	
18:50:54	4	pillows sticking out of pelagic sediment	
18:51:25		thruster dust	
18:51:49	3	strongly sedimented pillows	
18:53:32	3	strongly sedimented pillows , steep slope, 3041m	
18:55:42	4	contact between sediment and pillows, 3041m	
18:56:38	3	strongly sedimented pillows	
18:57:05	23	holothurian	
18:57:35	3	strongly sedimented pillows with rind texture	
18:58:08	23	holothurian on pillow	
18:58:44	23	holothurian	
18:58:54		8°17,583S; 13°31,191W; going 200m westward, then turnings to north	
19:00:20	3	elongated pillows	
19:00:56	23	holothurian	
19:01:07	3	strongly sedimented pillows on slope, 3020m	
19:02:13	23	holothurian	
19:03:15	4	pillows sticking out of lava	
19:03:22	23	holothurian	
19:04:10	3	strongly sedimented pillows on slope, 3027m	
19:04:50	23	2 holothurians	
19:05:18	23	holothurian	
19:06:15	3	strongly sedimented pillows, 3027m	
19:06:43		thruster dust	
19:07:49	3	strongly sedimented pillows, 3032m	
19:09:44	4	pillows sticking out of sediment, 3040m	
19:10:14	23	holothurian	
19:10:36	23	holothurian	
19:11:23	3	strongly sedimented pillows and talus	
19:11:56	12	going up steep wall, 3045m	
19:12:45	3		
19:13:45	4	pillows sticking out of sediment, 3044m	
19:15:43	4	sediment	
19:15:57	23	holothurian	
19:17:10	4	contact between sediment and pillows, 3050m	
19:17:39	3	sedimented pillows on slope, 3050m	
19:18:13	23	gorgonian	
19:18:46	12	cliff, 3050m	
19:19:49	12	going northwards on the edge of the cliff, 3049m	
19:20:48	3	sedimented pillows, 3051m	
19:22:20	3	sedimented pillows on slope, 3058m	
19:23:36	3	sedimented pillows on very steep slope, 3061m	
19:24:53	3	strongly sedimented pillows on slope, 3065m	
19:25:35		3 holothurians	
19:25:52		200m eastward	
19:26:12	4	pelagic sediment on slope, 3062m	
19:26:58	4	contact between sediment and strongly sedimented pillows, 3055m	
19:28:17	23	holothurian	
19:28:26	3	sedimented pillows, ropy	
19:29:22		fissure north-south, 3046m	
19:31:32		deep fissure, pillows on edges, 3045m	
19:32:04	23	2 holothurians	
19:32:19	23	3 gorgonians	
19:32:33		another fissure	
19:33:04	23	bythitid fish	
19:33:12	3	strongly sedimented pillows, 3042m	
19:33:40	23	shrimp	
19:33:52	23	gorgonian	
19:34:07		fissure, 3040m	
19:34:33	4	sediment, 4 holothurians	

Time (hh:mm:ss)	CODE	Notes	Sample #
19:35:01	3	strongly sedimented pillows, 3035m	
19:35:52	23	dead horn coral (gorgonian) on pillow with concentric rings of "cells", 3029m	
19:39:50	3	strongly sedimented pillows, 3027m	
19:40:09	23	holothurian	
19:40:30	3	pillows with rind texture	
19:40:51	3	elongated and round pillows, 3025m	
19:41:29		small fissure, 3025m	
19:41:42	23	shrimp	
19:41:58	3	sedimented pillows, 3024m, actinian?	
19:42:52		seafloor not in sight	
19:43:22	3	sedimented pillows on slope, 3034m	
19:45:30	4	pillows sticking out of sediment, 3040m	
19:46:15	23	2 holothurians	
19:46:48	4	pillows sticking out of sediment, 3038m	
19:48:20	23	holothurian	
19:49:03	4	few pillows sticking out of sediment, 3033m	
19:50:07		reaching WP in the east, going 30m to north	
19:50:49	4	pillows sticking out of sediment, 3035m	
19:51:52	23	holothurian	
19:52:10	4	few pillows sticking out of sediment, 3040m	
19:53:29	23	2 holothurians	
19:54:12		reaching WP in the north, going 250m to the west	
19:54:46	3	weathered pillows	
19:55:07	23	2 holothurians	
19:55:36	4	pillows sticking out of sediment, 3041m	
19:55:57	23	holothurian	
19:56:54	3	sedimented pillows with rind texture, 3040m	
19:57:20	3	steep slope, strongly sedimented pillows, 3037m	
19:58:14	3	strongly sedimented pillows, 3036m, shrimp	
19:59:06	3	strongly sedimented pillows on slope, 3036m	
19:59:32	23	holothurian	
19:59:49	23	gorgonian	
20:00:00	4	sediment slope	
20:00:18	3	contact between sediment and lava front, holothurian	
20:00:58		fissure, 3037m	
20:01:21	3	strongly sedimented pillows, 3038m	
20:01:53	23	bythitid fish, holothurian	
20:02:32		fissure, 3041m, west-east	
20:03:06		another fissure, southwest-northeast	
20:03:40	3	strongly sedimented pillows, 3041m	
20:05:27	23	holothurian	
20:05:50	3	sedimented pillows, 3042m	
20:07:00	3	strongly sedimented pillows on slope, 3044m	
20:07:24	23	holothurian	
20:07:40	3	pillow with rind texture	
20:08:21	3	strongly sedimented pillows on steep slope, 3052m	
20:10:19	3	strongly sedimented pillows on steep slope, 3057m	
20:11:45		going northwards along the slope	
20:12:36	23	gorgonian	
20:12:43	3	sedimented pillows on slope, 3057m	
20:13:25	3	pillows with rind texture	
20:14:00	23	sponge	
20:14:17		going eastward along the slope	
20:14:42		beer bottle	
20:14:52		thruster dust	
20:15:11	3	strongly sedimented pillows, 3055m	
20:15:43	3	nice pillows with rind texture	
20:16:00	23	gorgonian	
20:16:38	23	hydromedusa, 3046m	
20:18:03	3	sedimented pillows, 3037m	
20:19:29		fissure, north-south, 3036m	
20:20:13	23	gorgonian	
20:20:47	3	sedimented pillows, 3038m	
20:21:15	23	holothurian	
20:21:24		fissure, north-south	

Time (hh:mm:ss)	CODE	Notes	Sample #
20:22:34		gastropod shells on slope	
20:23:18		contact between gastropod shells and pillows, slope	
20:23:41	23	shrimp	
20:24:16	23	holothurian	
20:24:27	3	sedimented pillows on steep slope, 3038m	
20:25:17		seafloor not in sight	
20:25:42	3	sedimented pillows, 3041m	
20:28:25	4	dark line of gastropod shells, 3054m	
20:29:39	23	shrimp, holothurian	
20:30:14	23	holothurian	
20:30:45	23	holothurian	
20:30:57	23	4 holothurians	
20:31:39	3	strongly sedimented pillows, 3048m	
20:34:38	3	strongly sedimented pillows on slope, 3039m	
20:35:48	23	holothurian	
20:38:08	15	talus on slope, 3035m	
20:38:59	23	holothurian	
20:40:04		2 holothurians	
20:40:43	23	2 holothurians	
20:40:53	23	shrimp	
20:41:11	3	strongly sedimented pillows, 3049m	
20:43:27	23	2 holothurians, shrimp	
20:43:50	3	strongly sedimented pillows, 3046m	
20:44:18	3	pillows with rind texture	
20:45:04	3	sedimented pillows on slope, 3036m	
20:45:21	23	gorgonian, shrimp	
20:45:40	3	lava front	
20:46:09	23	shrimp	
20:48:44	23	holothurian	
20:49:24		fissure, 3038m north-south	
20:50:33	3	sedimented pillows, 3039m	
20:52:13	3	strongly sedimented pillows, 3038m	
20:53:02	3	strongly sedimented pillows on slope, 3040m	
20:53:22	23	holothurian	
20:53:33	3	steep slope	
20:54:37		40m to north, 250m to east	
20:57:22	3	strongly sedimented lava, going eastwards, 3055m	
20:58:28	3	strongly sedimented pillows on steep slope, 3056m	
20:59:49	3	nice pillows with rind texture	
21:00:44	3	nice pillows with rind texture, 3042m, dead gorgonian, 2 gorgonians on pillow	
21:01:47	23	shrimp	
21:02:00	3	strongly sedimented pillows	
21:02:14		fissure, north-south	
21:02:48	3	strongly sedimented pillows, 3035m	
21:03:08	23	holothurian near fissure	
21:03:38	23	gorgonian, shrimp	
21:03:58		2 parallel fissures	
21:05:54	3	sedimented pillows on slope	
21:06:19	23	2 holothurians	
21:06:33	4	dark sediment with ripples, 3050m	
21:07:04	3	contact between sediment and pillows on slope	
21:07:54	23	bythitid fish	
21:08:52	23	holothurian	
21:09:01	3	sedimented pillows on slope, 3037m	
21:09:35	3	large pillows with rind texture	
21:12:07	23	shrimp, 2 holothurians	
21:13:00	4	pillows sticking out of sediment, 3053m	
21:13:58	23	2 holothurians	
21:14:23	23	holothurian	
21:14:38	3	sedimented pillows on slope, 3052m	
21:15:02	3	weathered pillows	
21:16:15	23	holothurian	
21:16:42	3	sedimented and weathered pillows	
21:17:55	23	holothurian	
21:19:14	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
21:19:26	3	pillows sticking out of sediment, 3042m	
21:23:00	15	sedimented talus on slope, 3035m, going northward	
21:24:13	23	holothurian	
21:24:28	3	strongly sedimented pillows on slope, 3043m	
21:25:32	4	pelagic sediment, 3053m	
21:26:33	23	red crustacean?, gorgonian	
21:26:55		thruster dust	
21:27:00	23	gorgonian	
21:27:30	4		
21:28:52		having gone 30m to the north, now going 53m to the west	
21:30:01	23	gorgonian	
21:30:28	4	sediment slope, 2 holothurians ripples	
21:31:11	3	sedimented pillows and talus	
21:32:19	3	sedimented and weathered pillows on slope	
21:33:17		fissure, 3043m	
21:34:07		small fissure, 3038m	
21:34:23	3	nice pillows with rind textures	
21:35:00	3	strongly sedimented pillows, 3033m	
21:36:04		seafloor not in sight	
21:37:30	3	strongly sedimented pillows, 3029m	
21:38:31		seafloor not in sight, 3031m	
21:39:15	3	strongly sedimented pillows, 3039m	
21:39:52	3	slope, 3040m	
21:40:09	23	shrimp	
21:40:49		seafloor not in sight, 3035m	
21:41:39	3	strongly sedimented pillows on slope, 3041m	
21:43:26		seafloor not in sight, 3046m	
21:46:52		seafloor not in sight, 3071m	
21:47:59	23	swimming plathyhelminth, 3076m	
21:50:39		seafloor not in sight, 3076m	
21:51:24	12	steep wall but seafloor not in sight, 3071m	
21:52:25	23	fish in distance	
21:52:37	3	sedimented pillows, 3065m	
21:53:19	12	escarpment of plateau, 3064m, sponge on top	
21:55:17	3	strongly sedimented pillows	
21:56:11	23	6 gorgonians on pillow, cliff behind pillow with 8+ more gorgonians, increased natural turbidity	
21:57:09	23	shrimp	
21:57:21	12	steep wall, pillows sticking out of wall, 3059m	
21:58:45	23	bresingida	
21:58:54	23	ca. 10 gorgonians	
21:59:32	23	bythitid fish	
22:00:04	3	strongly sedimented pillows, ripples	
22:01:03	23	holothurian	
22:01:39	23	crinoid?	
22:01:58	23	5 gorgonians	
22:03:29	3	strongly sedimented pillows, 3040m	
22:03:57	23	gorgonian	
22:04:51		fissure, 3039m	
22:06:40	12	cliff, 3050m	
22:07:11	3	strongly sedimented pillows, 3054m	
22:08:17	4	pillows sticking out of sediment, 3053m	
22:08:41	4	ripples	
22:08:57	23	2 holothurians	
22:09:22	23	shrimp	
22:09:37	3	strongly sedimented pillows on slope, 3047m	
22:17:49	15	talus and sediment	
22:20:18	23	hydromedusa	
22:23:48		slope, volcanic sediment	
22:27:47		course change from E to N -> 40m	
22:29:51	15	talus	
22:31:39	15	strongly sedimented talus on slope, 3036m	
22:32:43	15	sedimented fine and coarse talus on steep slope, 3032m, holothurian	
22:34:53	15	strongly sedimented talus, 3046m	
22:35:20	23	3 holothurians on pelagic sediment	

Time (hh:mm:ss)	CODE	Notes	Sample #
22:36:31	3	sedimented pillows, 3047m	
22:37:22	3	strongly sedimented pillows, ripples, 3046m	
22:37:59	3	sedimented pillows on slope	
22:38:32	4	pelagic sediment with ripples, 3048m, holothurian	
22:39:15	4	parallel ripples, hyaloclastites and few pillows	
22:40:30	11	pillows	
22:41:32	3	sedimented pillows, 3038m	
22:42:25	3	strongly sedimented pillows, slight slope, 3035m	
22:43:30	23	holothurian	
22:44:31	3	strongly sedimented and weathered pillows, 3039m	
22:44:58	23	holothurian	
22:45:32	23	holothurian	
22:45:57	4	pillows sticking out of sediment with ripples	
22:46:32	23	holothurian	
22:46:57	23	holothurian	
22:47:25	23	holothurian	
22:47:57		going 200m to south	
22:48:31	3	sedimented pillows on slope, 3048m	
22:50:06	23	holothurian	
22:50:43	4	3057m	
22:51:06	23	holothurian	
22:51:55	4	steep sediment slope	
22:52:21	15	strongly sedimented talus on slope, 3050m	
22:55:33	15	strongly sedimented talus on steep slope, 3033m	
22:56:47	23	crinoid	
22:58:22		thruster dust	
22:59:20	3	steep slope, 2987m	
23:01:18	15	talus on slope, 2991m	
23:02:49	15	sedimented talus, 2998m	
23:03:59		seafloor not in sight	
23:04:20	15	sedimented talus, 3000m	
23:05:26		thruster dust	
23:07:37	15	sedimented talus on slope, 2991m	
23:08:13		thruster dust	
23:10:48	15	sedimented talus on slope, 2984m	
23:12:33	23	bythitid (fish)	
23:15:04		seafloor not in sight	
23:15:43	15	strongly sedimented talus on slope, 3000m	
23:17:32		thruster dust	
23:18:21	3	steep slope with sedimented talus and pillows, 3011m	
23:19:41		going 100m north	
23:21:37	3	strongly sedimented talus and pillows, 3019m	
23:23:08	3	strongly sedimented pillows, 3016m	
23:24:06	3	strongly sedimented, elongated pillows, 3006m	
23:24:52	23	gorgonian, 2 holothurian	
23:25:30	3	sedimented lava	
23:28:00	12	small steep wall, 3015m	
23:28:42	3	sedimented pillows and talus, 3021m	
23:29:53	3	sedimented, nice pillows, some with rind texture	
23:31:15	3	sedimented pillows on slope, 3011m	
23:33:59		seafloor not in sight	
23:34:47	3	sedimented pillows and talus on slope, 3025m	
23:38:05	3	sedimented and weathered pillows, 3035m	
23:39:13	23	gorgonian	
23:40:04	23	2 gorgonian	
23:40:29	12	cliff, maybe about 25m to bottom?	
23:40:43	23	gorgonian, actinian	
23:41:09	23	branched gorgonian on edge of cliff	
23:41:23		thruster dust	
23:42:34	3	sedimented pillows on edge of cliff, 3040m	
23:45:24	23	4 gorgonians	
23:45:50	23	4 gorgonians, actinian	
23:47:53	3	strongly sedimented pillows, 30421m	
23:48:15	23	2 gorgonians	
23:48:40	23	sponge	
23:48:55	23	2 gorgonians	

Time (hh:mm:ss)	CODE	Notes	Sample #
23:49:16	23	3 gorgonians	
23:49:26	3	collapsed pillows	
23:49:39	23	sponge	
23:49:49	3	pillows with rind texture, 3038m	
23:50:56	3	strongly sedimented pillows on slope	
23:51:22	15	sedimented talus on slope, 3028m	
23:52:48		Anna´s report	
23:53:35	15	sedimented talus; 3033 m	
23:54:12	23	gorgonian	
23:55:03	23	gorgonian	
23:56:23	3	some pillows on slope, some nice crosscuts	
23:57:27		t=2.64°C	
23:57:49	15	sedimented talus slope; 2996 m	
23:59:18	3	sedimented pillows/ talus; 2999 m	
23:59:42		increased particle flow	
0:01:57		restart CTD display	
0:02:12	3	3018 m	
0:03:06		8°17.322'S; 13°31.114'W; 3020m	
0:03:51	3	nice pillows with rind textures	
0:07:06	3	collapsed pillow	
0:08:01	4	small sediment channel	
0:08:32	3	sedimented pillows/ talus; slope, could be flow front	
0:10:38	23	shrimp	
0:11:09	3	sedimented pillows, 3018m	
0:12:08	23	bythitid fish	
0:12:46	10	fissure, filled with pelagic sediment	
0:13:41	3	3008m	
0:14:14	3	beautiful rind textures	
0:15:18		laser points 20 cm distance	
0:16:05	3	elongated pillows/ lava tubes	
0:16:46	3	collapsed pillows, 2987m	
0:17:22	10	2 small fissures, very narrow and fairly deep, holothurian	
0:19:00		following fissure to the W to steep cliff	
0:20:13	3	sedimented pillows, 2984m	
0:21:55	3	ein Hinkelstein	
0:23:12	10	fissure less deep or filled with talus and sediments	
0:24:25	3	strongly sedimented pillows	
0:25:45	4	some talus blocks or pillows sticking out	
0:26:05	23	holothurian	
0:26:46	3	strongly sedimented pillows	
0:28:13	3	collapsed pillows	
0:28:27	23	2 holothurians	
0:29:51	4	mostly sediment, some pillows sticking out	
0:31:11	4	some ripples	
0:31:47	3	beautiful rind textures	
0:32:27	23	gorgonian	
0:33:39	15	some talus between pillows; 3009m	
0:34:51	23	bresingida	
0:36:30	15	sedimented talus; 2994m	
0:43:45	4	some pillows sticking out	
0:44:37		increased particle flow	
0:44:50	23	holothurian	
0:45:27	15	talus on base of slope	
0:45:41	3	big pillows, some nice crosscuts, gorgonian	
0:47:50	23	holothurian	
0:48:05	3	elongated pillows/ lava tubes; some collapsed, look like small canals	
0:51:23	15	sedimented talus; 3014m	
0:52:39	15	talus slope, some pillows	
0:54:35	3	pillow crosscut	
0:54:40	23	crinoid	
0:54:58	3	nice pillows, some elongated	
0:55:08	23	2 gorgonians	
0:56:52	3	very nice rind texture	
0:57:02	23	gorgonian, natural turbidity	
0:59:25	3	collapsed pillows, 3003m	

Time (hh:mm:ss)	CODE	Notes	Sample #
1:02:46	3	3017m	
1:03:01		waiting for Meteor	
1:03:57	23	gorgonian	
1:06:02	23	holothurian	
1:07:37	3	pillows	
1:09:26	23	holothurian	
1:11:14	23	bythitid fish, 3030m	
1:12:35	23	nice pillows, 3 gorgonians	
1:13:22	23	sponge?	
1:14:19		meteor is drifting strongly northwards, still waiting for meteor, shrimp	
1:18:17	3	nice pillows with rind textures	
1:19:15	23	3 gorgonians	
1:20:59	23	sponge, bythitid fish	
1:22:31		thruster dust	
1:23:28	12	cliff	
1:25:06		upwelling of cold water at cliff face, therefore nutrients for the organisms, 6 more gorgonians	
1:27:37	4	sediment with fine talus	
1:28:00	23	holothurian	
1:28:17	3	pillows, actinian	
1:28:28	23	3 holothurians	
1:29:14	23	2 gorgonians	
1:29:51	23	many "candy canes," dead gorgonian, 3008m	
1:30:43		thruster dust	
1:31:33	23	gorgonian, 3006m	
1:33:36		slope, 3002m	
1:34:20	23	shrimp	
1:34:38	23	crinoid, 2996m	
1:35:16	3	collapsed pillows, 2996m	
1:36:08	23	8 dead "candy canes" r.i.p.	
1:37:15		thruster dust	
1:39:20	3	collapsed lava tube filled with sediment?, 2997m	
1:41:48	23	gorgonians, shrimp	
1:44:23	23	sponge	
1:46:33	23	holothurian, 2994m	
1:47:00		thruster dust	
1:47:25	3	collapsed pillow, cable in view, 2994m	
1:48:49	23	holothurian curled on back	
1:49:52		temp. 2.54°C	
1:50:19		8°17,228 S, 13°31,213 W	
1:51:41	6	pillow lava with parts of ropy lava, 2999m	
1:52:43		dead gorgonian, thruster dust	
1:54:47	3	sedimented pillows, 2995m	
1:59:16	12	steep slope with pillows	
2:00:19		thruster dust	
2:01:35		temp. Variations between 2,55 and 2.57, 2994m	
2:03:39		temp. 2,58°C, 3007m	
2:04:32	3	some pillows, 3008m, holothurian	
2:05:30		natural turbidity is high, 3007m	
2:07:10	23	holothurian	
2:07:51	12	cliff, 3008m	
2:10:35		thruster dust?	
2:11:01	15	talus with sediment, 3018m	
2:11:48		natural turbidity is high, 3017m	
2:16:40	15	talus with more sediment, 3027m, still natural turbidity	
2:17:44		going eastward to the higher plateau	
2:19:26	23	holothurian	
2:19:52	15	fine talus with sediment, 3017m	
2:20:47	3	slope with sedimented lava and some pillows, 3006m	
2:22:27	23	3 holothurians	
2:23:45	23	3 holothurians, 2990m	
2:24:18	23	holothurian traces	
2:24:56	10	fissure, temp. 2,54°C	
2:25:59	10	fissure, 2984m	
2:27:27	12	small cliff, 2983m	

Time (hh:mm:ss)		CODE	Notes	Sample #
	2:27:46	23	holothurian	
	2:28:24	4	white material on sediment	
	2:28:52	23	holothurian, 2984m	
	2:30:06	23	holothurian, 2987m	
	2:30:34	4	some pillows	
	2:31:11	23	2 holothurians	
	2:31:42	23	holothurian	
	2:31:55	12	sedimented volcanic slope with pillows, 2987m	
	2:33:13	23	holothurian	
	2:34:27	3	collapsed pillows, 2985m	
	2:35:02	23	holothurian	
	2:36:02		going north, brachiopod shells, shrimp, NOTE: -- > now turning, and seeing holothurians again for next observations??? Check tape. Real number ~15 holothurians between 2:23 and 2:49	
	2:38:24	23	dead gorgonian	
	2:39:37	3	steep slope with pillows	
	2:40:57		thruster dust	
	2:41:32	23	actinian	
	2:42:19	3	contact sediment with lava	
	2:42:49	23	bythitid fish	
	2:43:06	3	pillows	
	2:43:24		thruster dust	
	2:45:21	4	some pillows	
	2:45:54	23	gorgonian	
	2:46:38	23	holothurian traces	
	2:47:20	1	sedimented pillows, huge pillows	
	2:48:07	23	2 holothurians	
	2:48:41		8°17,226, 13°31,033	
	2:49:42	10	2 fissures and collapsed pillows, 2985m	
	2:51:04	9	contact lobate and pillow flow	
	2:52:01	10		
	2:53:01	12	steep wall of pillow lava	
	2:53:11	1	contact pillow lava and sediment, 2988m	
	2:54:44		thruster dust	
	2:54:58	10	2988m	
	2:55:31		thruster dust	
	2:57:42	3	slightly sedimented lobate flow/ sheet flow, many collapsed structures and fissures	
	2:58:52	23	huge gorgonian, many branches; another organism growing on gorgonian (brachiopod/actinian?); daughter polyp also extended from branches	
	2:59:30		problems with GAPS, positions imprecise	
	3:01:34		taking photographs of gorgonian; nice pillows in the background	
	3:06:11	23	shrimp	
	3:06:42	3	collapsed pillows	
	3:09:13	23	bythitid fish	
	3:10:52	3	going down, 3003m	
	3:11:17		thruster dust	
	3:12:18	4	small sedimented ledge on pillow/ talus slope	
	3:13:28		records ST	
	3:14:45	3	base of slope sedimented talus, 3014m	
	3:17:07	15	with a bit sediment	
	3:18:07	23	bresingida	
	3:18:52	15	volcanic rocks have yellowish crust	
	3:19:57	23	gorgonian	
	3:22:16		thruster dust	
	3:22:36	12	slope with pillows and sediment	
	3:24:18	23	holothurian	
	3:24:31	10	fissure, 2992m	
	3:24:55	1	with sediment	
	3:25:10	23	holothurian	
	3:25:39	3	pillows	
	3:26:22	23	bythitid fish	
	3:26:40	10	2990m	

Time (hh:mm:ss)	CODE	Notes	Sample #
3:27:26	1	slope	
3:27:47	23	gorgonian	
3:29:41	23	sponge on pillow	
3:29:53	1	rind textures	
3:30:14	23	grenadier fish	
3:32:44	12	pillow cliff	
3:33:16	3	plateau	
3:34:04	10	same as before	
3:36:24	12	pillow slope	
3:37:16		going down, 2984m	
3:38:50	23	fish, gorgonian, sponge on pillow	
3:41:16	23	holothurian	
3:42:40	23	"candy canes"	
3:44:23	3	pillows	
3:45:47	23	gorgonian	
3:46:36	23	2 holothurians	
3:46:59	3	collapsed pillow	
3:47:23	23	holothurian, gorgonian	
3:48:27	23	gorgonian	
3:48:49	3	collapsed pillows	
3:49:53	12	cliff, 2989m	
3:52:28	3	pillow lava with sediment	
3:53:45	12	very nice pillows	
3:55:13		natural turbidity?	
3:56:09	23	holothurian	
3:56:46	3	pillow lava with sediment	
3:58:18	10	fissure, 2987m	
4:04:47		thruster dust	
4:05:33	23	holothurian	
4:06:13	23	6 holothurians	
4:08:29	3	sedimented pillows	
4:08:57	12	pillow slope	
4:10:17	23	holothurian	
4:10:44	23	2 holothurians	
4:12:07	6	part of ropy lava in pillow lava	
4:12:47	3	sedimented pillow lava	
4:14:31	23	shrimp ?	
4:14:54	3	collapsed pillow	
4:15:21	3	perfect round pillows	
4:16:30	12	going down; 2983 m	
4:17:10	23	2 gorgonians	
4:19:06	3	2991m	
4:21:48	3	sedimented pillows and some talus; 2996m	
4:23:17	23	holothurian	
4:23:38	3	3000m	
4:23:49	23	gorgonian	
4:25:22	23	gorgonian	
4:26:21	3	sedimented pillows/ talus	
4:27:17	23	actinian	
4:27:52	23	shrimp	
4:28:01	23	2 gorgonians	
4:28:15	13	pillow/ talus ridge?, 2998m	
4:30:19	3	Kermit the frog	
4:31:04	23	ceranthus	
4:33:23	23	2 gorgonians	
4:34:20	23	gorgonian	
4:34:49	15	sedimented talus; 3010m	
4:36:08	4	large ripple structure/ slump structure?	
4:36:50	23	holothurian	
4:37:16	3	strongly sedimented pillows	
4:38:16	4	some talus blocks sticking out	
4:38:43	15	talus slope; 3020m	
4:39:59	3	sedimented pillows on slope	
4:40:35	23	2 gorgonians	
4:41:09	23	holothurian	
4:41:29	23	gorgonian	

Time (hh:mm:ss)	CODE	Notes	Sample #
4:41:44	3	strongly sedimented pillow/ talus slope, 3018m	
4:43:27	23	gorgonian	
4:44:58	3	going down; 3026m	
4:45:44	23	holothurian	
4:46:28	23	holothurian	
4:47:07	23	brisingida	
4:47:24	23	"candy canes" sticking out of sediment	
4:48:16		ROV hits ground, accidental sampling?	
4:48:17	3	nice pillow and lava tube	
4:49:51	23	"candy canes" sticking out of sediment	
4:50:12		ROV hits ground, accidental sampling?	
4:50:30	3	yellowish precipitation on rock?	
4:51:00	23	actinian?	
4:51:36	3	nice pillow with rind texture; 3015m	
4:52:17	15	sedimented talus slope	
4:53:21	3	pillows and talus slope, some fine talus chutes	
4:55:01	23	swimming animal	
4:55:14	3	pillows, 3010m, holothurian on brachiopod shells	
4:56:08	23	actinian?	
4:56:18	23	shrimp	
4:57:35	3	perfect pillows, going up; 2997m	
4:57:56	23	gorgonian, crinoid	
4:58:33	23	brisingida	
5:00:57	3	elongated pillows/ lava tubes; nice rind textures; 2996m, holothurian	
5:02:45	3	collapsed pillow	
5:03:54	23	gorgonian	
5:04:06	23	gorgonian	
5:04:57	3	lobate flows?, many collapsed tubes/ collapsed structures, holothurian	
5:06:25	10	fissure in pillow lava; 2981m	
5:06:59	10	wide fissure	
5:07:14	23	2 bythitid fish, grenadier fish briefly	
5:07:34	3	collapsed pillow	
5:12:47		still hovering over fissure watching the fish	
5:14:47		closed Niskin bottle 3; sample no. 1288-1; 8°17.147'S; 13°31.002'W; 2984m	**1288-1**
5:16:13		preparing for He-sampling	
5:19:14	23	shrimp	
5:21:27		taking off sampling tube	
5:22:41	23	shrimp	
5:26:18		closing first valve	
5:27:08		closing second valve of He; sample no. 1288-2	**1288-2**
5:32:35		finished sampling	
5:33:57	3	hollow elongated pillow?	
5:35:39	23	"candy canes" sticking out of sediment	
5:36:39		going 50m S	
5:36:57	3	nice rind textures	
5:39:43	10	small fissure?	
5:40:09	10	back at big fissure	
5:41:59	23	holothurian	
5:42:37	3	nice pillows	
5:43:11	3	collapsed pillows and tubes; 2986m	
5:44:00	23	holothurian	
5:44:10	23	grenadier fish	
5:44:19	23	holothurian	
5:44:29	4	some pillows sticking out	
5:44:38	23	holothurian	
5:45:20	23	"candy canes" sticking out of sediment	
5:46:37		closed Niskin bottle 2; sample no. 1288-3; 8°17.174'S; 13°31.001'W; 2985m	**1288-3**
5:50:43		leaving seafloor, going up	
6:04:52		closed Niskin bottle 1; sample no. 1288-4; 8°17.171'S; 13°31.014'W; 2693m	**1288-4**
8:30:00		End of station; ROV on deck	

Station 1291 **M62/5B**
Segment A2 North
18. December 2004
Dive 34

Time (hh:mm:ss)	CODE	Notes	Sample #
ca. 14:00		start of station	
15:33:58		ROV at 1240m	
16:18:27		ROV at 2089m	
16:57:38		seafloor in view	
16:58:00		records AK	
16:58:34	3	sedimented pillows/ talus	
16:59:44		thruster dust	
17:02:04	3	collapsed pillows	
17:02:15		thruster dust	
17:02:24		temperature down to 2.58°C from 2.62°C	
17:03:20		cable in view	
17:04:11		temperature back to 2.62°C	
17:04:34	3	slightly sedimented pillows; 2869m	
17:05:29		going down; 2873m; no view of seafloor	
17:06:45	3	strongly sedimented pillows; 2880m	
17:07:22	23	holothurian	
17:10:11	3	collapsed pillows; 2885m	
17:13:04	3	some darker material (fine talus/ hyaloclastite--> gastropod shells?) on pelagic sediment between pillows; 2889m	
17:14:34	23	holothurian	
17:15:34	23	brisingida	
17:15:46	3	collapsed pillow	
17:16:34	23	2 holothurian	
17:16:55	3	collapsed pillows; ripples in sediment	
17:17:33		slightly increased turbidity	
17:17:00	15	talus at base of slope, left edge of view	
17:18:32	4	interesting ripples (=slump structure?)	
17:19:06		collapsed pillows	
17:19:43		thruster dust	
17:20:33	15	sedimented talus; 2891m	
17:20:40	23	holothurian	
17:21:13	4	perfectly straight tracks in sediment	
17:22:59	23	holothurian	
17:24:11	4	pelagic sediment without ripples	
17:24:46	23	shrimp	
17:24:57	23	2 holothurian	
17:25:34	23	holothurian	
17:26:38	23	holothurian	
17:26:57		thruster dust	
17:30:14	4	pelagic sediment without ripples	
17:34:58	4	pelagic sediment without ripples; 2899m	
17:35:32	23	shrimp	
17:37:13		finishing mapping SW of station 1230; then going 450 m W	
17:37:14	23	holothurian	
17:38:21	4	pelagic sediment without; 2895m	
17:39:14	23	holothurian	
17:40:09		thruster dust	
17:42:43	4	white patch in sediment	
17:43:43	4	some pillows sticking out; 2890m	
17:45:00	23	holothurian	
17:45:11	3	small pillow patch or ridge sticking out of sediment	
17:47:33	4	single pillows sticking out	
17:48:51	3	sedimented pillows/ talus	
17:49:35	23	holothurian on rock	
17:49:39	23	holothurian	
17:51:06	15	sedimented talus; 2871m	
17:51:31	4	sediment channel between talus ridges (?)	
17:52:18		drop in temperature to 2.56°C	
17:53:07	23	holothurian	
17:53:36	23	holothurian	
17:53:48	15	talus slope; 2869m	

Time (hh:mm:ss)	CODE	Notes	Sample #
17:54:00	23	2 holothurian	
17:54:40	15	going down sedimented talus slope; 2873m	
17:55:09	4	long "ripples" of dark sediment (fine talus/ hyaloclastite--> gastropod shells?) on pelagic sediment	
17:55:20	23	2 holothurians	
17:56:04	3	nice pillows	
17:56:47	10	wide fissure (?), not very deep, filled with pelagic sediment; some dark sediment (hyaloclastite--> gastropod shells?)	
17:58:27	3	collapsed pillows	
17:59:13	23	holothurian	
17:59:19	23	shrimp	
17:59:29	3	nice elongated pillows; 2885m	
18:00:15	4	some pillows sticking out	
18:00:38		records SSt	
18:00:47	23	holothurian	
18:01:02		Sonja´s report	
18:01:34	23	4 Holothurians	
18:02:13	23	shrimp	
18:02:22	4	2902m	
18:02:34	23	Holothurian	
18:02:54	23	"Candy cane" sticking out of sediment	
18:03:09	3	beautiful pillows with great rind textures	
18:03:36	23	cup of end of stalk (hydrozoan?)	
18:03:48		ROV hits ground	
18:04:13	23	Holothurian	
18:04:22	23	gorgonian	
18:04:34	3	pillow ridge	
18:04:52	23	3 Holothurians	
18:05:37	3	collapsed pillows, 2895m	
18:06:27	3	strongly sedimented pillows on slope	
18:07:48	23	holothurian	
18:08:20	4	pillows sticking out of sediment	
18:08:50	23	Holothurian	
18:09:14	3	strongly sedimented pillows, 2908m	
18:09:41	4	sediment on slight slope	
18:09:49	23	2 Holothurians	
18:10:34	3	pillows sticking out of sediment thruster dust	
18:11:55	4	pillows sticking out of sediment with ripples	
18:12:55	15	strongly sedimented talus, 2915m	
18:13:31		thruster dust	
18:14:45	23	holothurian	
18:15:09	3	strongly sedimented pillows, 2910m	
18:15:40	4	pillows sticking out of sediment	
18:16:35	4	dark sediment with ripples, 2903m	
18:17:16	14	flow front?	
18:17:22	23	2 Holothurians	
18:18:03	3	strongly sedimented pillows, 2898m	
18:18:27	23	Holothurian	
18:19:09	3	sedimented pillows	
18:19:30		increased natural turbidity?	
18:20:18	4	sediment with ripples, contact to talus	
18:20:56	3	pillows and talus on steep slope, 2890m	
18:22:01	23	3 Holothurians	
18:22:20	23	Holothurians	
18:22:43	3	strongly sedimented pillows	
18:23:12	23	Holothurian	
18:23:38	23	Holothurian	
18:23:48	4	pillows sticking out of sediment, 2887m	
18:24:14	23	Holothurian	
18:24:25	3	sedimented collapsed pillows	
18:25:03	4	2884m	
18:25:24	14	flow front, pillows	
18:25:52	14	going up to the top, 2873m	
18:26:24	23	swimming animal, with radiating "arms"/"tentacles"	
18:27:03	3	sedimented pillows, 2870m	

Time (hh:mm:ss)	CODE	Notes	Sample #
18:27:59	23	shrimp	
18:28:32	15	sedimented talus	
18:28:48	12	pillows, 2859m	
18:29:47	12	going up the wall?, 5852m	
18:30:46	23	gorgonian	
18:31:00	3	sedimented pillows, 2858m	
18:32:34	12	small cliff, 2858m	
18:33:18	3	sedimented pillows on slope, 2858m	
18:33:57	23	branched gorgonian	
18:34:51	23	shrimp	
18:35:21	15	sedimented talus, 2857m	
18:36:56	23	shrimp	
18:37:46	15	strongly sedimented talus, 2865m	
18:38:38	3	sedimented and weathered? pillows, 2867m	
18:40:57	3	strongly sedimented pillows, 2873m	
18:41:57	23	shrimp	
18:43:14	4	2891m	
18:43:31	23	Holothurian	
18:44:12	12	cliff, sedimented lava on edge	
18:44:57		seafloor not in sight, 2896m	
18:46:10	4	2908m	
18:46:26	4	darker sediment	
18:46:36	3	contact between sediment and pillows	
18:46:58	23	Holothurian, shrimp,	
18:47:29	4	pelagic sediment, 2916m	
18:47:51	23	Holothurian	
18:48:08		Not hyaloclastite--> gastropod shells, 2918m	
18:48:30	3	contact between sediment and lava	
18:49:12	3	sedimented pillows and lava on slope, 2919m	
18:50:20	3	strongly sedimented and weathered pillows	
18:50:41	23	Holothurian	
18:51:33	23	shrimp	
18:51:41	12	small cliff, 2923m	
18:52:14		seafloor not in sight, 2925m	
18:52:45	3	strongly sedimented lava on slope, 2933m	
18:53:54		thruster dust	
18:54:47		seafloor not in sight, 2931m	
18:55:34		thruster dust	
18:56:05	12	steep wall (cliff), sedimented pillows, 2930m	
18:57:40	3	contact between sedimented pillows and sediment	
18:59:15	12	sedimented pillows, 2931m	
18:59:54		seafloor not in sight, 2930m	
19:01:19	4	some talus/pillows sticking out of sediment, 2945m	
19:01:56		thruster dust	
19:04:01	23	Holothurian	
19:04:51	4	2956m	
19:05:22	23	Holothurian	
19:06:08	3	contact between sediment and strongly sedimented pillows, 2960m	
19:06:48	23	Holothurian	
19:07:42	3	strongly sedimented pillows, 2961m	
19:12:01	4	pillows sticking out of sediment, 2974m	
19:14:28	23	Holothurian	
19:14:41	4	2985m	
19:14:51	23	2 Holothurians	
19:15:31	4	darker sediment, large ripples, brachiopod shells	
19:16:00	23	Holothurian, hydromedusa	
19:16:23	3	strongly sedimented pillows, 2984m	
19:17:42	23	3 Holothurians	
19:18:20	4	pillows sticking out of sediment, 2980m	
19:18:57	3	strongly sedimented pillows on slope, 2979m	
19:20:59	3	strongly sedimented pillows on slope, ripples, 2981m	
19:22:26	3	collapsed pillow	
19:22:40	23	2 Holothurians	
19:23:00	23	Holothurian	
19:23:25	23	shrimp	

Time (hh:mm:ss)	CODE	Notes	Sample #
19:23:37	23	3 sponges on pillows	
19:23:52	23	Holothurian	
19:24:38	23	2 Holothurians	
19:24:50	23	Holothurian between pillows	
19:25:08	3	sedimented pillows, 2988m	
19:25:40	23	Holothurian	
19:25:59	3	strongly sedimented pillows on slope, 2993m	
19:26:19	23	gorgonian	
19:27:24	3	sedimented pillows, 2989m	
19:27:38	23	sponge	
19:28:21	3	elongated pillow	
19:29:40	23	sponge	
19:29:52	3	nice elongated and round pillows; 2968m	
19:30:33	3	sedimented pillows on slope, 2968m	
19:32:30	23	shrimp	
19:32:50	23	Holothurian	
19:33:00	4	2981m	
19:33:13	23	shrimp	
19:33:30	23	Holothurian	
19:33:59	23	2 Holothurians	
19:34:13	23	Holothurian	
19:34:26	23	Holothurian	
19:34:34	3	contact between sediment small lava cliff	
19:35:33	4	2978m	
19:35:44	23	Holothurian	
19:35:54	23	shrimp, 2 Holothurians	
19:36:40	23	Holothurian	
19:37:19	4	2968m	
19:37:33	23	Holothurian	
19:38:29	23	Holothurian	
19:38:53	23	Holothurian	
19:39:33	23	2 Holothurian	
19:40:17	4	talus strip sticking out of sediment, 2956m	
19:42:40	3	pillows and talus (gastropod shells) sticking out of sediment with ripples, 2952m	
19:43:46	4	2951m	
19:44:33	4	slightly darker sediment, 2948m	
19:45:04	23	Holothurian	
19:45:57	15	contact between sediment and talus, 2936m	
19:46:24	23	Holothurian on sediment	
19:46:48	23	Holothurian	
19:47:20	3	strongly sedimented pillows	
19:47:40	23	bythitid fish	
19:48:06	23	gorgonian	
19:48:27	23	Holothurian	
19:48:38	23	gorgonian	
19:49:04	23	bresingida, fish on slope	
19:49:35	4	sediment and talus, 2957m	
19:50:02	3	strongly sedimented pillows on slope, 2959m	
19:50:48	23	2 Holothurian in sediment channel	
19:51:21	13	pillow and talus ridge, 2958m	
19:52:36	4	2962m, slope	
19:52:45	23	3 Holothurians	
19:54:18	23	Holothurian	
19:54:57	3	strongly sedimented and weathered pillows, 2960m	
19:55:41	23	2 gorgonians	
19:56:26	23	bythitid fish	
19:56:41	4	talus sticking out of sediment	
19:57:20	15	sedimented talus on slope, 2947m	
19:58:14	3	strongly sedimented pillows, 2943m	
19:58:54	12	sedimented pillows on steep slope, 2937m	
19:59:53	23	Holothurian	
20:00:34	15	sedimented talus, 2937m	
20:01:29	3	sedimented pillows and talus, 2929m	
20:02:05	12	small cliff and slope, 2925m	
20:03:02	15	sedimented talus slope, 2929m	

Time (hh:mm:ss)	CODE	Notes	Sample #
20:04:22	15	strongly sedimented talus on slope, 2935m	
20:05:16	4	2938m	
20:05:35	23	shrimp, Holothurian	
20:06:19	23	2 Holothurians	
20:06:40	3	contact between sediment and sedimented and weathered pillows on slope, 2937m	
20:08:50	12	small cliff, 2829m	
20:09:26	4	2931m	
20:10:28	4	contact between sediment and sedimented lava, 2926m	
20:11:32	23	2 Holothurians	
20:11:47		8°17,891; 13°31,059	
20:12:42	3	sedimented pillows on slope, 2935m	
20:13:05	3	collapsed pillow	
20:13:29	12	small cliff, sedimented pillows, 2939m	
20:13:59	23	shrimp	
20:14:16	3	collapsed pillow	
20:14:38	23	shrimp	
20:14:58	23	thin long red swimming animal	
20:15:45	12	cliff, 2950m, sediment on terrace	
20:17:38	12	sedimented pillows on top, 2949m	
20:19:33	12	cliff, east-west, 2951m	
20:20:43	3	collapsed pillows	
20:22:01	3	strongly sedimented pillows, 2950m	
20:23:51	23	Holothurian	
20:26:01	23	2 shrimps	
20:26:23	3	sedimented pillows on edge of cliff, 2947m	
20:27:21	23	sponge	
20:29:57	12	cliff, sediment on terrace below, 2936m	
20:31:24	3	collapsed pillows, 2936m	
20:31:55	23	Holothurian	
20:33:54	23	gorgonian	
20:34:39	3	strongly sedimented pillows, 2935m	
20:34:59	23	Holothurian	
20:35:41	23	Holothurian	
20:35:50	3	collapsed pillow, 2936m	
20:37:50	3	strongly sedimented and weathered pillows, 2938m	
20:38:27	23	gorgonian	
20:38:45	3	elongated pillow	
20:38:59	23	2 gorgonians	
20:39:39		thruster dust	
20:40:19	12	cliff, sedimented pillows on edge, 2935m	
20:43:43		seafloor not in sight, 2933m	
20:45:03	3	strongly sedimented pillows, 2950m	
20:45:56	10	fissure, 2952m	
20:47:05	3	small cliff, then slope, sedimented pillows	
20:48:11	3	sedimented pillows on slope	
20:49:29	3	collapsed pillow	
20:50:11	3	sedimented pillows, 2960m	
20:51:04	23	shrimp	
20:51:18	23	shrimp	
20:51:34	23	Holothurian, branched gorgonian	
20:52:05	3	strongly sedimented pillows, 2966m	
20:53:59	23	shrimp	
20:54:50	3	strongly sedimented pillows on slope, 2978m	
20:55:09	3	collapsed pillow	
20:58:42	23	Holothurian	
21:00:31	3	strongly sedimented pillows on slope, 2999m	
21:01:36	3	collapsed pillow	
21:03:38	23	fish	
21:03:54	3	sedimented nice pillows, 3001m	
21:04:34	3	elongated pillows	
21:04:54	23	Holothurian	
21:06:07	23	fish	
21:06:36	3	strongly sedimented pillows	
21:06:49	23	Holothurian	
21:07:03	15	sedimented talus on slope, 2995m	

Time (hh:mm:ss)	CODE	Notes	Sample #
21:07:51	3	sedimented pillows on slope, 2990m	
21:08:23	23	shrimp, gastropod shells	
21:08:51	12	cliff, 2978m, pillows sticking out of wall	
21:10:16	12	2961m	
21:10:47	23	Holothurian	
21:10:59	23	shrimp	
21:11:12	3	sedimented pillows	
21:11:34	23	ceranthus	
21:11:51	23	shrimp	
21:11:58	23	Holothurian, gorgonian on elongated pillow	
21:12:28	3	sedimented and weathered pillows, 2953m	
21:13:34	23	fish	
21:13:41	4	pillows sticking out of sediment, 2950m	
21:14:06	23	2 Holothurians	
21:14:21	3	sedimented talus and pillows	
21:14:57	15	strongly sedimented talus, 2938m	
21:15:28	3	weathered pillows and talus	
21:15:52	23	Holothurian	
21:16:15	3	sedimented and weathered pillows on slope, 2919m	
21:17:43	12	cliff, 2921m	
21:19:20	12	going down the wall, 2925m	
21:20:39	15	sedimented talus on slope, 2931m	
21:22:47	15	strongly sedimented talus on slope, 2943m	
21:25:30	23	asteroid, gorgonian	
21:26:02		thruster dust	
21:26:07	12	steep lava slope, 2924m	
21:26:58	3	sedimented pillows, 2920m	
21:27:41	13	ridge	
21:30:07	15	slope 2948m	
21:31:12	3	elongated pillows 2953m	
21:32:20		cliff 2948m	
21:33:16	3	pillows 2941m ripples	
21:34:28		3 holothurians	
21:35:15		holothurian, gorgonian	
21:36:01	3	elongated pillow 2941m	
21:37:04	3	nice elongated and round pillows; 2932m	
21:37:56	3	holothurian on pillow	
21:38:56	3	holothurian on pillow	
21:39:42	3	ripples	
21:39:49	12	steep slope 2922m	
21:41:36	12	steep talus slope, 2933m	
21:42:09		seafloor not in sight	
21:42:44	3	strongly sedimented lava, 2947m	
21:44:27	4	few pillows sticking out of sediment, 2959m	
21:46:02	4	2964m	
21:46:31	23	Holothurian	
21:47:02	3	pillows sticking out of sediment, 2962m	
21:47:50	3	nice round pillow with rind texture	
21:49:14	23	2 holothurians	
21:50:22	4	contact between sediment and strongly sedimented talus, 2960m	
21:51:27	15	sedimented talus on slope, 2946m	
21:52:26	3	sedimented pillows and talus on slope, 2938m	
21:52:50	12	cliff	
21:53:12	23	2 holothurians on edge of the cliff, 2932m	
21:54:01	4	pillows sticking out of sediment	
21:54:29	23	holothurian	
21:55:08	3	strongly sedimented pillows, 2928m	
21:55:30	23	Holothurian	
21:55:50	23	sea-feather	
21:56:09	4	pillows sticking out of sediment, 2936m	
21:56:28	23	2 Holothurians	
21:56:49	3	strongly sedimented pillows, 2936m	
21:57:24	23	2 Holothurians	
21:57:45	23	Holothurian	
21:57:56	3	large collapsed pillow	

Time (hh:mm:ss)	CODE	Notes	Sample #
21:58:54	3	strongly sedimented and weathered pillows, 2943m	
22:00:43		thruster dust	
22:03:10	23	gorgonian	
22:03:53	3	collapsed pillow	
22:04:14	23	3 holothurians	
22:04:44	23	holothurian	
22:04:57	23	Holothurian	
22:05:22	3	strongly sedimented and weathered pillows, collapsed pillow, 2943m	
22:07:35	3	collapsed pillow, 2944m	
22:08:15	3	strongly sedimented round and elongated pillows on slope, 2942m	
22:08:50	23	dead gorgonian	
22:10:06		thruster dust	
22:10:41	3	strongly sedimented pillows	
22:11:42	3	collapsed pillow	
22:13:46	23	2 Holothurians	
22:14:31	3	strongly sedimented pillows, 2947m	
22:15:06	23	2 Holothurians	
22:15:43	3	collapsed pillow, 2952m	
22:17:13	23	gorgonian	
22:18:16	3	strongly sedimented pillows, 2979m	
22:18:42	23	shrimp	
22:19:26	3	strongly sedimented pillows on slope, 2973m	
22:20:47	23	Holothurian	
22:21:18	23	2 Holothurians, shrimp	
22:21:56	4	pillows sticking out of sediment, 2977m	
22:23:08	4	2977m	
22:24:57	23	Holothurian	
22:25:12		thruster dust	
22:26:05	4	pillows sticking out of sediment	
22:26:29	23	2 Holothurians	
22:26:38		thruster dust	
22:29:04	3	strongly sedimented pillows on slope, 2972m	
22:29:30		8°17,512; 13°30,804	
22:30:36	3	strongly sedimented pillows, 2973m	
22:31:05	23	eel-like fish	
22:31:42	3	strongly sedimented and weathered pillows, 2955m	
22:32:10	23	3 Holothurians	
22:32:23	23	Holothurian	
22:32:36		increased natural turbidity	
22:33:03	23	grenadier fish	
22:33:21	23	Holothurian	
22:33:42		Not hyaloclastite--> brachiopod shells, 2943m	
22:34:21	3	strongly sedimented pillows, 2944m	
22:35:29		thruster dust	
22:36:30		ROV hit pillow	
22:36:53		thruster dust?	
22:37:49	4	taking sediment (NOT hyaloclastite--> gastropod shells, instead is composed of empty gastropod shells) sample	**1291-1**
22:40:04	4	Not hyaloclastite--> gastropod shells and pillow with nice rind texture	
22:52:56		going on looking for vents, thruster dust	
22:53:14	23	gorgonian	
22:53:45	12	cliff	
22:54:06	3	strongly sedimented pillows, 2937m	
22:55:52		thruster dust	
23:01:34		seafloor not in sight	
23:03:26	12	cliff, sedimented pillows on slope	
23:05:53	3	strongly sedimented pillows, 2985m	
23:07:24	3	nice pillows with rind texture, 2984m	
23:08:47	23	Holothurian	
23:09:37		increased natural turbidity	
23:11:08	3	steep slope, pillows and talus, sediment, 2945m	
23:11:15	23	shrimp, 2 Holothurians	
23:11:29	15	talus	

Time (hh:mm:ss)	CODE	Notes	Sample #
23:11:38	12	going up steep wall, pillows	
23:12:31	12	top at 2928m	
23:12:54	3	sedimented pillows	
23:13:42	23	Holothurian	
23:14:04	12	cliff, 2920m	
23:14:35		seafloor not in sight	
23:15:10	12	steep slope, strongly sedimented talus, 2933m	
23:17:53		going downhill, 2968m	
23:18:44	4	2978m, slope	
23:19:34	3	pillows sticking out of sediment, 2981m	
23:19:54	23	2 Holothurians	
23:22:58	4	2975m	
23:23:10	23	Holothurian	
23:23:32	4	pillows sticking out of sediment	
23:23:47	23	shrimp	
23:23:55	23	fish	
23:24:15	3	strongly sedimented pillows, 2977m	
23:24:48	4	2982m	
23:25:30	23	hydromedusa, 2985m	
23:26:19	4	2986m	
23:26:37		thruster dust	
23:28:09	23	grenadier fish with head down in sediment	
23:28:37	4	light sediment and darker sediment in ripple valleys, 2983m	
23:29:00	23	2 Holothurians	
23:30:14	15	sedimented talus on slope, 2971m	
23:31:25	23	crinoid	
23:32:27	3	nice pillows with rind texture on steep slope, 2931m	
23:33:15	23	shrimp	
23:33:28	10	fissure	
23:33:50	23	actinian	
23:34:02	10	fissure	
23:34:17	12	cliff, 2927m	
23:34:52		thruster dust	
23:35:24	12	pillows sticking out of wall, going down, 2945m	
23:36:17	4	sediment at bottom	
23:37:15	3	nice broken pillow, 2946m	
23:39:19	23	actinian? on wall, 2939m	
23:41:53	10	fissure, north-south, 2925m	
23:42:44	12	cliff, 2925m	
23:44:03	12	going along wall	
23:44:35	3	strongly sedimented pillows, 2920m	
23:46:51		seafloor not in sight	
23:47:08	3	strongly sedimented lava on steep slope, 2948m	
23:48:42		brachiopod shells, not hyaloclastite, 2965m	
23:50:13	4	2979m	
23:50:33	23	4 Holothurians, fish	
23:51:16	4	pillows sticking out of sediment, 2979m	
23:51:50	23	small fish	
23:54:37	23	Holothurian	
23:55:07	4	pillows sticking out of sediment, 2972m	
23:55:07	4	2973m, Holothurian	
23:56:16	23	Holothurian	
23:56:59	3	strongly sedimented and weathered pillows on slope, 2966m	
23:57:31	23	Holothurian	
23:58:36	4	2976m	
23:58:46	23	eel-like fish (bythitid)	
0:00:37	23	4 holothurians	
0:01:46		restart CTD display	
0:02:06		thruster dust; 2975m	
0:02:58	23	shrimp	
0:04:06	3	sedimented pillows; 2971m	
0:08:10	23	3 holothurians	
0:08:57	3	nice pillows; 2973m	
0:10:30	3	collapsed pillow; 2964m	
0:11:46	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
0:12:24	3	strongly sedimented pillows (a giant trilobite)	
0:13:40	3	collapsed pillows	
0:13:57	23	holothurian	
0:14:27	4	single pillows sticking out	
0:16:21	23	4 holothurians	
0:19:26	23	shrimp	
0:19:53	3	heavily sedimented collapsed pillows; 2953m	
0:23:09	23	shrimp	
0:24:36	4	fat lonely pillow sticking out of sediment	
0:26:02	3	heavily sedimented pillows, some collapsed; 2955m	
0:27:29	23	holothurian	
0:28:52		thruster dust	
0:29:30	4	pillows (some collapsed) sticking out of sediment	
0:30:12	3	heavily sedimented pillows, many collapsed; 2955m	
0:32:19	4	some pillows sticking out of sediment	
0:36:10	23	2 holothurians	
0:36:33	23	red shrimp on seafloor	
0:36:47	3	heavily sedimented pillows and lava tubes	
0:38:08	4	some pillows sticking out (nice round one); 2956m	
0:39:33	23	gorgonian	
0:40:13	23	shrimp	
0:41:33	15	steep slope, talus at base; 2059m	
0:43:38	12	steep slope, talus chutes going down the slope?, shrimp	
0:45:30	12	steep pillow slope; going up; 2927m	
0:47:56	3	top of slope? 2912m	
0:49:37	3	sedimented lobate flow/ sheet flow?	
0:50:25	23	shrimp, holothurian on talus	
0:50:39	3	"group of turtles" - nice sedimented pillows	
0:51:09	23	holothurian on pillow	
0:53:20	3	a sheep for Steffi	
0:53:34	12	going down 2912m, gorgonian on cliff	
0:55:37	3	sedimented pillows/ talus; base of wall; 2928m	
0:58:41	15	sedimented talus; 2940m	
0:59:15	4	ripples	
1:00:32	15	talus at base of slope; 2946m	
1:01:10	4	some darker material (gastropod shells) on pelagic sediment at base of slope	
1:02:03	15	going up talus slope; 2943m	
1:02:35	12	some nice pillow crosscuts	
1:03:52	23	holothurian	
1:04:01	15	heavily sedimented talus slope; 2940m	
1:08:46	15	heavily sedimented talus slope; 2948m	
1:10:40		increase in temperature	
1:11:18	4	base of slope; contact talus to sediment; 2956m	
1:12:31	4	ripples	
1:12:54	15	base of talus slope, some pillows	
1:14:18	23	bythitid fish	
1:15:30	4	interesting ripples - small scale and very irregular	
1:16:45	15	base of talus slope again (same as last one), some nice pillows	
1:17:42	3	sedimented pillows; going up; 2952m	
1:19:05	4	back at base of slope; 2959m	
1:20:13	23	shrimp	
1:20:51	3	sedimented pillows	
1:21:51	23	swimming holothurian	
1:22:16	3	elongated pillows/ lava tubes, partly collapsed	
1:23:08		thruster dust	
1:23:51	15	sedimented talus; 2946m	
1:24:35	3	sedimented pillows	
1:25:40	4	ripples	
1:26:10	4	darker brown clastic material (hyaloclastite--> gastropod shells?), white areas in sediment, interesting pattern	
1:26:33	23	shrimp	
1:28:29	23	shrimp	
1:30:08	23	close-up of sediment: dark material turns out to be gastropod shells	

Time (hh:mm:ss)	CODE	Notes	Sample #
1:32:46		ROV hits ground	
1:33:50	3	pillows with spectacular rind textures	
1:33:56	23	shrimp	
1:34:08	23	holothurian	
1:34:25		thruster dust	
1:37:12	23	holothurian	
1:37:23		thruster dust	
1:37:35	23	back to brachiopod cemetery	
1:39:15		preparing for sampling	
1:39:28		8°17.548'S; 13°30.622'W; 2961m	
1:46:00		Niskin bottle no. 3 doesn't close	
1:47:39		closed Niskin bottle no. 2; sample no. 1291-2; 8°17.544'S; 13°30.622'W; 2960m; ship-time 01:47:55	**1291-2**
1:57:30		sampling gastropod shells; sample no. 1291-3; 8°17.535'S; 13°30.621'W: 2958m	**1291-3**
2:03:42		going around area covered by gastropod shells to estimate its size	
2:07:05		gastropod cemetery is surrounded by rippled pelagic sediments, but patches of pelagic sediment within cemetery show no ripples at all	
2:11:08		extend of cemetery to the E is approx. 25m, to the W approx. 40m, total approx. 60m; thickness is approx. 35 cm	
2:12:56		sonar scan of cemetery area	
2:14:45	3	spectacular pillows with incredibly beautiful rind textures	
2:15:14		going around gastropod cemetery to investigate the area	
2:17:13		thruster dust	
2:23:08	23	hydromedusa?	
2:23:25	23	gastropod shells in very long and straight ripples	
2:24:46		thruster dust	
2:27:34		taking photographs of gastropod cemetery; lots of thruster dust	
2:31:46	23	shrimp	
2:31:58	3	nice pillows	
2:32:45		start going around cemetery, along the edge	
2:35:55	15	base of talus slope; 2975m	
2:39:00		t=2.63°C	
2:39:44	4	fine talus on sediment	
2:41:50	23	holothurian?	
2:42:02		following edge of cemetery, only thin gastropod shell cover on pelagic sediment	
2:42:39		thruster dust	
2:47:31		t=2.65°C	
2:51:10	15	base of talus slope; 2957m	
2:53:40		extend of cemetery N-S approx. 25m	
2:54:00		going into cemetery area again, stirring up shells and taking water sample	
2:55:13	3	nice pillows	
2:58:00		grenadier feeding with head down on gastropod shells	
3:01:50	15	base of talus slope; 2953m	
3:04:33		giving up attempt of water sampling, going ESE uphill instead to find source of gastropod shells	
3:10:07	23	holothurian	
3:11:34	4	pelagic sediment with thin cover of gastropod shells	
3:12:43	23	back in cemetery area, long ripples of shells	
3:12:58	23	shrimp	
3:13:32	23	shrimp, cirroteuthis	
3:13:38	23	holothurian	
3:13:58	4	pelagic sediment with ripples	
3:14:34	15	contact sediment to talus; 2943m	
3:16:37	3	nice pillows; 2973m	
3:17:26	23	2 shrimp	
3:18:06		thruster dust	
3:18:47	15	sedimented talus; 2923m	
3:19:43	23	"candy cane" sticking out of sediment	
3:21:29	23	holothurian	

Time (hh:mm:ss)	CODE	Notes	Sample #
3:21:34	23	shrimp	
3:21:47	4	contact talus to sediment; sediment channel; 2896m	
3:22:52	15	base of talus slope; 2891m	
3:23:49	15	going up talus slope; 2881m	
3:24:12	23	fish	
3:25:47	12	pillows, some nice crosscuts; going up, 2848m	
3:27:57	3	nice pillows; 2827m	
3:29:59	12	2818m	
3:31:07		2813m, no view of seafloor	
3:33:11	3	sedimented pillows; 2842m	
3:35:15	23	big dead branched gorgonian	
3:35:19	23	dead gorgonian	
3:37:24	3	sedimented pillows; 2841m, grenadier fish	
3:39:11	15	talus slope; 2847m	
3:41:07	23	3 shrimps	
3:41:16	3	great pillows, one collapsed and with a little lava tube going downhill, possible draining it and causing collapse	
3:41:34	23	gorgonian	
3:44:18	23	2 gorgonians	
3:44:33	3	beautiful rind textures	
3:45:03	12	2845m, fish	
3:47:39	1	going down; 2853m	
3:49:42	23	shrimp	
3:50:19		2854, no view of seafloor	
3:51:54	3	heavily sedimented pillows; 2876m	
3:52:38	23	holothurian	
3:52:48	4	2883m	
3:54:32	3	pillow/ talus slope, going down	
3:54:55	4	small sedimented ledge on talus slope: 2896m	
3:55:53	15	going down talus slope; 2899m	
3:57:12	15	heavily sedimented talus slope; 2907m	
3:58:58	3	pillows on slope; still going down; 2913m, dead gorgonian	
3:59:35	3	elongated pillows/ lava tubes, flowing down the slope; 2908m	
4:01:23	15	sedimented talus slope	
4:02:58	15	some pillows on talus slope; 2891m, actinian	
4:04:38	3	nice pillows: 2888m	
4:05:16	23	holothurian on pillow	
4:05:34		thruster dust	
4:07:23	3	spectacular pillows, 4 actinians	
4:07:44	23	holothurian	
4:07:59	3	collapsed pillows	
4:08:25	10	fissure, filled with pelagic sediment	
4:10:19		2872m	
4:10:42		thruster dust	
4:11:48	3	collapsed pillow	
4:13:06	23	2 holothurians	
4:14:05	3	elongated pillows/ lava tubes, partly collapsed	
4:17:21		fuzzy yellowish sponge between pillows	
4:20:49		white sediment next to pillow; shell fragments?	
4:23:47	3	funny protrusions on pillow	
4:27:42	23	animal floating past	
4:29:44	3	sedimented pillows; 2863m	
4:34:49		closed Niskin bottle no. 1; sample no. 1291-4; 8°17.498'S; 13°30.535'W; 2868m; ship-time 04:35:06	**1291-4**
4:37:29		ship-time 04:37:45; offset 16 sec	
4:38:38		going WNW	
4:40:39	12	steep slope at left edge of view, sedimented pillows on top	
4:43:41	12	steep pillow slope, elongated pillows/ lava tubes	
4:45:04	23	shrimp	
4:46:16	15	contact pillow slope or wall to sedimented talus slope; 2867m	
4:48:57		2859m; no view of seafloor	
4:52:00		going up; 2820m	
8:00:00		ROV on deck, end of station	

Station 1296 **M62/5B**
Segment A2 North
19. December 2004
Dive 35

Time (hh:mm:ss)	CODE	Notes	Sample #
20:29:53		ROV starts diving	
23:02:53		3565m, seafloor in sight, holothurian	
23:02:56		ROV reached the seafloor	
23:03:01	4	light and darker sediment	
23:03:27		8°18,504; 13° 31,430	
23:07:23	23	grenadier fish	
23:18:54	4	light and darker sediment, few pillows sticking out of sediment, 3582m, swimming holothurian?	
23:22:37	23	shrimp	
23:23:28		going 450m to north	
23:24:12	23	fish	
23:25:48	23	shrimp	
23:28:27	4	3567m	
23:29:36		no GAPS data, following the Meteor, thruster dust, holothurian	
23:32:58	4	some lava sticking out of sediment, slope, 3566m	
23:33:40	23	shrimp	
23:34:00	23	hydromedusae	
23:36:04	23	bythitid fish	
23:36:40	23	shrimp	
23:37:17		thruster dust	
23:37:31	23	same fish	
23:38:08	23	shrimp	
23:38:59		thruster dust	
23:39:07	4	small sediment hills (cm-dm), 3567m	
23:39:33		thruster dust	
23:40:11	23	shrimp	
23:40:40	4	3565m	
23:41:53		thruster dust	
23:42:33	23	shrimp	
23:46:22	4	pillow sticking out of sediment, 3570m	
23:49:20	23	another bythitid fish	
23:49:43	23	shrimp?	
23:50:58	4	3578m	
23:52:53	4	slight slope, 3580m	
23:54:26	23	same fish	
23:55:11	23	shrimp	
23:55:49	23	"candy cane"	
23:56:11	4	3579m	
23:58:02	15	small talus field, 3580m	
23:58:35	23	shrimp	
23:59:21		thruster dust	
0:01:17		restart CTD display	
0:01:46	4	some talus blocks sticking out	
0:02:13	23	holothurian	
0:03:01	15	strongly sedimented talus/ pillows	
0:04:32	4	3578m	
0:05:48	23	shrimp	

Time (hh:mm:ss)	CODE	Notes	Sample #
0:07:08	4	3580m	
0:07:39	4	some rocks sticking out	
0:08:27	23	shrimp	
0:08:41	23	same fish?	
0:09:54	23	2 crinoids	
0:10:29	4	rock sticking out	
0:10:52		thruster dust	
0:11:34	4	sediment	
0:12:29		thruster dust	
0:14:32	4	sediment	
0:17:40		thruster dust	
0:17:48	23	shrimp	
0:18:37		thruster dust	
0:21:07	23	shrimp	
0:21:26	23	small fish with white head/dark body	
0:21:47		thruster dust	
0:23:46	23	hydromedusae	
0:23:50	23	shrimp	
0:25:59		thruster dust	
0:26:20	4	3577m	
0:27:17	23	holothurian	
0:27:47	4	big lonely pillow sticking out	
0:28:09	23	bythitid fish	
0:28:48	23	several gorgonians on pillow	
0:29:43	23	sponge on pillow?	
0:30:36	23	hydromedusae	
0:30:53	4	sediment	
0:31:46	23	same fish	
0:34:56	23	shrimp	
0:36:20	4	some rocks sticking out	
0:36:51	23	same fish	
0:38:03	4	3581m	
0:40:20	23	animal with long legs, doesn't look like shrimp	
0:40:36	4	big nosed pillow on sediment	
0:41:42	23	shrimp	
0:41:53	4	slightly wavy "desert landscape"	
0:43:11	4	"crater" in sediment	
0:43:54	4	big pillow on sediment	
0:44:52	23	animal with long legs (no shrimp)	
0:45:38	23	shrimp	
0:46:47	23	"candy cane" ?	
0:49:37	23	shrimp	
0:50:05	23	"candy cane"	
0:50:25	23	bythitid fish	
0:51:44	23	small fish with white head?	
0:52:00	23	giant shrimp	
0:54:28	23	"candy canes"	
0:55:20	4	sediment	
0:56:18	23	shrimp	
0:57:27	4	lonely rock sticking out	
0:57:46	23	"candy cane"	
0:58:33		thruster dust	
1:00:46	4	some rocks sticking out	

Time (hh:mm:ss)	CODE	Notes	Sample #
1:02:48	23	sponge on pillow	
1:04:19	4	some rocks sticking out	
1:05:51	23	candy cane	
1:06:29	23	shrimp, holothurian	
1:07:00	23	dead gorgonian	
1:07:22	23	shrimp	
1:14:34	23	2 gorgonians	
1:15:12	23	bythitid fish	
1:15:50	23	same fish	
1:16:15	23	holothurian	
1:16:29	23	shrimp	
1:16:43	23	small fish with white head?	
1:19:25	23	shrimp	
1:19:46		gaps works for 30 minutes	
1:20:27	4	some rocks sticking out	
1:21:07		8°17,605; 13°31,981	
1:24:18	23	some (at least 2) gorgonians on pillow	
1:25:27	23	brisingida on stone	
1:26:35	23	actinian on same stone	
1:26:55	23	gorgonian on same stone	
1:27:46		thruster dust	
1:27:53	23	3 types of sponges, gorgonian, polychaete tubes on lava block	
1:28:56		thruster dust	
1:30:06	23	shrimp	
1:30:43	23	cirroteuthis	
1:32:30		thruster dust	
1:33:10	4	some rocks sticking out	
1:33:49	23	gorgonian	
1:34:57	23	bythitid fish	
1:35:36	23	bythitid fish	
1:36:14		just 3 hours left	
1:37:28	23	shrimp	
1:40:19	4	some rocks sticking out, bythitid fish	
1:47:17	23	holothurian	
1:49:46	15	talus on sediment slope, 3572m	
1:51:16	15	talus on steep slope, sediment	
1:53:16	15	some pillows, 3546m	
1:53:36	23	fish	
1:53:58	15	nice pillow crosscuts sticking out	
1:54:54	23	2 gorgonians	
1:55:15	12	pillow wall, 3511m	
1:56:34	4	plateau with some rocks, 3497m	
1:57:01	23	gorgonian	
1:58:05	23	gorgonian	
1:59:24	12	sediment slope with talus, going up other slope	
2:00:46	23	holothurian	
2:00:54	23	shrimp	
2:01:22	23	3 holothurians	
2:01:57	23	animal with long legs (no shrimp)	
2:02:34	15	with sediment	
2:03:24	23	fish	
2:03:43	12	massive volcanic rocks	

Time (hh:mm:ss)	CODE	Notes	Sample #
2:04:10	23	shrimp	
2:04:23	12	volcanic rocks covered with sediment	
2:05:22	23	fish	
2:05:31	23	gorgonian	
2:05:42	4	plateau, 3459m	
2:06:28		records AK	
2:06:54	12	steep pillow wall, heavily sedimented plateau or terrace on top, some slump structures in sediments along edge	
2:07:51	3	sedimented pillows, some crosscuts, 3442m	
2:09:04	4	sediments and patches of sedimented pillows	
2:09:23	23	gorgonian	
2:10:11	3	heavily sedimented pillows	
2:10:42	3	pillows with nice rind textures	
2:11:16	23	gorgonian	
2:11:33	12	top of steep slope? 3426m	
2:11:46	23	2 gorgonians	
2:13:29	4	sediments with some pillows sticking out	
2:14:53	12	steep talus/ pillow slope; going up; 3422m	
2:15:02	23	fish	
2:15:38	23	gorgonian	
2:16:03	23	gorgonian	
2:16:18	3	sedimented pillows; 3413m	
2:17:09	23	crinoid	
2:17:28	4	sediment and fine talus, some blocks sticking out	
2:18:00	23	gorgonian	
2:18:11		3402m; top of slope or next terrace?	
2:18:54	15	sedimented fine talus? (darker material on sediment)	
2:22:13	23	winding traces on sediment? diameter approx. 20cm	
2:24:28		thruster dust	
2:25:53	4	sediment somewhat consolidated, can't be stirred up very easily	
2:31:52	15	big talus blocks/ pillows	
2:33:01	23	small yellow sponges on rock	
2:33:06	23	3 gorgonians	
2:34:15	15	sedimented talus slope; 3408m	
2:35:08	23	more winding traces	
2:35:28	3	perfect pillow	
2:35:49	4	some pillows or talus blocks sticking out; dark material on sediment (fine talus/ hyaloclastite/ brachiopod shells?)	
2:35:51	23	bythitid fish	
2:37:15		thruster dust	
2:37:20	12	going across terraced slope: steep steps with pillows or talus and sedimented flat terraces; 3404m	
2:38:51		thruster dust	
2:39:03	23	gorgonian	
2:39:40		thruster dust	
2:41:04	23	still winding traces in sediment	
2:41:39	23	polychaete?	
2:42:32		thruster dust	

Time (hh:mm:ss)	CODE	Notes	Sample #
2:44:53	12	steep sedimented talus slope; going up; 3399m	
2:46:04	23	bythitid fish	
2:46:12	23	sponge	
2:46:30	4	next sedimented terrace; 3395m	
2:47:21	4	dark material on sediment (fine talus/ hyaloclastite/ brachiopod shells?)	
2:48:52		thruster dust	
2:49:58	23	gorgonian	
2:50:00	23	shrimp	
2:51:39		thruster dust	
2:52:41	4	circular to arc-like accumulations of black material on sediment	
2:57:01	23	gorgonian	
3:00:58	23	bythitid fish	
3:01:06	15	sedimented talus; 3389m	
3:01:36		8°17.376'S; 13°31.677'W	
3:02:18	23	holothurian	
3:02:40	4	sedimented fine talus? (darker material on sediment)	
3:03:05	4	some blocks sticking out	
3:03:42	4	very nice wriggly strings or tracks on sediment	
3:04:50	4	nice pillow sticking out, great rind textures	
3:05:20	23	holothurian	
3:05:45	4	sedimented fine talus? (darker material on sediment)	
3:06:05	3	great pillow; 3372m	
3:06:18	23	gorgonian	
3:06:35		thruster dust	
3:08:11	15	sedimented talus; going up; 3363m	
3:08:49	4	sedimented fine talus? (darker material on sediment)	
3:09:08	15	going up next step on terraced slope?	
3:09:32	23	gorgonian	
3:09:55	4	top of slope? some pillows/ talus sticking out; 3360m	
3:11:18		thruster dust	
3:11:42	23	bythitid fish	
3:12:28	4	sedimented fine talus? (darker material on sediment); also some interesting arrangements of black material	
3:12:58		going down; 3368m	
3:14:30	23	shrimp?	
3:14:38	4	some talus and pillows sticking out	
3:15:05	3	3360m	
3:15:46		thruster dust	
3:16:38		hydromedusae?	
3:17:09	4	some talus sticking out	
3:19:52	4	sedimented fine talus? (darker material on sediment)	
3:20:26	23	holothurian	
3:20:54	23	holothurian	
3:20:56	23	gorgonian	
3:21:21	15	small talus ridge; 3358m	
3:21:50	23	shrimp	

Time (hh:mm:ss)	CODE	Notes	Sample #
3:21:58	23	bythitid fish	
3:22:09		white/ yellowish blocks on sediment/ fine talus; some fairly well rounded; carbonates?	
3:23:26	23	gorgonian	
3:25:12		thruster dust	
3:25:59	23	shrimp	
3:26:17	23	winding traces on sediment	
3:27:36		"thumbs up" (still yellowish rocks)	
3:28:57	23	very hungry animal, excretingwinding traces ("Vorne rein, hinten raus...")	
3:29:20		thruster dust	
3:32:00	23	bythitid fish	
3:32:16		thruster dust	
3:35:15	23	holothurian	
3:36:09	23	holothurian	
3:36:20	3	sheet flows? (small outcrop, possibly big block, on fine talus slope)	
3:39:04		more yellowish rocks	
3:39:23		preparing for sampling	
3:39:56		thruster dust	
3:40:47	23	gorgonian	
3:43:38	4	some talus blocks and dark material (brachiopod shells, and glass)	
3:45:48		thruster dust	
3:46:31	15	sedimented talus	
3:48:17	15	orange crusts or discolorations on basalt talus?	
3:58:10		ROV hits ground; accidental sampling! 8°17.342'S; 13°31.557'W; 3358m	
4:00:02	15	orange rock fragments/ alteration?	
4:04:31	15	talus slope with yellowish and orange crusts or discolorations/ alteration?	
4:09:06		rock sample taken (altered basalt); sample no. 1296-1; 8°17.346'S; 13°31.557'W; 3357m	**1296-1**
4:15:06		thruster dust	
4:17:04	4	sedimented fine talus? (darker material on sediment), some bigger talus blocks	
4:17:32		more yellowish rocks = consolidated sediment?	
4:18:23		thruster dust	
4:52:32		interesting sampling technique - using the net to shove yellow rocks onto the ROV; 8°17.347'S; 13°31.558'W; 3364m; temperature anomaly (2.65-2,7°C while stirring up sediment; corrected data 0.14˚C)	
5:03:46		sampled yellow rocks and probably sediments/ fine talus; sample no. 1296-2; 8°17.347'S; 13°31.558'W; 3363m	**1296-2**
5:08:15		closed Niskin bottle no. 3; sample no. 1296-3; 8°17.347'S; 13°31.558'W; 3363m	**1296-3**
5:10:27	23	brisingida	
5:12:04		ship-time 05:12:10; offset 6 sec.	
5:15:51	23	small fish	
5:18:38	23	bythitid fish	
5:22:57	23	gorgonian	

Time (hh:mm:ss)	CODE	Notes	Sample #
5:23:47	4	3358m	
5:26:33	23	holothurian	
5:26:39	23	gorgonian	
5:27:25	15	fine talus, some bigger blocks	
5:28:34	15	some pillows in fine talus/ sediment	
5:29:22	12	3355m	
5:30:37		thruster dust	
5:30:57	3	strongly sedimented pillows	
5:32:33	3	sedimented pillows, some crosscuts; 3360m	
5:33:15	23	gorgonian	
5:33:41	23	holothurian	
5:33:49	23	gorgonian	
5:34:29	3	pillows in fine talus/ sediment	
5:35:30	15	sedimented talus, some pillows	
5:36:52	4	sediment and fine talus, some blocks sticking out	
5:37:15	23	gorgonian with "star"-like animal in branches	
5:38:21	15	3360m	
5:38:34	23	bythitid fish on bottom sediment	
5:39:11	12	lobate flows/ sheet flows? outcrop on wall, crosscut	
5:39:49	3	heavily sedimented pillows	
5:40:30	23	sponge	
5:40:43	15	talus slope; 3355m	
5:41:42		thruster dust	
5:44:27	14	nice pillows	
5:45:11	3	sedimented pillows	
5:46:08	4	sediment and fine talus, some blocks sticking out	
5:46:51	23	gorgonian	
5:47:43	4	sediment is altogether darker and "dirtier" than usual, seems to have a thin cover of fine talus or some other dark material almost everywhere	
5:48:11	23	gorgonian	
5:49:10		yellowish rocks again	
5:49:11	23	shrimp	
5:50:01	23	gorgonian	
5:50:14	15	sedimented talus; 3353m	
5:51:21		bigger and more angular blocks of yellow rocks	
5:53:33		thruster dust	
5:56:00		thruster dust	
5:58:49	15	3356m	
6:00:58		records SSt	
6:03:45	23	bythitid fish	
6:04:56	15	talus on slight slope, 3360m	
6:10:32		turning, going west, 3363m	
6:13:01	15	sedimented talus	
6:13:41	15	fine talus, some bigger blocks	
6:14:10	15	slight slope, 3360m	
6:15:06	3	talus and pillows, 3355m	
6:15:43		increased natural turbidity?	
6:15:45	23	gorgonian	

Time (hh:mm:ss)	CODE	Notes	Sample #
6:16:42	15	fine talus, some bigger blocks	
6:17:21	15	talus on steep slope	
6:17:53	15	fine talus, 3349m	
6:18:39	4	sediment, some blocks, hilly terrain	
6:19:53	14	contact between flow front and sediment	
6:21:42	13	sharp ride, pillows, 3338m	
6:22:46		thruster dust	
6:23:34		seafloor not in sight, 3339m	
6:25:00		thruster dust	
6:25:43	3	strongly sedimented pillows on steep slope	
6:26:39		thruster dust	
6:26:50	4	some blocks sticking out of sediment, 3345m	
6:27:58	23	bythitid fish	
6:28:13	4	some pillows sticking out of sediment, going on top of a ridge, 3345m	
6:30:21	12	steep wall only a few meters high with 2 fissures, pillows	
6:31:58	4	sediment and talus slope, 3352m	
6:33:20	4	pillows sticking out of sediment and fine talus on slope, 3351m, thruster dust	
6:35:07	23	Brisingida	
6:38:12	4	sediment and fine talus, some blocks sticking out	
6:39:47	23	gorgonian	
6:39:55	4	talus sticking out of sediment, hilly terrain, light sediment blocks?	
6:40:41	4	sediment ridge	
6:41:53	15	steep talus slope, 3352m, hill	
6:42:39	15	coarse talus on slope, 3352m	
6:43:33	15	going up a slope, finer talus, 3347m	
6:44:11	23	2 gorgonians	
6:44:37	15	sedimented coarse talus on top, 3345m	
6:45:57	15	coarse talus on top, light blocks, branched gorgonian	
6:47:22	15	strongly sedimented coarse talus, 3347m	
6:47:48	23	shrimp	
6:49:10	15	fine talus and blocks, sedimented, slope	
6:50:18	23	3 gorgonians on talus	
6:50:52	23	shrimp	
6:51:27	3	strongly sedimented blocks, 3347m	
6:53:36	4	strongly sedimented talus, hilly terrain	
6:54:11	4	steep slope, 3352m	
6:55:11	4	slight slope, some blocks sticking out	
6:55:42	23	Holothurian	
6:57:43	4	steep sediment slope, 3365m, some blocks sticking out	
6:58:45		thruster dust	
6:59:19	4	sediment ridge, pillows and talus sticking out	
6:59:34	23	Holothurian	
7:00:44	4	steep sediment slope, pillows sticking out under top of slope	
7:01:43	4	few blocks sticking out of sediment, 3354m	
7:03:27	4	hilly terrain, pillows sticking out on top of ridge, 3354m	
7:05:17		thruster dust	

Time (hh:mm:ss)	CODE	Notes	Sample #
7:05:44	13	sediment ridge, some pillows sticking out, 3354m	
7:06:31	23	shrimp, gorgonian	
7:07:25		thruster dust	
7:07:48	11	pillow ledge and sediment slope	
7:09:55		thruster dust	
7:10:03		fissure?	
7:11:13	12	pillows sticking out of steep wall, wall strongly sedimented on top	
7:11:49		thruster dust	
7:12:23	4	3351m	
7:13:08		place where hydrothermal field was found (perhaps plateau above yellow stone sampling), starting operation "Nibelungen Sword"	
7:14:17		thruster dust	
7:15:23	15	fine talus	
7:15:35		8°17,339S; 13°31,552W, 3352m	
7:16:37		thruster dust	
7:21:13	23	2 gorgonarians	
7:54:28		mission accomplished, sword in sediment	
7:54:56		going south	
7:55:18	4	sediment, some talus sticking out	
7:56:18	12	strongly sedimented broad talus ridge	
7:58:07	15	strongly sedimented talus valley, 3347m	
8:00:53	15	strongly sedimented talus ridge, 3342m	
8:02:45	4	3345m	
8:06:23	15	sedimented talus, 3348m	
8:07:36	23	bythitid fish	
8:09:15		thruster dust	
8:12:22	15	sedimented talus slope, 3363m	
8:15:10	4	sediment slope, 3376m	
8:15:56	23	bythitid fish	
8:16:04	4	darker sediment, 3376m	
8:16:32	4	pillows and talus sticking out of sediment	
8:17:47	4	3368m	
8:19:52	4	slight sediment slope	
8:20:18	4	pillows and talus sticking out of sediment, 3359m	
8:21:37	3	strongly sedimented pillows and talus, 3357m	
8:22:50		8°17,376S; 13°31,605W; 3361m; water sample no. 1296-4; Niskin bottle no. 2	**1296-4**
8:25:40	23	bythitid fish	
8:26:38	4	steep sediment slope, 3365m	
8:27:27	15	strongly sedimented talus slope, 3367m	
8:28:25	23	bythitid fish	
8:30:18	15	fine talus, steep slope, 3387m	
8:31:00	15	steep coarse talus slope, strongly sedimented, 3383m	
8:32:15		slightly increased natural turbidity	
8:32:43	23	gorgonian	
8:35:21	4	3400m	
8:37:01	4	steep sediment slope, 3401m	
8:37:29		thruster dust	

Time (hh:mm:ss)	CODE	Notes	Sample #
8:37:48	15	fine talus slope, 3395m	
8:38:25	23	gorgonian	
8:38:47	4	talus sticking out of sediment slope	
8:39:11	3	strongly sedimented pillows, pillow with nice rind texture, 3370m	
8:40:17	4	hilly terrain, blocks sticking out of sediment	
8:43:11	23	swimming Holothurian	
8:44:01	23	bythitid fish	
8:45:29	4	broad sediment ridge, 3355m	
8:46:25		Niskin bottle no. 1 closed, sample no. 1296-5, 8°17,362S; 13°31,619W; 3356m	**1296-5**
8:48:20		leaving the bottom, ascent begun at 3354m	

Appendix 4:

OFOS station protocols

No	legend
1	pillow lava
2	lLobate lava
3	sedimented older lava
4	pelagic sediment
5	sheet flows
6	ropy lava
7	collapsed pits
8	lava pillar
9	contact of older (i) and young flow (ii)
10	fractures, fissures, larger cleft
11	ledge
12	steep wall
13	ridge
14	flow front
15	pillow, sheet flow talus
16	Fe-, silica-stained talus
17	direction of near-seafloor water
18	sulfide mound
19	sulfide talus
20	hydrothermal sediment
21	sulfide chimney (active / inactive)
22	hydrothermal crust
23	deep-sea-fauna
24	Ventfauna

Station 1236 OFOS

Time UTC (GMT)	Code	Observation	Photo #
16:45:00		Begin Station	
17:04:23		Tape on	
17:09:47		bottom sight	
17:10:12	12	lightly sedimented basalt (pillows)	6
17:12:08			7
17:12:46			8
17:12:57			9
17:14:21	3	sedimented lava	
17:14:43			10
17:14:47			11
17:15:17			12
17:17:34	3	heavily sedimented lava	
17:17:45			13
17:18:25			14
17:18:39			15
17:19:02		rippled sediment	
17:19:37			16
17:20:08			17
17:20:50	3		18
17:21:34	3	sediment-covered lava	19
17:22:36			20
17:22:55			21
17:23:04			22
17:23:15			23
17:23:39	5	very thin sediment layer on lava flow	
17:24:06			24
17:24:22			25
17:25:10			26
17:25:55			27
17:26:55		sediments with rippled valleys and fine-kernelled talus	
17:27:20			28
17:28:10			29
17:29:24		sedimented lava flows	30
17:29:53	9		
17:29:58			31
17:30:42	9		32
17:31:42		sedimented pillow lava	33
17:32:57		sedimented old pillows	34
17:33:15			35
17:33:37		sediment ponds between single flows	
17:34:01			36
17:34:19			37
17:35:55			38
17:37:08		old, heavily sedimented pillow lava	39
17:37:28		dark blue holothurians (3)	40
17:39:10	4	*vollständige Sedimentbedeckung*	
17:40:26	4	ditto	41
17:41:59	4	sloping downhill	
17:42:44		crossing animal?	42
17:43:23			43
17:43:41	14	flow front, then younger lava flow	44
17:44:34	4	sediment again	
17:44:59			45
17:46:33			44
17:46:49		flow front, some meters thick, only slightly sedimented	45
17:47:21			46
17:47:38			47
17:48:25		uphill	
17:49:14			48
17:49:41			49
17:50:43		cable 2895m, step upwards 20m	
17:51:23			50
17:51:41		still uphill	
17:53:37		plateau reached, cable 2889m	

Time UTC (GMT)	Code	Observation	Photo #
17:54:06		lightly sedimented old pillows	51
17:54:43		downhill again, probably ridge	
17:55:44		downhill pillow ridge	52
17:56:11			53
17:58:36	4	pelagic sediment	
17:59:16			54
17:59:57		lightly sedimented pillows	55
18:00:43		flow front	56
18:01:45		cable 2923m	
18:02:44		cable 2928m	
18:03:03	4	sediment again 100%	
18:04:05		full sediment	57
18:05:04			58
18:06:23	4	cable 2940m, sediment	
18:07:27	4	cable 2943m, sediment	59
18:07:45			60
18:09:53		light-colored swimming animal crossing camera	61
18:10:32	4	cable 2946m, sediment	
18:12:31	4	cable 2948m, sediment	
18:13:22		40 m difference between hydrosweep depth and cable length	
18:14:22			62
18:15:22	4	cable 2952m, sediment	
18:16:23			63
18:17:18		dark blue holothurian	64
18:17:35			65
18:18:16		old flow	
18:19:24			66
18:19:42		cable 2941m	
18:20:30		swimming animal crossing	67
18:22:06		pillows	
18:22:37		old lava flow	68
18:23:03			69
18:23:20			70
18:23:55		cable 2949m	
18:24:50	4	sediment	71
18:25:11			72
18:25:31			73
18:25:37			74
18:25:48		talus flow	75
18:25:58			76
18:26:15		coarse sediment inbetween ripples (lapilli)	77
18:27:15		large old pillows	78
18:28:12		cable 2955m	
18:28:25			79
18:29:36			80
18:30:15			81
18:30:32		sedimented old pillows	82
18:31:26		ditto	83
18:32:04	3		84
18:33:17		cable 2957	
18:33:59			85
18:34:30		pillows	86
18:35:23		pillows	87
18:35:39			88
18:36:36		flow front	89
18:37:23		sediment with some pillow	90
18:38:10			91
18:38:16			92
18:40:43		pillow pile	93
18:41:13			94
18:41:33		2957 rope length	95
18:42:13		pillow	96
18:42:28		slope with pillow	97
18:43:00		dark blue holothurian	98
18:43:22		pillows	99
18:43:52		2948 m rope length	100

Time UTC (GMT)	Code	Observation	Photo #
18:44:25		pillows	101
18:45:51		pillow slope	102
18:46:42			103
18:47:15		pillows	104
18:47:39		rope length 2941m	
18:48:07			105
18:49:12		pillow slope	106
18:49:35			107
18:49:44		pillow slope, gorgonian	108
18:52:00		pillows	109, 110
18:52:27		collapsed pit	111.112
18:53:58		in the collapsed pit	
18:55:33		sediment	
18:57:14			113
18:57:29	14	steep pillow wall	
18:58:05			114
19:01:02	3	rope 2956, sedimented pillows	115
19:02:01		dark blue holothurian	116
19:02:22			117
19:03:17		25m more cable out than WD, OFOS under ship	
19:03:24		animal traces in sediment	118
19:04:26			119
19:06:11		rope 2955	120
19:06:40		pillow	121, 122
19:08:10		slightly sedimented pillows	123
19:09:19			124
19:10:00		pillow	125
19:12:15		rope 2965	126
19:13:58			127, 128
19:15:31	3	sedimented lava flows	128
19:16:44			129
19:17:00			130
19:17:27		collapsed pit ?	
19:19:19		rope 2974	
19:21:15	3	sedimented pillows	131
19:24:24		sedimented pillows	
19:25:28		pillow talus	132
19:25:42		pillow talus	133
19:28:32			134
19:29:00		rope 2979	
19:29:45		talus, sediments	
19:30:27			135
19:32:56		ripples in sediment	
19:34:19		old pillow	136
19:34:24		ditto	137
19:36:05			138
19:36:35		sediments and small talus fragments	139
19:37:43		ditto	140
19:39:22		ditto	141
19:40:39		rope 2988	
19:40:48		sediments and small talus fragments	142
19:43:14		small scarp, higher particle concentration, pillows	143
19:43:49		rope 2997	
19:44:05			144
19:46:02		rope 3005	
19:46:29		sediments and small talus fragments	145
19:49:14		rope 3008	
19:50:27	4	ripples in sediment	
19:50:44		rope 3016, ripples in sediment	146
19:52:43		haul @ 0.5, start recovery	
21:44:03		OFOS on deck, end of station	

Summary: Old pillow lava flows covered by pelagic sediment and fine-grained talus, some lava flow fronts, succession of sedimented plateaus (=flow upper side) and scarps (flow fronts), no hydrothermal signature, 550 pictures left

Station 1258 **M62/5B** Film: 400 ASA; aperture 11; focus: 3.5 to 1.5 m

Segment A2 North Photo no. (start at #150); 550 pictures remaining

10. December 2004
OFOS track

Time (hh:mm:ss)	CODE	Notes	Photo-No.
14:50:00		Begin of station at 8°18.77'S 13°30.90'W	
15:44:36		OFOS at 2089 m	
16:02:31		tape on 2810 m	
16:06:43	3	Seafloor in view at 2920 m	151
16:08:18	4	sediments with some minor pillows	152
16:09:04	4	ship at 8°18.50'S and 13°30.77'W	
16:09:51	23	holothurian?	
16:10:50			153
16:11:03		shrimp (NOT fish)	
16:11:35		8-armed "star" trace extending from an central "dot"	
16:11:35		shrimp	
			154
16:11:31	4		155
16:11:59	4		156
16:12:04		gorgonian? tube on sediment	
16:12:19	4	8°18.52'S; 13°30.74'W ship; 2932 m	157
16:13:34		tube on sediment	
16:15:13	4	some minor basalt	158
16:17:34	4	8°18.49'S; 13°30.77'W ship; 2930 m	159
16:20:09	3	lonely pillow on sediment	160
16:20:57	3	pillows with sediment in intra pillow spaces	
16:22:03	4	sediments and fine grained talus	161
16:22:04		"grainy stones" are actually empty brachiopod shells	
16:22:37	4	sediments and fine grained talus	162
16:23:04	3		163
16:23:24		ophiuroid on sediment	
16:23:35	3	8°18.48'S; 13.30.75'W ship at 2928 m	
16:24:46	3		164
16:25:16	4		
16:25:48	3		165
16:26:25	4		
16:26:46	3		166
16:27:38	4	talus on sediment	167
16:28		top sediments are brachiopod shells	
16:28:04		polyp on basalt flow	
16:28:05	4	8°18.47'S 13°30.74'W	
16:28:36	3		168
16:29:04		tube on sediment	
16:29:32	3	some hyaloclastite	169
16:29:58	4		
16:30:22	3		170
16:30:45	3		171
16:31:33	3		
16:32:30	3		172
16:32:43	3	8°18.46'S; 13°30.73'W 2925 m	173
16:33:34		holothurian	
16:34:04		tube on sediment	
16:34:29	23	holothurian	174
16:34:58	4	Hyaloclastite covering pelagic sediment	
16:35:35	3		175
16:36:17	3		176
16:36:55	4		
16:37:11	3		
16:37:43	3		177
16:38:07	23	holothurian	178
16:39:21	4	8°18.43'S; 13°30.72'W 2931 m rope length; HS depth: 2910 m	
16:39:34		tube on sediment	

Time (hh:mm:ss)	CODE	Notes	Photo-No.
16:40:16	4		
16:40:34		tube on sediment	
16:42:53	3		
16:43:05	3		179
16:44:14	4		
16:45:05		"star" shape in sediments	
16:45:18	3		
16:46:01	4		
16:46:28	4		
16:46:34		tube on sediment	
16:46:39	3		
16:46:50	3		180
16:47:06	3	8°18.39'S; 13°30.71'W 2933 m RL, 2916 HS	
16:49:31	3		
16:51:08	4		
16:51:40	3		181
16:52:04		holothurian	
16:52:39	4		
16:53:04		white, weathered brachiopod shells	
16:53:09	3		
16:53:34		2 gorgonians on broken pillow	
16:53:40	3	pillow breccia?	182
16:54:29	3		183
16:54:34		polyp (tunicate?) with two openings (daughter?) on side of basalt block	
16:54:46	3	cliff; RL: 2941 m; at least 10 m down already	184
16:56:44	3	going down cliff RL: 2947 m; cliff is oriented approx. SW-NE	
16:57:40	23	gorgonian?	185
16:58:38	3	cliff; RL: 2954 m	
16:59:43	3	going down the cliff: 2959 m RL; 8°18.34'S; 13°30.68'W	
17:00:34	4	base of cliff at 2962 RL	
17:01:13	4		186
17:01:51	4	dark talus/ hyaloclastite (?) on sediment.	187
17:01		dark "sediments" are empty brachiopod shells	
17:02:30	3		188
17:03:16	3		189
17:03:48	3	8°18.32'S; 13°30.67'W; 2958 m RL; 2946 m HS	
17:04:34		tube on sediment	
17:05:17	3	sediment. with ripples	190
17:06:04		dead gorgonian on pillow	
17:07:51	3	going downslope, 2961 m RL	
17:09:34		holothurian on pillow	
17:09:42	3	delightful pillow	191
17:10:13	3	8°18.29'S; 13°30.65'W; 2964 m RL; 2940 m HS	
17:11:09	4	ripples	192
17:11:36		tube on sediment	
17:12:03		tube on sediment	
17:12:22	3		
17:14:59	3		193
17:16:33	3	8°18.26'S; 13°30.64'W; 2975 m RL; 2948 m HS	
17:17:47	4	dark talus/ hyaloclastite (?) on sediment.	194, 195
17:18		"dark talus" => empty brachiopods shells	
17:19:52	4	ripples	196
17:20:26	4	dark talus/ hyaloclastite (?) on sediment.	
17:20:56	3		
17:22:09	3		197
17:22:54	3	cliff	
17:23:04		sponge?	
17:23:39	4		
17:23:59	3	lava flow front ?	198
17:24:04		gorgonian on lower basalt flow	
17:25:09	3	8°18.2'S; 13°30.62'W; 2981 m RL; 2981 m HS	

Time (hh:mm:ss)	CODE	Notes	Photo-No.
17:26:04		gorgonian on pillow	
17:26:35		shrimp on pillow	
17:27:33	3	hydrozoan ?	199
17:29:11	3		200
17:31:04		gorgonian	
17:31:34		holothurian	
17:31:39	3	collapsed pillow	201
17:32:30	4	ripples in sediment.; small talus fragments	202
17:32:33		Ceranthus	
17:32:59	3	pillows	203
17:33:09		lost weight; cliff	
17:33:52		going up; 2983 m RL	
17:34:04		gorgonian amid pillow rubble	
17:34:33	3	pillow talus	
17:35:26	4	ripples	204
17:35:34		2 gorgonians	
17:36:07	3		
17:37:05		dark "sediments" are empty brachiopod shells	
17:37:06	4	strange ripples ?	205
17:37:41	4	dark talus/ hyaloclastite (?) on sediment.	206, 207
17:37:58	4	dark talus/ hyaloclastite (?) on sediment.	208
17:38:36	3		
17:38:43		8°18.12'S; 13°30.58'W; 2988 m RL; 2956 m HS; steep slope	
17:39:04		gorgonian on young pillows	
17:40:01	3	hydrozoan ?	209
17:40:54	3	steep slope	210
17:42:19	3	cliff, going up, 2979 m RL	211
17:43:12	3	2971 m RL	
17:44:01	3	very rugged only slightly sedimented surface	
17:45:06		slightly more particle flow	
17:45:37	3	cliff	212
17:46:04	3	going down, 2978 m RL, crater ?	
17:47:54		3005 m RL; pillow talus in sediment.	213
17:49:29	3	3000 m RL	
17:50:16		particle flow is constant	
17:51:02		gorgonian on pillow	
17:51:08	3	going down cliff RL 3010 m	214
17:52:01	3	going back up again along steep cliff	
17:53:04	3	3001 m RL	
17:54:44	3	going down to 3007 RL	
17:56:05		Ceranthus	
17:56:10	3	seafloor in view at 3018 m RL	215
17:56:40	3		216
17:57:46		elevated particle flow	
17:58:32	3	seafloor in view at 3026 m RL	
17:59:16	3	8°18.02'S; 13°30.54'W	217
17:59:57	3	ripple structures in sediment	
18:01:04		holothurian on more sediment	
18:01:18	3	cliff going up, 3020 m RL	218
18:01:50	3		219
18:02:11	3	3016 m RL	
18:04:04		gorgonian on strongly sediment pillows	
18:04:33		gorgonian attached to sediment-buried basalt	
18:04:40	3	3014 m RL; rugged terrain with sharp ridges	220
18:05:41	3		221
18:06:08		OFOS stuck at overhanging cliff; wild turbulence; 2991 m	
18:07:37		OFOS freed	
18:09:16	3	seafloor in view; 2971 m RL	222
18:10:53	3	seafloor in view 2962 m RL	
18:12:04		bresingida (NOT ophiuroid) on wall, gorgonian	
18:12:05			223
18:12:17	23	crinoid	224
18:12:39	23	echinoderm	225
18:12:59	3	cliffs passing from left to right	
18:13		slightly increased turbidity	

Time (hh:mm:ss)	CODE	Notes	Photo-No.
18:13:35	3	seafloor in view at 2938 m	
18:14:06	3		226
18:14:46	3		
18:15:13	3	8°17.96'S; 13°30.51'S	
18:15:46	3	2933 m RL; 2922 m HS	
18:16:38	3	a cliff is going down	
18:17:19	3	2945 m seafloor just in view	
18:17:53		2948 m seafloor not in view OFOS going down	
18:18:43	3	seafloor just in view at 2960 m	
18:19:37	3		227
18:19:53	3		
18:20:54	3	2972 m RL	228
18:23:07	3		
18:24:09	3	8°17.91'S; 18°30.49'N; 2967 RL; 2912 HS	
18:25:06	3		229
18:26:03	3	elevated particle flow	
18:27:12	3	2975 m RL	230
18:27:58	3	cliff	
18:28:48	3	2963 m RL	
18:29		high particulate flow dies down	
18:29:12	3		
18:29:39	3	cliff; 2953 m RL	
18:30:27	3	cliff, going up, 2950 m RL	231
18:31:00	3	cliff; 2944 m RL	232
18:32:06	3	cliff;	
18:32:51	23	actinian?	233
18:33:05	3	cliff going up, 2935 m RL	
18:34:37	4		
18:34:54	3	steep pillow flow front	
18:35:13	3	nice pillow	234
18:36:16	3	8°17.86'S 13°30.47'W 2931 m RL; 2916 m HS	
18:37		change in flow to more particles, more sedimented basalt	
18:38:37	3		235
18:39:04	3	continuous particle flow	
18:40:39	3	wall	236
18:41:59	3	2934 m RL	
18:42:50	3	strongly sedimented pillows	237
18:43:32	3	steep cliff 2923 m RL	
18:43:34		holothurian	
18:43:53	3	going up; 2917 m RL	
18:44:19	3	going up cliff 2914 m RL	
18:45:39	3	2904 m RL	
18:47:08	3	8°17.81'S; 13°30.45'W 2903 m RL; 2911 m HS	
18:48:57	3		
18:49:20	3	2897 m RL	
18:49:39	3		238
18:52:25	3		239
18:53:44	12	steep wall; 2900 m RL	240
18:54:23	3		
18:55:39	3	2910 m RL	
18:56:03	3		241
18:57:28	3	2918 m RL	
18:57:40	3	slightly elevated particle flow	
18:59:12	3	2922 m RL; 2924 m HS	
19:00:53	3	2926 m RL	
19:01:17	3		242
19:03:16	23	hydrozoan ?	243
19:05:15	3		244
19:06:00	3	8°17.69'S 13°30.40'W, 2924 m RL, 2925 m HS	245
19:08:12		going down sea floor out sight; 2934 m	
19:08:38		end of station	
19:09:31		tape off	
21:03:00		OFOS on deck with 2 basalt samples with some Mn crusts	

Station 1264 **M62/5B** Film: 400 ASA; aperture 11; focus: 3.5 to 1.5 m

Segment A2 North Photo no. (start at #250); 450 pictures remaining

11. December 2004
OFOS track

Time (hh:mm:ss)	CODE	Notes	
17:13:38		start of station	
17:58:31		at 1874 m	
18:21:20		at 2744 m	
18:23:32		tape on	
18:27:16		at 2905 , RL 8°18,2'S 13°30.96'	
18:28:17		seafloor in view	
18:28:57	4		252
18:29:32	4	2933 m RL; 2896 m HS	
18:30:16	4	8°18.2'S 13°30.96'	
18:32:10	4		253
18:34:42	4		254
18:37:27	23	holothurian feces (NOT holothurian)	255
18:38:20		8°18,19'S 13°30.95'W; 2934 m RL; 2897 m HS	
18:40:32	4		256
18:41:06		animal trace with small pit filled with shells at one end	
18:45:07	4		257
18:45:48		ophiuroid on sediment	
18:48:39	4	talus	
18:49:09	4	occasional pillows sticking out of the ground	
18:50:01		2931 m RL, 2898 m HS	
18:50:38	4	8°18.15'S 13°30.96W	
18:51:17	4	pillows are absent	
18:52:05	23	holothurian traces	258
18:53:52	4		
18:54:22	23	holothurian traces	259
18:55:40	4		260
18:58:15	4		
18:59:38		Mn-crusted sediment shelf (same area as later sample 1280-3 with ROV)	
19:00:23	4		
19:00:34	3	short interval of basalt sticking out of the ground	261
19:01:37		tube on sediment	
19:02:05	4	talus?	262
19:03:26	4	8°18.14'S 13°30.96'W 2927 m RL; 2901 m HS	
19:04:26	4		
19:04:33	23	holothurian	263
19:05:08	3	pillows sticking out the sediment	264
19:06:09	3		
19:07:19	3		
19:07:44	12	or lava flow front?; going down	265
19:09:01	12	going up; lava flow front	266
19:10:19	3		267
19:11:08		gorgonian on side of pillow	
19:11:57	23	holothurian, out of area for picture	268
19:12:22	3		
19:14:16	3		270
19:15:06	23	swimming organism	271
19:15:28	3	pillow pile	272
19:15:39		tube on sediment	
19:16:49	4		
19:17:42	4		
19:17:58	4	with fine grained volcanic talus	273
19:18:19	4	brown sediment (hyaloclastite) covering white pelagic sediment	274
19:18:38		"talus stripes" are empty brachiopod shells	
19:19:14	4		275
19:19:25	4	hyaloclastite accumulates a the lee side of large ripples	276

Time (hh:mm:ss)	CODE	Notes	
19:20:12	4		
19:21:05	4		
19:22:09		polyp (sponge?) on basalt block, dark sea urchin?	
19:22:39		dead gorgonian on sedimented basalt	
19:23:01	12	steep cliff of lava going up; 2930 m RL	277
19:23:26	3	2927 m RL	
19:24:00	3	going up cliff	
19:24:08		dark sea urchin(?)-like animal at base of pillow	
19:24:23	12		278
19:24:46	3	going up cliff	
19:26:20	12	2924 m RL, top	279
19:27:08		tube/dead gorgonian (aka. "candy cane")	
19:27:12	3		280
19:28:28	23	shrimp	281
19:28:56	4	nice ripples	282
19:29:14	4	8°18.06'S 13° 30.98W, 2925 m RL	
19:29:48	3		283
19:31:01	3		284
19:31:26	12	going up 2925 m RL	
19:31:55	12		285
19:32:15	12	2918 m RL; steep wall	
19:32:46	12	2913 m RL	286
19:33:07	12	2908 m RL	287
19:33:39	12	2905 m RL	288
19:34:07	12	2905 m RL	
19:34:45	13	top of ridge 2908 m RL	289
19:35:07		2 dead gorgonians	
19:35:11	3		290
19:35:46	23	swimming organism	291
19:37:07	3	going down gentle slope 2911 m RL	292
19:38:02	3	2913 m RL	
19:39:08		holothurian on pillow	
19:39:10	3		293
19:39:21	3	2918 m RL; 2903 m HS	
19:39:37	3	white spots in the sediment	294
19:40:21	3		
19:41:51	12	2916 m RL	295
19:42:57	12		296
19:44:04	3		297
19:45:03	3		298
19:45:31	3		
19:46:08		"branched" organism on talus block	
19:47:08	3		299
19:47:28	12	going up	
19:47:40	12	8°18.00'S 13°31.00'W	300
19:48:11	12	2914 m RL	
19:48:37	12	2913 m RL	
19:49:09	12	2906 m RL	301
19:49:23	12	2900 m RL	
19:50:20	12	2895 m RL	
19:51:26	3	top of ridge 2900 m RL	
19:52:07	3		302
19:52:57	3	gentle slope going down 2910 m RL	
19:53:54	12		303
19:56:08		dead gorgonian on talus slope	
19:56:12	3	8°18.00'S; 13°30.99'W	
19:56:53	3		304
19:58:43	3	2922 m RL	
20:00:08	3		305
20:01:05	4		
20:01:31	4	sediment and some small talus fragments	306
20:02:55	4	ripples	307
20:04:22	4	still ripples	
20:05:09	4	still ripples	308
20:05:55	4	pillow talus in sediment	309

Time (hh:mm:ss)	CODE	Notes	
20:08:03	3	nice pillows	
20:08:52	4		
20:09:10	4	8°17.92'S; 13°30.97'W; 2930 m RL; 2911 m HS	
20:09:47	4	brown patches of gastropods on sediment	310
20:11:31	3	pillow talus	
20:12:14	3	pillows	311
20:15:03	3		312
20:16:32	4	8°17.87'S; 13°39.96'W; 2941 m RL; 2921 m HS	
20:17:51	4	some talus	313
20:19:09	3		
20:20:24	3		314
20:21:20	12	steep slope	315
20:23:04		gorgonian on partly sediment-buried rock	
20:23:22	4	fine talus	316
20:24:16	4	8°17.86'S; 13°30.92'W; 2960 m RL; 2926 m HS	
20:25:47	4	fine talus/ hyaloclastite	317
20:25		patch of dark "sediment" is composed of empty gastropod shells	
20:26:31	4	fine talus	318
20:27:55	4	pillow fragments	319
20:28:32	3		320
20:29:10	3	going uphill, 2948 m RL	321
20:30:04	3		322
20:30:13		end of profile, start recovery	
20:31:24		tape off	
20:33:36		lights off	

Station 1277 **M62/5B** Film: 400 ASA; aperture 11; focus: 3.5 to 1.5 m
Segment A2 North Photo no. (start at #250); 450 pictures remaining
14. December 2004
OFOS track

Time (hh:mm:ss)	CODE	Notes	Photo No.
13:52:00		Start of station, OFOS leaves deck	
15:19:00		Tape on	
15:22:45	4	seafloor in view	251
15:24:38		ophiuroid on sediment	
15:25:53	4	2966 m RL; 8°17.88S 13°30.88'W	
15:27:50	4		
15:28:59	4	lonely pillow sticking out of the sediments	252
15:30:42	3		
15:31:14	23	holothurian	
15:31:39		dead gorgonian tube on sediment	
15:32:08		traces in sediment might be from FISH feeding (rather than holothurians)	
15:32:13	4		
15:32:43	3	2963 m RL; 2939 m HS	
15:35:32	4		
15:36:08		gorgonian on sedimented pillow	
15:37:00	3		
15:37:05	23	swimming animal	
15:37:41	4		253
15:38:08		pink asteroid on sediment	
15:39:12	4		
15:39:38		gorgonian on mostly sedimented basalt	
15:39:52	23	holothurian	
15:40:16		8°17.84'S 13°30.88'W OFOS position!; 2962 m RL; 2944 m HS	
15:41:06	4	some lapilli-sized volcanic talus	
15:42:19			254
15:43:22	3		255
15:43:37	12	traveling along flow front ?	
15:45:04	15		
15:45:17	12		256
15:46:58	3	great pillow with scratch marks	257
15:47:00	23	gorgonian on photo 257?	
15:47:08		gorgonian on sediment-glass slope	
15:48:09		gorgonian on sedimented elongated pillow	
15:48:46		2970 m RL	
15:49:12	23	swimming animal	258
15:49:51	3		
15:50:30	4	ripple; talus?	
15:50:37		gorgonian on sedimented pillow	
15:51:34	3		
15:51:54	4		
15:52:14	3	BIG pillow with prominent surface textures	259
15:52:43	3		260
15:53:16	23	animal?	261
15:54:29	4	ripples	262
15:55:09	4	ripples	
15:56:45	4	2974mRL 3262m HS	
15:58:07	3		263
15:59:21	3	nice pillow	264
15:59:37	23	gorgonian	264
16:00:26	23	actinian?	265
16:01:15	4		
16:02:59	3	slope	
16:03:18	12		266
16:03:38	4	2984m RL	
16:05:56	4	2989m RL, 2957m HS	
16:08:25	4	2990m RL	267
16:10:07		ophiuroid on sediment	
16:11:48	4	2991m RL	
16:13:38		another ophiuroid on sediment	
16:14:08		second view of same ophiuroid	
16:14:32	4	2992m RL, evtl holothurian	268

Time (hh:mm:ss)	CODE	Notes	Photo No.
16:18:14	4	2991m RL, 2957m HS	
16:22:09	4	2991m RH, 2957m HS	
16:25:47	4		269
16:29:36	4	2993m RL, 2959m HS	
16:31:07	3	2994m RL	270
16:31:43	3		271
16:32:12	3	2995m RL	272
16:36:15	3	3001m RL	
16:36:34	3	nice pillows	273
16:37:18	3	nice pillow	274
16:37:59	3	3005m RL, 2965m HS	
16:39:36	3	3011m RL	275
16:40:09	23	holothurian	276
16:42:00	4	3018m RL, 2966m HS	
16:42:27	3	3021m RL	277
16:45:21	4	3032m RL	
16:46:16		going down slope for 10 min.	
16:47:10	3	nice pillows	278
16:47:39	3	3038m RL	279
16:48:23	3	pillows sticking out of sediment	280
16:49:21	3	nice pillows	281
16:49:50	3	3042m RL, pillows define small ridge with ca. 5m cliff	282
16:50:29	4	with volcanic talus	283
16:54:57	4	some talus sticking out of sediment	284
16:58:30	3	3035m RL, 2963m HS	285
16:59:34	3		286
17:00:26	3	3027m RL, 2962m HS	
17:01:26	3		287
17:02:11	3		288
17:02:35	3		289
17:02:53	3		290
17:03:31	3	3014m RL, 2958m HS	291
17:03:38		gorgonian on sedimented rubble	
17:04:03	3		292
17:04:54	3		293
17:05:14	3	3008m RL, 2964m HS	294
17:05:46	3		295
17:06:08	3	3003m RL, 2962m HS	296
17:06:35	3		297
17:07:05	12		298
17:07:22	12		299
17:07:48	12		300
17:08:13	12	2990m RL, 2966m HS	301
17:09:23	3		302
17:09:39		gorgonian on talus cliff/flow front?	
17:10:58	3	2992m RL, 2967m HS, down slope	303
17:12:47	3		304
17:13:57	3		305
17:14:34	3	3001m RL, 2960m HS	306
17:15:15		hauling	
17:16:07		tape off	
19:15:00		end of station, OFOS on deck	