ARK-XXIV-3

5 August - 25 September 2009

Rejkjavik - Bremerhaven

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CONTENTS

1. ZUSAMMENFASSUNG UND FAHRTVERLAUF

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Die *Polarstern* Expedition ARK-XXIV/3 hatte die Seegebiete von Ostgrönland als Zielgebiet. Schwerpunkt der wissenschaftlichen Programme war geowissenschaftliche Forschung zur tektonischen und glazialen Geschichte von Ostgrönland. Die Expedition startete am 5. August 2009 in Reykjavik (Island) und endete am 25. September 2009 in Bremerhaven. Insgesamt wurden auf dieser Expedition 8097 NM (~15000 km) zurückgelegt. Die Durchführung der Expedition weicht aufgrund der vorgefundenen Eisbedingungen deutlich von den ursprünglichen Planungen ab. Dichtes Packeis erlaubte keinerlei geophysikalische Experimente auf dem Schelf und entlang des Kontinentrandes. Um die geschleppten Systeme aber auch die Ozeanbodenseismometer sicher einsetzen zu können, wurden die Profile weiter nach Süden und Osten verlagert.

Insgesamt wurden zwei tiefenseismische Profile vor Ostgrönland vermessen. Die erste Linie lag vor dem Kong Oscar Fjord und stellt eine Ergänzung der bereits vorhandenen Profile weiter im Norden dar. Als Aufzeichnungseinheit wurden Breitband-Ozeanbodenseismometer (BB-OBS) eingesetzt. Diese Geräte erlauben sowohl die Registrierung der Airgun Signale aber auch die Erfassung von lokalen und globalen Erdbeben. Dieser neue experimentelle Ansatz war von Erfolg gekrönt. Die Geräte detektierten zu unserer großen Überraschung ein lokales Erdbeben direkt am Kontinentrand vor dem Kong Oscar Fjord. Hier war bisher das Auftreten von Erdbeben vollkommen unbekannt. Das zweite Profil lag im Boreas Becken und verlief vom aktiven mittelozeanischen Knipovich Rücken bis an die Treibeiskante auf dem Ostgrönlandschelf. Einsetzt wurden hierfür 18 BB-OBS. Ferner wurde entlang des Knipovich Rückens gezielt ein Detektionsarray bestehend aus 10 BB-OBS zwischen zwei magmatischen Segmenten aufgestellt. Nachdem das Profil mit dem Airgun-Cluster vermessen wurde, blieben die Geräte noch weitere 10 Tage auf ihren Positionen, um erneut globale und lokale Erdbeben aufzuzeichnen. Das Detektionsarray war das erste Experiment seiner Art mit BB-OBS entlang eines ultralangsamen Rückensegmentes. Eine erste Sichtung der Daten zeigt, dass die Seismizität für die geplanten Auswertungen ausreichend ist. Aufgrund der Eissituation aber auch aufgrund zeitlicher Engpässe wurden nur wenige reflektionsseismische Profile vermessen. Das vorhandene Profilnetz wurde gezielt ergänzt.

Das Sedimentecholot (Parasound) und das Fächersonar Hydrosweep lief routinemäßig entlang der gesamten Fahrtstrecke im Zielgebiet. Vor dem Kong Oscar Fjord, dem Nordost-Grönland Schelf und entlang des Knipovich Rückens wurden vorhandene Daten gezielt ergänzt, um eine vollständige Karte zu erhalten.

Parasound Daten liefern Hinweise, dass im Boreas Becken und an den Flanken des Knipovich Rückens aktive Fluidaustritte vorhanden sind.

Entlang der Küste wurden von Geodäten sechs neue GPS Punkte eingemessen bzw. Punkte, die im Jahr 2008 eingerichtet wurden (6), erneut für GPS Messungen benutzt. Ziel dieser Untersuchungen ist es erstmals belastbare Informationen über die postglazialen Hebungsraten von Ostgrönland zu erhalten.

Eine Geologengruppe hingegen untersuchte Süßwasserseen im Kong Oscar Fjord und östlich vom Djimphna Fjord, um Hinweise über die Ausdehnung und Dynamik des grönländischen Eisschildes zu erhalten. Die beiden Außenlager konnten ausgeflogen und wieder abgebaut werden. Insgesamt wurden in Nordost-Grönland fünf Seen erfolgreich beprobt. Erste Ergebnisse sowie geomorphologische Untersuchungen deuten darauf hin, dass das Eisschild im Kronprins Christian Land stabil ist. Es wurden keine Anzeichen für ein schnelles Abschmelzen gefunden.

Zur Bestimmung der Verteilung von toxischen Chemikalien (Polyfluoroalkyl-Verbindungen), die bei der Herstellung von Gebrauchsgegenständen freigesetzt werden, wurden kontinuierlich Wasserproben über das wissenschaftliche Pumpensystem gewonnen, ebenso wurden in unregelmäßigen Abständen Luft- und Schneeproben gezogen. Ergebnisse sind aber erst nach detaillierten Analysen in entsprechenden Labors zu erwarten.

Während der gesamten Fahrtroute wurden Messungen zur Bestimmung der Strahlungsbilanz der Erde in polaren Gebieten durchgeführt. Es sollten die Effekte von Meereis und die speziellen polaren Wetterbedingungen im Hinblick auf die Strahlungsbilanz quantifiziert werden. Ergänzt wurden die Forschungsarbeiten durch kontinuierliche Beobachtungen von Vögeln und von marinen Säugern (Robben, Eisbären, Wale).

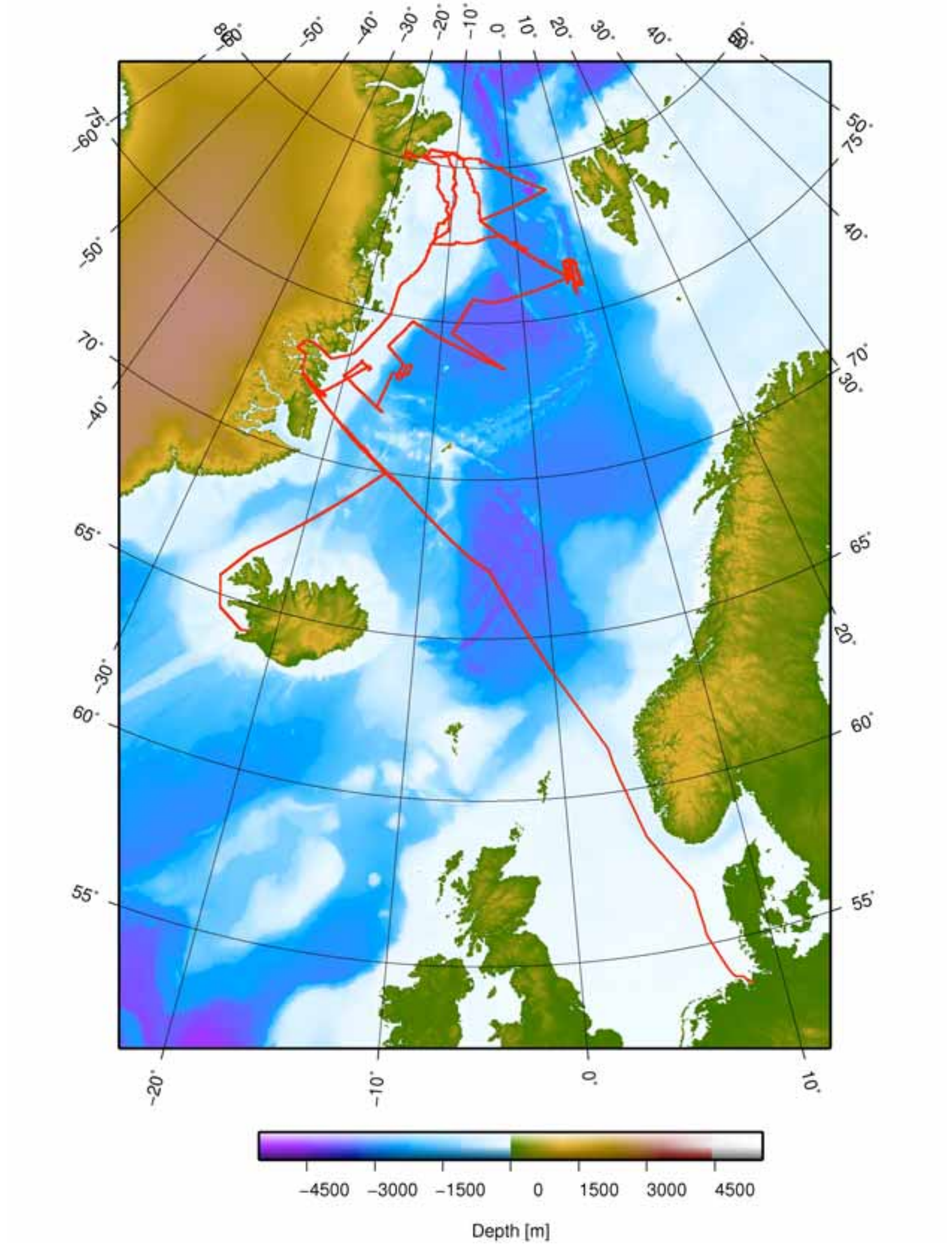

Abb. 1.1: Kurskarte der Polarstern Reise ARK-XXIV-3
Fig. 1.1: Cruise track of Polarstern during the expedition ARK-XXIV-3

ITINERARY AND SUMMARY

The target area of the *Polarstern* expedition ARK-XXIV/3 was the shelf and margin of Northeast Greenland. The main objective of the geoscientific programs was to gather new information on the tectonic and glacial history of East Greenland and its ice shield. The expedition started on August 5th in Reykjavik (Iceland) and terminated on September 25th in Bremerhaven. The ship sailed almost 8097 NM (~15000 km) during this leg. The final positions of the geophysical profiles differ significantly from the original plan. Dense pack ice north of 76°N prevented any geophysical experiments on the shelf and along the margin. To operate the streamer system as well as the oceanbottom seismometers safely, the geophysical profiles were shifted south- and eastwards.

Two deep seismic sounding profiles were acquired off East Greenland. The first transect was in the prolongation of the Kong Oscar Fjord across the Kolbeinsey Ridge. It supplements profiles gathered more in the north in 2003. We used altogether 23 Broadband Oceanbottom seismometers (BB-OBS) for seismic recording. These instruments allow the recording of seismic signals from airguns as well as from local and global earthquakes. This new experimental set-up worked very well. Much to our surprise the BB-OBS recorded a local earthquake just off the Kong Oscar Fjord margin. So far, it was completely unknown that earthquakes occur at all in this region. The second profile was located in the Boreas Basin and terminated at the mid-ocean Knipovich Ridge (18 BB-OBS). In addition, a seismological detection array was deployed for 10 days recording the seismicity of the ultra slow ridge between two magmatic segments. This is the first seismicity study with BB-OBS along an ultra-slow ridge segment. A first analysis of the data shows reasonable high seismicity for later analyses. The ice conditions allowed only very few seismic reflection profiles to supplement the existing seismic network.

The sediment echosounder Parasound and the swath bathymetric sonar Hydrosweep were operated along the entire tracks in our research area. Off the Kong Oscar Fjord, on the NE Greenland shelf and along the Knipovich Ridge detailed surveys were conducted to supplement existing data for a more complete map. Parasound data provide evidences for active seeps in the deep plains of the Boreas Basin and at the flanks of the Knipovich Ridge.

Along the East Greenland coast six new GPS stations were installed and six stations installed in 2008 were revisited. The objective of these measurements is to determine sound data on the current postglacial rebound of East Greenland coast.

Geologists investigated the younger glacial history and the dynamics of the Greenland ice sheet. They sampled several fresh water lakes onshore East Greenland. For this purpose we installed two field camps just off Mestersvig and in Kronprins Christian Land. The *Polarstern* helicopters deployed and recovered both camps without any problem because of good weather conditions. In total the geologists successfully probed five lakes in Northeast Greenland. First results of the coring program as well from cosmogenic investigations show that the ice shield in Kronprins Christian Land is rather stable. There was no evidence for an increased ice melting.

Continuous observation of birds and marine mammals, continuous water sampling with the onboard pumping system, and measurements to the net radiation budget at the surface completed the scientific programme.

2. WEATHER CONDITIONS

Harald Rentsch, Klaus Buldt
Deutscher Wetterdienst

The expedition ARK XXIV/3 started in Reykjavik under influence of a low and an occlusion, which was turning to the north of Iceland. During the journey to the position 74°N 14°W a bad weather area caused by this front reached us with fog and rain on the 6th of August. Besides, strong winds blew of the strength 6 to 7 Bft (Beaufort), and there were shower gusts up to 8 Bft. The swell reached 3 m from north-east, later east. Planned flights for ice reconnaissence could not be carried out.

- **8/8/2009 - 8/11/2009, 1st MCS-profile from Kolbeinsey Ridge at 70°N 14°W to 72°N 23°W (Kong Oscar Fjord):**

A storm-cyclone with 995 hPa southwest from Iceland and its belonging occlusion, which moved and extended to the north, was weakening slowly. This weather together with his multi-layered cloudiness and a vast nebulous zone remained determined for us up to 8/11/2009 (Fig. 2.1). The slightly higher water temperatures in the fjord caused the dissolving of fog and low clouds, so that the planned flight program was passed in the available time. Besides, flights to Greenland-mountains were carried out at low clouds and a minimum visibility from the Kong Oscar Fjord.

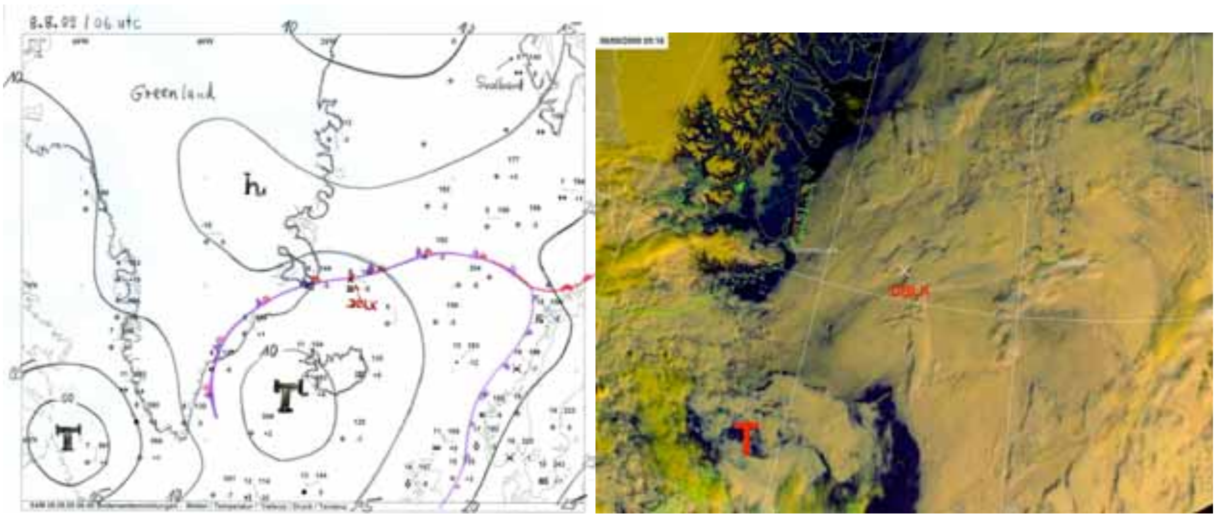

Fig. 2.1: Surface analysis of the meteorologist on board on 08th of August 2009, 12 UTC (left picture) and a combination of VIS/IR-Sat-picture from 08.08.2009, 09:16 UTC (right picture).The Position of POLARSTERN is always marked by x-sign and the call-name DBLK.

With a low atmospheric pressure gradient and southeast winds, mostly controlled from the fjord, the sea remained quiet. During this time the 500 hPa-level situation was marked by a low-pressure complex, which applied from 85° N to 60° N over Greenland and to the east of Jan Mayen. This raised the cyclonic and cloud production over and over again in this period. From the 12th of August new developments of lows east of Jan Mayen and an approaching occlusion determined the weather in our working field. With a slightly moved sea, 3 to 4 wind forces, and a swell to 1.5 m from north-east, low clouds, fog and occasional sleet or drizzle dominated the weather all the time.

- **8/14/2009 - 8/18/2009, track to Kong Oscar Fjord, 80.2°N 16.6°W:**

High water temperatures and a near-surface wind powered by katabatic winds formed a Polar low on the 13th of August in the Scoresby Sund. On the following Friday a regular low was formed by this with a 1010 hPa central pressure. At the same time the pressure rose north of Jan Mayen (maximum 1015 hPa, see Fig. 2.2). Therefore, during the day 5 to 6 wind forces were measured and came from the south, this was nearly 2 Bft more than expected from models.

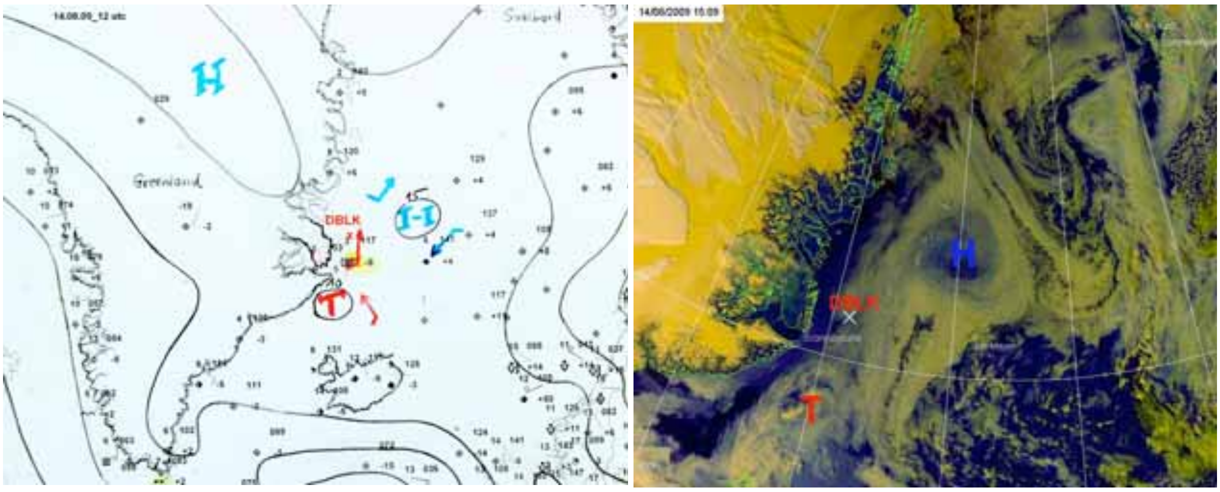

Fig. 2.2: Surface analysis of the meteorologist on board on 14th of August 2009, 12 UTC. (left picture) and a combination of VIS/IR-Sat-picture from 14.08.2009, 15:09 UTC (right picture). The Position of POLARSTERN is always marked by x-sign and the call-name DBLK.

The sea increased at the same time up to 3 m, this made it a little bit more difficult to lower the OBS (Ocean-Bottom-Seismometer).

During 16th and 19th of August we headed for 81°N 15°W, the starting point of other research activities on the Greenland mainland. Besides, we reached the ice edge on the 17th of August at misty, wind-weak weather. The continual near-surface inversion prevented the exchange of air with higher atmosphere shifts, so that planned Helicopter flights were cancelled, because of very low clouds and icing conditions.

On the 19th of August *Polarstern* reached the entrance of the Dijmphna-Fjord at 80.2°N and 16.6°W, the starting point for flights to the geologcial camp in the Greenland mountains. Under stable flight weather conditions (only high clouds, good visibility) also GPS stations could be installed, but the mountains above 1200-m height at times were covered by fog.

- **8/20/2009 - 9/04/2009, profiles in the sea ice from 80°N 2°W to 75.9°N 8.2°E and back:**

To the east of 80°N 6°W the weather was marked by thick, melting sea ice pitches and low atmospheric pressure gradients. On the 20th of August we already sailed in fog and high fog regions itself, which seldom disappeared caused by the degree of ice covering and wind direction. Under difficult flight conditions ice investigations and long-distance flights were carried out to install seismic stations on ice floes. During the next two days cyclones off Iceland moved northwestwards and reached us with frontal rain on the 21.8. Besides, the northeast wind increased to 6 Bft, but changed later to southeast. The ice situation intensified on 23rd of August. The floes were under pressure by converging currents of wind and sea, so the optimum ship track could only be found by ice reconnaissance by Helicopter. For a long time the ship did not made much speed in thick, multi-years sea-ice.

After the 24th of August, with the filling-up of the weather-determining low-pressure system, a stable high-pressure bridge was present reaching from northeast of Greenland over Svalbard to the Kara Sea. This meant weak winds from southwest, later northeast, a quiet sea (swell 1.5 m from southeast) but tricky flight-weather conditions, marked by low clouds, fog and instable visibility. Till the 29th of the month we steadily approached Svalbard. During our track within the warm Gulf Current with clammy eastern surface winds (4 Bft) banks of fog and low stratus formed over and over again in the vicinity of the melting and cooling masses of ice of the Svalbard. At last, on the 30th of August a northward expending low-pressure system with high clouds from Icelandic region approached. One day later *Polarstern* crossed a fjord nearby the Greenland high (1015 hPa), the ruled wind in it did not exceed 5 Knots, so this was the most beautiful and most sunny day of the cruise till then.

The following days until September 5th, 2009, weather was characterized by a low-pressure system, which moved towards Svalbard. Our ship-track was influenced by snow-fall and multi-layered clouds and increasing wind of 4 to 5 Bft, starting blowing from northeast later more and more weakening. Additionally, there were fog and low clouds, caused by melting sea ice bringing much moisture into near-surface layers.

Reaching the warm Gulf Current under weakening influence of a low the recovery of OBS could be finished successfully. During the 6th of the September an anti-cyclone over Jan Mayen and a weak southwesterly flow determined the weather in our working area. On the 7th and 8th of the month a Polar low north of Svalbard moving eastward causes stronger winds from southeast of 5 to 6 Bft. At the same time the swell remained below 1.5 m.

- **09/10/2009-09/25/2009, profiles south of 75°N and transit route to Bremerhaven:**

The fast development of a low south of Iceland increased wind speeds to 6 Bft on the next day. Fortunately, *Polarstern* was only touched by the strong wind- and rainfields. In the morning of the 10th the delayed arrival of the swell brought us a sea-height of 4 m. The centre of the mentioned low moved towards Bear Island, later continued northeast and disappeared. The following ridge of high pressure gave temporarily quiet sea; we approached Greenland again by fine but cloudy weather.

During the night to the 11th of September a convergence-line east of Greenland was built (Fig. 2.3), caused by strongly rising pressure over western Greenland (10 hPa/3 h) and by simultaneously falling pressure over Greenland Sea (4.8 hPa/3h). Consequently, we had stormy winds of average 8 Bft and gales of 9 Bft and a sea-height of almost 4 m.

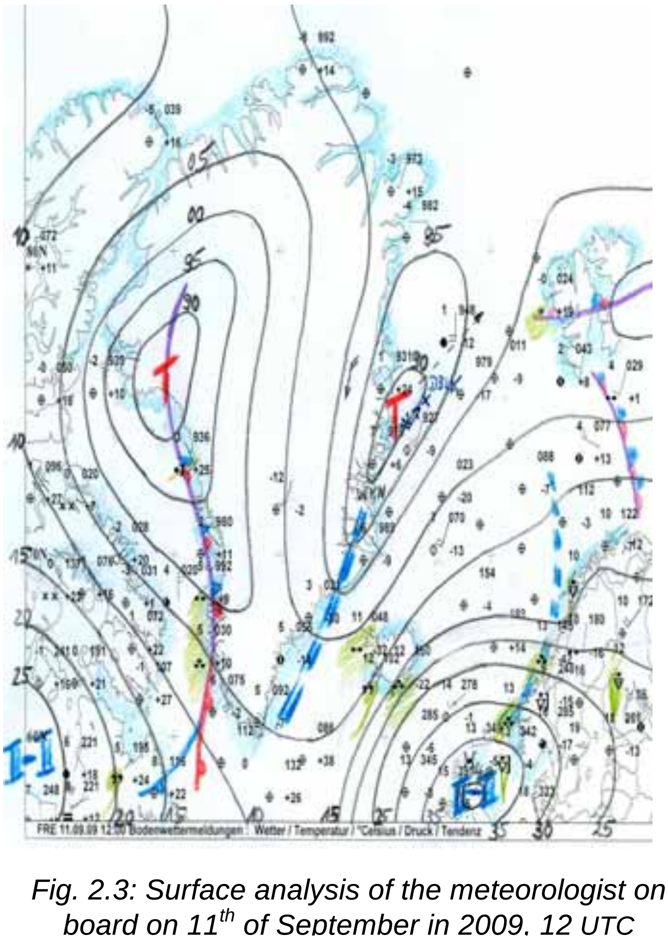

Fig. 2.3: Surface analysis of the meteorologist on board on 11th of September in 2009, 12 UTC

After some influence of a weak ridge of high pressure on 12th September weather was dominated again by many lows until 19th, which built up near Cap Fervel and used to move northeastward. During the night of the 15th of September *Polarstern* was touched by the strongest cyclone ever of this track. It caused strong winds of 8 and 9 Bft and also single gales of storm force.

The sea-height reached its maximum of nearly 4 m during morning hours. Such misty weather conditions brought us delays and losses of research time for planned seismic investigations. Our track back to Bremerhaven started on 20th of September into a region with mostly cyclonic flow. By that we got nearly 4 m wind-sea, were crossed by some cold fronts and the most westerly flow reached nearly 7 Bft.

Below, for statistical purposes the distribution of wind force, wind direction and visibility on our ship track during expedition ARK XXIV/3:

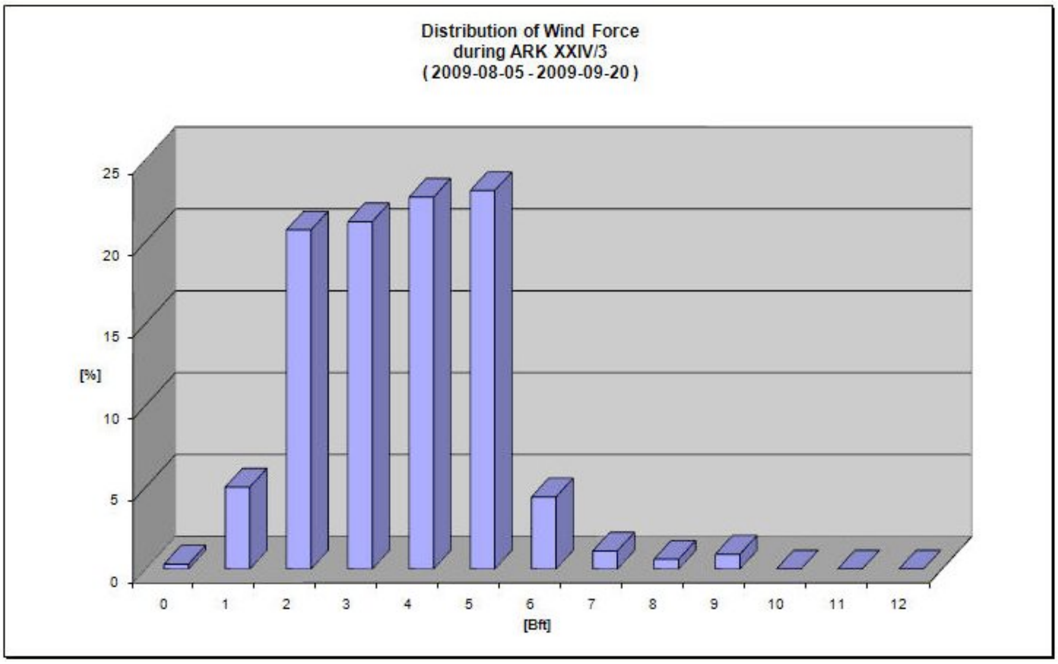

Fig. 2.4: Distribution of wind force during ARK-XXIV/3

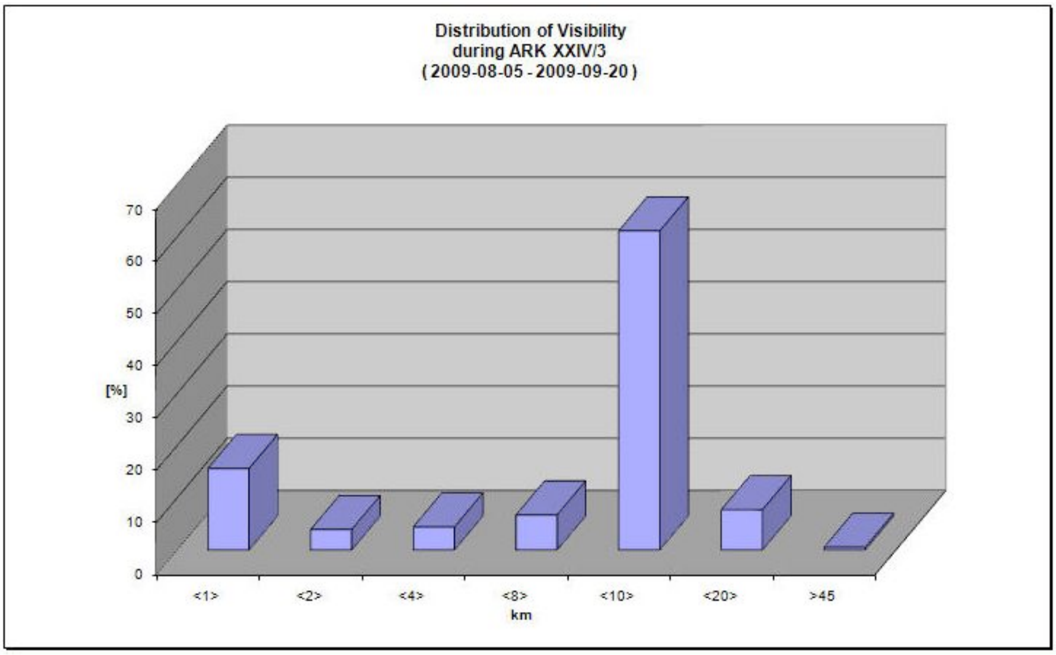

Fig. 2.5: Distribution of wind direction during ARK-XXIV/3

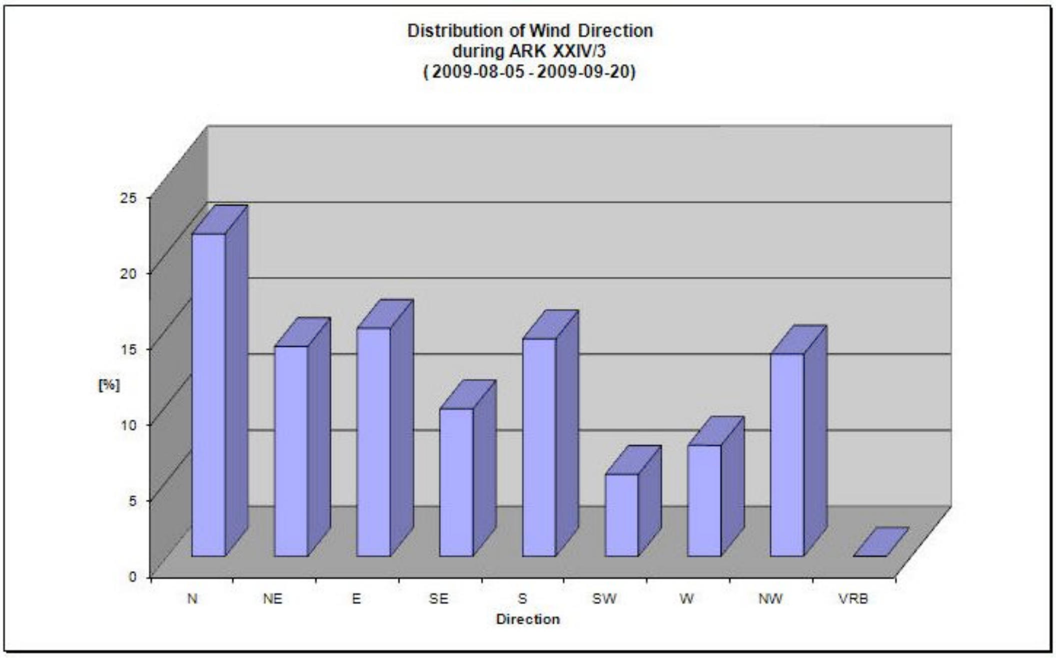

Fig. 2.6: Distribution of visibility during ARK-XXIV/3

3. MARINE GEOPHYSICS

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Introduction

Globally, the volcanic margin off Norway between Jan Mayen and Greenland-Senja fracture zones is one of the best-explored and studied ones, both by academia and industry. The existing large geophysical and geological database comprises a regional grid of deep wide-angle seismic data (OBS and ESP), deep and standard multi-channel seismic (MCS) reflection profiles, potential field data, and scientific and commercial drill holes. The data reveal important vertical and lateral variations in crustal structure and composition resulting from a complex history of rifting prior to and during the last Late Cretaceous-Early Tertiary rift episode leading to break-up and volcanic margin formation. One of the critical information to better understand the rifting processes in general is to have access to a similar geophysical database along the conjugate margin. Only such a database will allow an unbiased view on the entire effect of the rifting processes, and its symmetry. Thus, this project aimed to enlarge the geophysical database along the East Greenland margin to allow a sound comparison of both margin structures. The first part of these investigations was funded in 2003 by the Euromargins programme. This project aimed to continue the research of this first phase.

Off East Greenland deep seismic data only exist from the fjords and on the outer margin south of 76°N, whereas regional MCS and potential field data exist along most of the margin. Only one scientific well has been drilled on this margin segment. Four regional deep seismic profiles gathered in 2003 from the Jan Mayen Fracture Zone to the Greenland Fracture Zone revealed for the first time the deeper structure of this continental margin. Raytracing models indicate that the margin close to the Jan Mayen Fracture Zone is heavily intruded and underplated by volcanic material presumably erupted during and after the initial break-up. First estimates indicate that the amount of volcanic material might be of similar dimension like it was found along the Mid-Norwegian margin. Moreover, the East Greenland margin hosts a large, negative magnetic anomaly, which has no counterpart off Norway. The size and extent of this anomaly north of Shannon Island is quite speculative. The seismic and magnetic data indicate that the style of volcanism changes towards the north. The seismic reflection data clearly show that a volcanic outer high exists around 76°N. From the known data, however, its crustal structure and geological significance during the break-up process is not clear. No deep seismic data provide information on any structural link between the negative magnetic anomaly close to the Greenlandic coast and the magmatic outer high north of 76°N. It is completely unknown how the crust beneath the present day shelf was affected by the rift process between 75 and 79°N. The main objectives of the proposal were to provide an improved regional crustal database covering both conjugate margins. This will allow us to address the volcanic margin evolution in time and space, i.e. the "total rift” concept. This includes in general:

- Crustal and uppermost mantle architecture (crustal thickness variations, rift polarities, distribution of extrusives, intrusives, magmatic underplating).
- Tectonic and magmatic interplays and styles prior to, during and subsequent to break-up.
- Regional extension and magmatism.
- Along-strike segmentation, magmatic and tectonic (a)symmetry, structural inheritance.
- Interplay of sedimentation, magmatism and vertical motion.

And more specific for the East Greenland margin:

- How is the crustal structure between Shannon Island and the Greenland Fracture Zone? Is the volcanism vanishing like the magnetic data indicate or are the magnetic data biased by the sedimentary cover?
- North of the Greenland Fracture Zone there are strong indications that the Boreas Basin opened at ultra-slow spreading rates. Do we observe also reduced volcanism north and south of the Greenland Fracture Zone during the rift-drift transition? Has the Boreas Basin a seismic signature of non-volcanic rifted margin due to a reduced melt supply during the rift-drift period? How do the volumes of volcanic material estimated by seismic velocities relate to the findings more in the south?
- What is the crustal structure south of the Jan Mayen Fracture Zone? Can we observe a large seismic high velocity body also in the prolongation of the Kong Oscar Fjord ?
- What is the sedimentary structure of the East Greenland shelf between 75 and 79°N, and how was the shelf affected by the rifting event? Are there indications for strong erosional events related to this episode?

Work at sea

The major problem for achieving our goals this season off East Greenland was the pack ice distribution. Though, loosely distributed ice coverage of around 50% together with bad weather conditions north of 75°N latitude did not allow to tow our

3000 m streamer safely. A deployment of OBS instruments on the shelf was also not possible, since there was no guarantee that no ice field/floe was just above the OBS during recovery. Thus, the geophysical program was adjusted, and more load was put on heatflow measurements and deep seismic sounding. Finally, the geophysical group gathered the following data sets, which will be described more detailed in the following chapters

- One deep seismic line in the prolongation of the Kong Oscar Fjord to document the magmatic underplating south of the Jan Mayen Fracture Zone. Here, we lost one instrument. In total 24 OBS were deployed. There were strong seismic signals from industry ships operating in the vincinity. One regional earthquake close to the Greenland margin could be detected.
- One seismic refraction line from the Knipovich Ridge to the East Greenland margin. The line had to be terminated at the foot of the slope, because of drifting ice fields. All OBS rested on the seafloor for almost 10 days to record local and global earthquakes.
- Detecting array between two magmatic centres along the Knipovich Ridge to determine the seismicity south of the Logachev seamount. The instruments worked without major problems and recorded a reasonable number of local earthquakes.
- One seismic refraction line in the central valley of the Knipovich Ridge to detect the crustal thickness to better determine the hypocenters of the local quakes.
- Some short seismic reflection lines across existing and proposed scientific drill holes within the Ocean Drilling Programme.
- Multi-channel seismic profiles to document the transition of the Jan Mayen Fracture Zone towards the Greenland coast, and one seismic line along the deep seismic profile in the prolongation of the Kong Oscar Fjord.
- Deployment of a seismic detecting array on an ice floe in the Fram Strait to detect local seismicity. The instruments recorded reasonable signals for almost 10 days.
- Heat flow measurements were conducted mostly along the Greenland margin, where the data coverage is rather poor. The stations were preferably located along the deep seismic lines to have a reasonable control on the crustal fabric for thermal modelling.
- Gravity and magnetic data (fixed installed fluxgate magnetometer) were acquired along the entire track.

The following chapters will concentrate on the technical description and preliminary results of the different methods, while the objectives remain the same as described in the previous chapter.

3.1 Seismic refraction profiles and seismological array at Knipovich Ridge

Wolfram Geissler, Claudia Busche, Christian Feld, Jürgen Gossler, Jochen Kollofrath, Christine Läderach, Paul Lehmann, Volker Leinweber, Dietmar Penshorn

Alfred Wegener Institute, Bremerhaven

Instrumentation

We used up to 30 DEPAS LOBSTER (**L**ongterm **O**cean **B**ottom **S**eismometer for **T**sunami and **E**arthquake **R**esearch) K/MT 510 manufactured by K.U.M., Umwelt- und Meerestechnik Kiel GmbH, Germany, to perform wide-angle seismic and seismological measurements. The instruments are equipped with a Güralp CMG-40T broadband seismometer installed in a titanium pressure housing, a hydrophone, and a GEOLON MCS (**M**arine **C**ompact **S**eismocorder) data logger from SEND GmbH Hamburg, Germany. 48 alkaline power cells granted the electric power supply for the recorder and the seismometer. Each sensor channel is sampled with 100 Hz, preamplifier gain of the hydrophone channel was set to 8 (4) and 2 (1) for the three seismometer components. The maximum disk space of each station is 20 GB. The clocks of the data loggers were synchronized by GPS time before deployment and after recovery of the instruments. The time difference during the recording period will then be corrected linearly. The seismometers are equipped with a cardanic levelling mechanism, which was initiated a few hours after deployment, after the OBS arrived at the seafloor, and then periodically repeated.

At the western end of profile 20090100 four REFTEK-72 land stations were deployed. They were equipped with 3x3 4.5Hz-geophone chains, to improve the signal to noise ratio of the recordings. The stations recorded continuously with a sample rate of 100 Hz. Wherever possible the geophones were installed in bedrock fissures to get the best possible coupling to the ground; additionally they were covered with soil to reduce the noise produced by wind. The internal clock is controlled by continuous GPS signal.

Landstation 126 and 127 were installed on massive basalts often covered with striaes and grooves. Station 127 was on a little island about 450 meters long and 300 meters wide located in the fjord. Station 125 was installed on glacial debris, and station 124 on a hill slope.

Release unit tests

The KUMQUAT release unit is the most important part of the OBS for a safe recovery. To carry out an operational check of the 34 available release units under deployment condition in the deep sea we made three test releases. (Table 3.1.1) The releasers were lowered down to 1000 m depth using an oceanographic winch. Then the acoustic release code of each release unit was send two times. Due to the noisy conditions close to the vessel, the deck unit could not receive all acoustic responses from the release units. After recovery almost all releaser unita successfully passed the test .

Table 3.1.1: Parameters of OBS's release units tests

station	date	time	latitude [°]	longitude [°]	depth [m]	operation depth [m]
PS74/207-2	07.08.2009	15:27	69° 27.69' N	15° 35.48' W	1160	1000
PS74/208-2	07.08.2009	21:38	70° 00.91' N	13° 59.14' W	1543	1000
PS74/216-1	08.08.2009	14:21	70° 37.24' N	16° 34.07' W	1565	1000

Station deployment

Profile 20090100

We deployed 23 OBS together with 4 REFTEK onshore stations along a profile spanning from the Kolbeinsey mid-ocean ridge into the Kong-Oscar-Fjord/East Greenland (Fig. 3.1.1, Tables 3.1.2 + 3). The recording parameters of the OBS were 100Hz, and the gain was set to 8 and 2 for the hydrophone and the seismometer components, respectively.

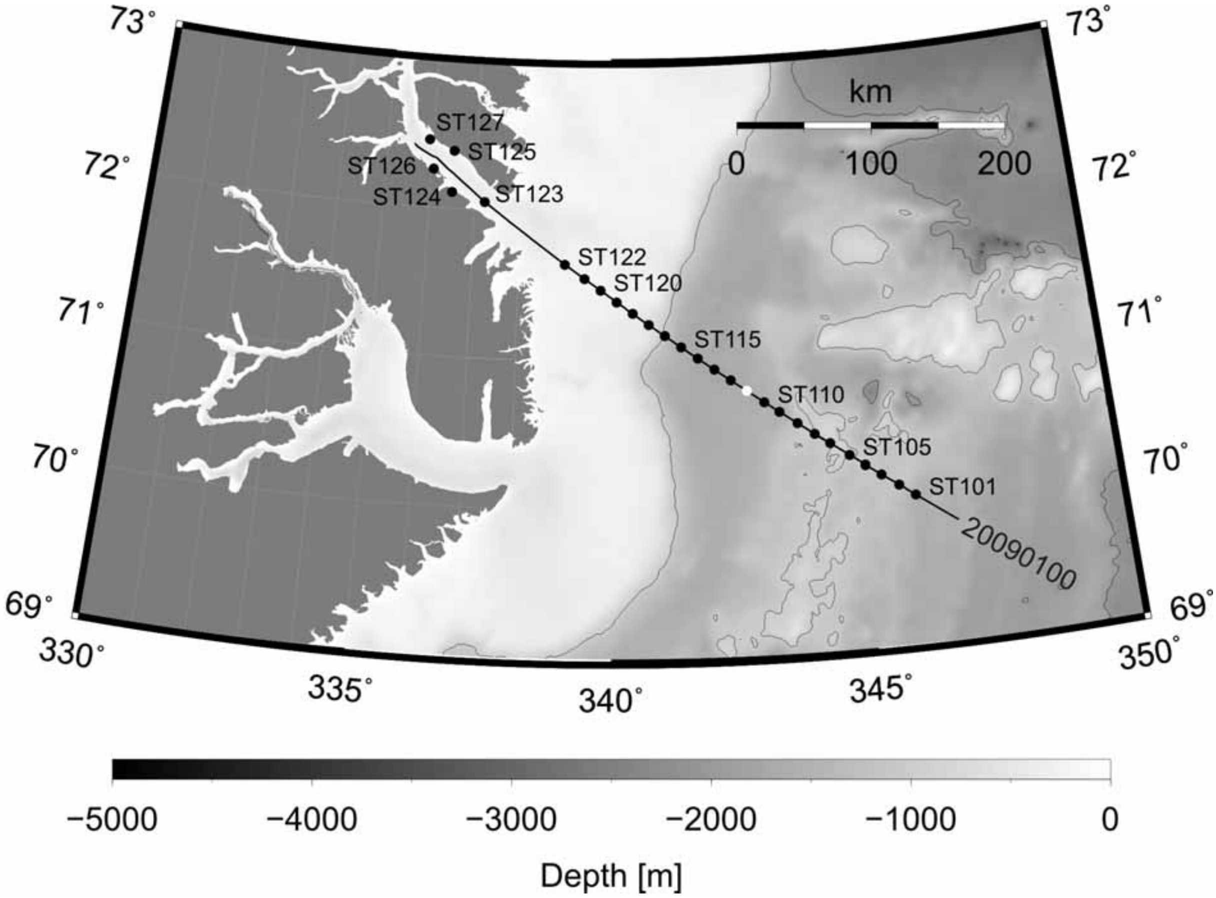

Fig. 3.1.1: Locations of the deployed Reftek/OBS stations along seismic profile 20090100. Station 111 (white) could not be recovered.

Table 3.1.2: Deployment parameters of OBS along seismic profile 20090100

station	OBS	date (UTC)	time (UTC)	latitude	longitude	water depth
PS74/208-3	st101	07.08.2009	23:03	70° 00.08' N	14° 00.63' W	1614
PS74/209-1	st102	08.08.2009	00:05	70° 04.72' N	14° 18.99' W	1366
PS74/210-1	st103	08.08.2009	02:04	70° 09.46' N	14° 38.66' W	1298
PS74/211-1	st104	08.08.2009	03:55	70° 13.88' N	14° 56.76' W	945
PS74/212-1	st105	08.08.2009	06:09	70° 18.25' N	15° 14.57' W	1057
PS74/213-1	st106	08.08.2009	08:12	70° 23.60' N	15° 36.86' W	1061
PS74/214-1	st107	08.08.2009	10:02	70° 27.82' N	15° 54.67' W	1186
PS74/215-1	st108	08.08.2009	12:00	70° 32.60' N	16° 14.45' W	1191
PS74/216-2	st109	08.08.2009	15:25	70° 37.58' N	16° 35.31' W	1553
PS74/217-1	st110	08.08.2009	16:59	70° 41.81' N	16° 53.07' W	1482
PS74/218-1	st111	08.08.2009	18:58	70° 46.79' N	17° 13.93' W	1703
PS74/219-1	st112	08.08.2009	20:45	70° 51.27' N	17° 32.97' W	1727
PS74/220-1	st113	08.08.2009	22:36	70° 55.94' N	17° 52.79' W	1735
PS74/221-1	st114	08.08.2009	23:45	71° 00.57' N	18° 12.87' W	1725
PS74/222-1	st115	09.08.2009	00:53	71° 05.32' N	18° 33.05' W	1606
PS74/223-1	st116	09.08.2009	01:59	71° 10.02' N	18° 53.01' W	1155
PS74/224-1	st117	09.08.2009	03:30	71° 14.59' N	19° 13.21' W	476
PS74/225-1	st118	09.08.2009	05:22	71° 19.17' N	19° 33.12' W	382
PS74/226-1	st119	09.08.2009	07:11	71° 23.86' N	19° 53.36' W	253
PS74/227-1	st120	09.08.2009	08:17	71° 28.67' N	20° 14.05' W	275
PS74/228-1	st121	09.08.2009	09:26	71° 33.26' N	20° 34.60' W	261
PS74/229-1	st122	09.08.2009	10:47	71° 39.00' N	21° 00.01' W	289
PS74/230-1	st123	10.08.2009	15:15	72° 03.40' N	22° 46.66' W	356

Table 3.1.3: Parameters of REFTEK stations deployed along profile 20090100

Station	Latitude	Longitude	Elevation [m]	Start of recording	End of recording
124	72°06.75' N	23°30.63' W	229	10.08.2009 19:42	15.08.2009 08:20
125	72°23.50' N	23°30.74' W	46	10.08.2009 15:20	15.08.2009 09:22
126	72°15.72' N	23°56.83' W	131	10.08.2009 12:48	15.08.2009 08:49
127	72°27.49' N	24°04.48' W	37	09.08.2009 19:36	15.08.2009 09:35

Profiles 20090200 and 20090250

We deployed 18 OBS along a profile spanning from the continental slope off East Greenland to the Knipovich mid-ocean ridge. This profile was supplemented by a seismological array (10 stations) along the Knipovich Ridge to study the seismicity of magmatic and amagmatic segments of this ultra-slow-spreading ridge. The OBS (Fig. 3.1.4) deployed in the central rift graben was later used for seismic profile 20090250 (Fig. 3.1.2) to study the crustal structure/thickness along the ridge. The recording parameters of the OBS were 100Hz, and the gain was set to 4 and 1 for the hydrophone and the seismometer components, respectively.

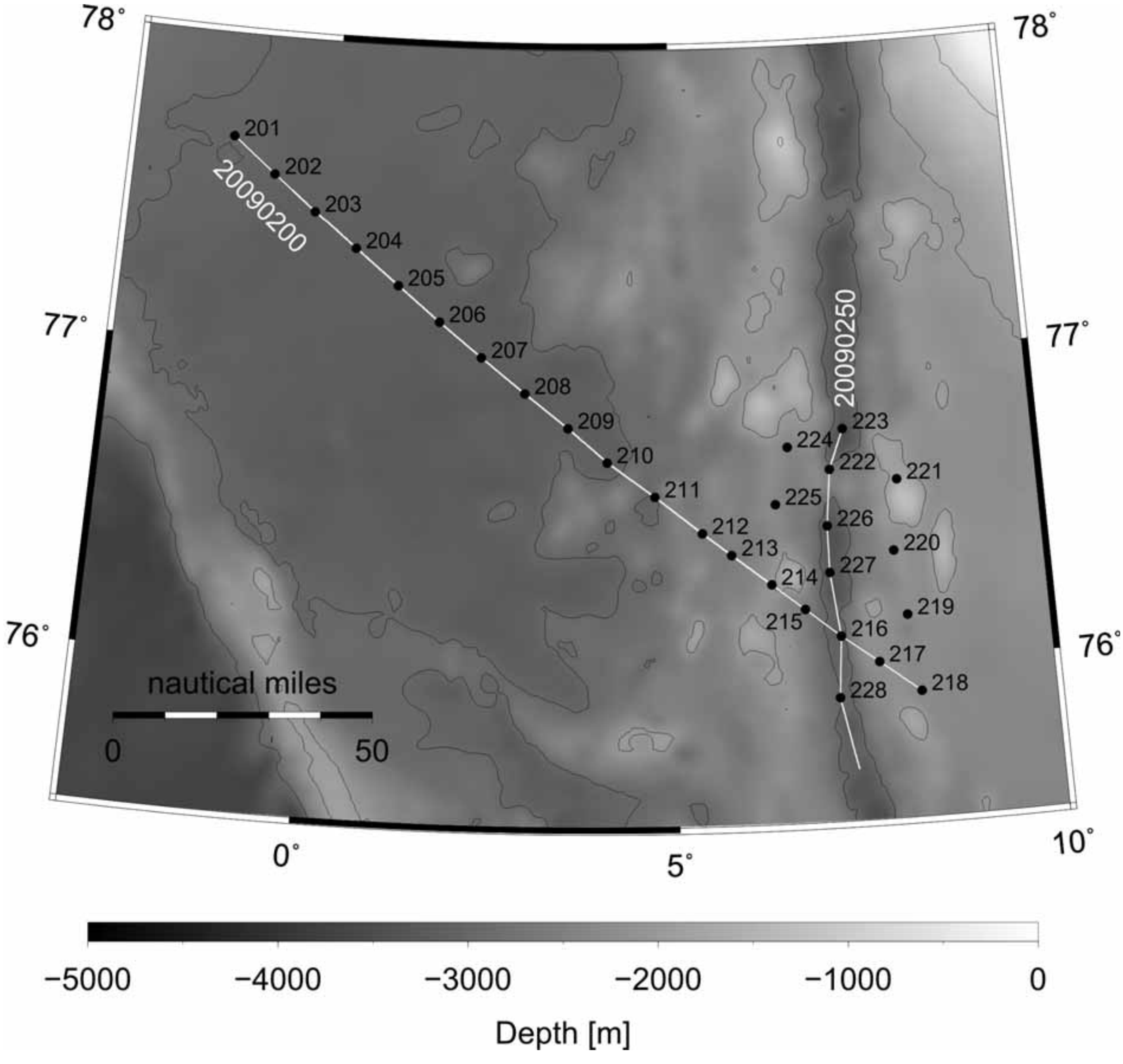

Fig. 3.1.2: Locations of the deployed OBS along seismic profiles 20090200/20090250 and at the Knipovich mid-ocean ridge.

Table 3.1.4: Deployment parameters of OBS along seismic profiles 20090200 and 20090250

station	OBS	date (UTC)	time (UTC)	latitude	longitude	water depth
PS74/274	st201	26.08.2009	04:17	77° 40.01' N	1° 32.34' W	3080
PS74/275	st202	26.08.2009	05:37	77° 33.31' N	0° 53.01' W	3138
PS74/276	st203	26.08.2009	09:12	77° 26.69' N	0° 14.68' W	3189
PS74/277	st204	26.08.2009	10:36	77° 20.19' N	0° 23.70' E	3242
PS74/278	st205	26.08.2009	14:07	77° 13.42' N	1° 02.40' E	3255
PS74/279	st206	26.08.2009	15:18	77° 06.73' N	1° 39.47' E	3250
PS74/280	st207	26.08.2009	18:45	77° 00.14' N	2° 16.68' E	3274
PS74/281	st208	26.08.2009	19:59	76° 53.38' N	2° 54.42' E	3286
PS74/282	st209	26.08.2009	23:30	76° 46.80' N	3° 31.34' E	3294
PS74/283	st210	27.08.2009	02:35	76° 40.20' N	4° 04.36' E	3140
PS74/284	st211	27.08.2009	05:59	76° 33.50' N	4° 43.84' E	3075
PS74/285	st212	27.08.2009	07:13	76° 26.31' N	5° 22.50' E	2750
PS74/286	st213	27.08.2009	10:04	76° 21.95' N	5° 46.03' E	2685
PS74/287	st214	27.08.2009	11:14	76° 16.06' N	6° 17.76' E	2239
PS74/288	st215	27.08.2009	14:00	76° 11.04' N	6° 44.04' E	2601
PS74/289	st216	27.08.2009	15:22	76° 05.56' N	7° 11.82' E	3447
PS74/290	st217	27.08.2009	18:28	76° 00.24' N	7° 41.12' E	2729
PS74/291	st218	27.08.2009	21:24	75° 54.15' N	8° 13.03' E	2333
PS74/292	st219	27.08.2009	23:02	76° 08.96' N	8° 06.02' E	2333
PS74/293	st220	28.08.2009	00:34	76° 21.49' N	7° 58.47' E	2306
PS74/294	st221	28.08.2009	02:12	76° 35.15' N	8° 04.83' E	1525
PS74/295	st222	28.08.2009	03:51	76° 37.78' N	7° 09.53' E	2943
PS74/296	st223	28.08.2009	04:58	76° 45.49' N	7° 22.24' E	3560
PS74/297	st224	28.08.2009	06:14	76° 42.44' N	6° 35.22' E	2548
PS74/298	st225	28.08.2009	07:46	76° 31.50' N	6° 23.32' E	2503
PS74/299	st226	28.08.2009	09:07	76° 26.93' N	7° 05.12' E	3562
PS74/300	st227	28.08.2009	10:15	76° 17.93' N	7° 05.34' E	3536
PS74/301	st228	28.08.2009	12:51	75° 53.73' N	7° 08.42' E	2930

Fig. 3.1.3: Photograph of the LOBSTER during deployment. Photograph by C. Brons-Illing.

Station recovery

Table 3.1.5: Recovery parameters of OBS along seismic profile 20090100

	first release		on surface		on deck		coordinates		
OBS	date (UTC)	time (UTC)	date (UTC)	time (UTC)	date (UTC)	time (UTC)	latitude	longitude	water depth
st101	13.08.2009	04:58	13.08.2009	05:23	13.08.2009	05:50	69° 59.86' N	14° 00.61' W	1591
st102	13.08.2009	08:49	13.08.2009	09:09	13.08.2009	09:23	70° 04.58' N	14° 18.92' W	1367
st103	13.08.2009	10:24	13.08.2009	10:43	13.08.2009	10:59	70° 09.30' N	14° 38.57' W	1303
st104	13.08.2009	12:01	13.08.2009	12:16	13.08.2009	12:25	70° 13.94' N	14° 56.87' W	977
st105	13.08.2009	13:24	13.08.2009	13:41	13.08.2009	13:56	70° 18.40' N	15° 14.45' W	1090
st106	13.08.2009	14:58	13.08.2009	15:16	13.08.2009	16:02	70° 23.27' N	15° 37.26' W	1069
st107	13.08.2009	16:57	13.08.2009	17:13	13.08.2009	17:28	70° 27.74' N	15° 54.42' W	1182
st108	13.08.2009	18:30	13.08.2009	18:46	13.08.2009	19:03	70° 32.56' N	16° 14.64' W	1182
st109	13.08.2009	20:01	13.08.2009	20:25	13.08.2009	20:37	70° 37.62' N	16° 35.43' W	1550
st110	13.08.2009	22:55	13.08.2009	23:18	13.08.2009	23:27	70° 41.71' N	16° 52.74' W	1476
st111	14.08.2009	00:36	lost	lost	lost	lost	lost	lost	lost
st112	14.08.2009	05:52	14.08.2009	06:17	14.08.2009	06:34	70° 51.44' N	17° 32.66' W	1728
st113	14.08.2009	09:04	14.08.2009	09:28	14.08.2009	09:41	70° 55.97' N	17° 52.71' W	1736
st114	14.08.2009	10:39	14.08.2009	11:03	14.08.2009	11:12	71° 00.58' N	18° 12.79' W	1725
st115	14.08.2009	12:13	14.08.2009	12:42	14.08.2009	13:05	71° 05.45' N	18° 32.91' W	1604
st116	14.08.2009	16:07	14.08.2009	16:27	14.08.2009	16:39	71° 09.88' N	18° 53.12' W	1156
st117	14.08.2009	17:40	14.08.2009	17:44	14.08.2009	18:24	71° 14.57' N	19° 13.26' W	477
st118	14.08.2009	19:23	14.08.2009	19:28	14.08.2009	19:45	71° 19.07' N	19° 33.29' W	387
st119	14.08.2009	20:48	14.08.2009	20:52	14.08.2009	20:58	71° 23.79' N	19° 53.50' W	253
st120	14.08.2009	22:35	14.08.2009	22:42	14.08.2009	22:54	71° 28.64' N	20° 13.48' W	275
st121	15.08.2009	00:12	15.08.2009	00:16	15.08.2009	00:29	71° 33.44' N	20° 34.04' W	261
st122	15.08.2009	01:43	15.08.2009	01:47	15.08.2009	01:59	71° 39.11' N	21° 00.06' W	285
st123	15.08.2009	06:06	15.08.2009	06:12	15.08.2009	06:20	72° 03.29' N	22° 46.31' W	347

Table 3.1.6: Recovery parameters of OBS along seismic profiles 20090200 and 20090250

OBS	first release		on surface		on deck		coordinates		water depth
	date (UTC)	time (UTC)	date (UTC)	time (UTC)	date (UTC)	time (UTC)	latitude	longitude	
st201	04.09.2009	06:14	04.09.2009	07:04	04.09.2009	07:30	77° 39.21' N	1° 31.82' W	3083
st202	04.09.2009	08:34	04.09.2009	09:22	04.09.2009	09:49	77° 32.03' N	0° 53.14' W	3157
st203	04.09.2009	18:09	04.09.2009	18:54	04.09.2009	19:14	77° 26.53' N	0° 15.00' W	3190
st204	04.09.2009	21:35	04.09.2009	22:25	04.09.2009	22:43	77° 20.16' N	0° 24.89' E	3244
st205	05.09.2009	01:00	05.09.2009	01:45	05.09.2009	02:01	77° 13.52' N	1° 02.88' E	3261
st206	05.09.2009	03:10	05.09.2009	03:58	05.09.2009	04:18	77° 06.76' N	1° 40.03' E	3251
st207	05.09.2009	05:24	05.09.2009	06:10	05.09.2009	06:28	76° 59.97' N	2° 16.50' E	3276
st208	05.09.2009	07:31	05.09.2009	08:19	05.09.2009	08:37	76° 53.52' N	2° 53.56' E	3278
st209	05.09.2009	09:45	05.09.2009	10:32	05.09.2009	10:46	76° 46.85' N	3° 31.32' E	3293
st210	05.09.2009	11:57	05.09.2009	12:38	05.09.2009	12:47	76° 40.14' N	4° 04.57' E	3139
st211	05.09.2009	13:57	05.09.2009	14:43	05.09.2009	14:54	76° 33.50' N	4° 43.75' E	3076
st212	05.09.2009	16:05	05.09.2009	16:46	05.09.2009	17:03	76° 26.05' N	5° 22.83' E	2745
st213	05.09.2009	17:51	05.09.2009	18:30	05.09.2009	18:50	76° 21.79' N	5° 46.47' E	2685
st214	08.09.2009	03:40	08.09.2009	04:12	08.09.2009	04:21	76° 16.04' N	6° 18.41' E	2220
st215	07.09.2009	23:38	08.09.2009	00:14	08.09.2009	00:30	76° 10.79' N	6° 44.09' E	2603
st216	07.09.2009	21:34	07.09.2009	22:21	07.09.2009	22:38	76° 05.52' N	7° 11.34' E	3449
st217	06.09.2009	21:50	06.09.2009	22:22	06.09.2009	22:40	76° 09.07' N	8° 06.65' E	2331
st218	06.09.2009	19:21	06.09.2009	19:54	06.09.2009	20:14	75° 54.45' N	8° 14.71' E	2343
st219	06.09.2009	21:50	06.09.2009	22:22	06.09.2009	22:40	76° 09.07' N	8° 06.65' E	2331
st220	07.09.2009	00:32	07.09.2009	01:05	07.09.2009	01:18	76° 21.57' N	7° 58.50' E	2334
st221	07.09.2009	03:00	07.09.2009	03:22	07.09.2009	03:31	76° 35.28' N	8° 05.05' E	1532
st222	07.09.2009	06:00	07.09.2009	06:39	07.09.2009	06:57	76° 37.99' N	7° 10.50' E	2961
st223	07.09.2009	08:25	07.09.2009	09:15	07.09.2009	09:26	76° 45.64' N	7° 21.86' E	3557
st224	07.09.2009	10:37	07.09.2009	11:13	07.09.2009	11:33	76° 42.75' N	6° 34.43' E	2553
st225	07.09.2009	12:55	07.09.2009	13:31	07.09.2009	13:44	76° 31.69' N	6° 22.91' E	2501
st226	07.09.2009	16:05	07.09.2009	16:56	07.09.2009	17:10	76° 26.85' N	7° 05.14' E	3571
st227	07.09.2009	18:40	07.09.2009	19:32	07.09.2009	19:57	76° 17.74' N	7° 05.24' E	3509
st228	06.09.2009	14:32	06.09.2009	15:14	06.09.2009	15:26	75° 53.77' N	7° 08.56' E	2930

Fig. 3.1.4: Photograph of the LOBSTER during recovery (at sea). Photograph by W. Geissler.

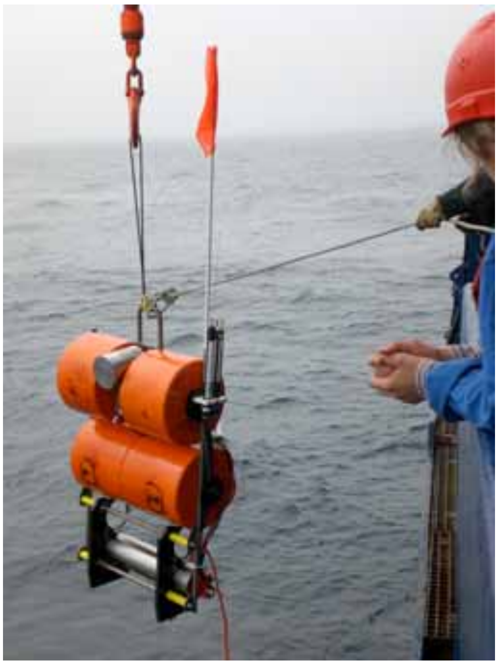

Fig. 3.1.5: Photograph of the LOBSTER during recovery (on deck). Photograph by J. Gossler.

Approaching the deployment positions we normally stopped 0.36 nm before the location to release the OBS. We first send the “enable” code twice followed by three release codes. Then, we waited 15 to 10 minutes before the estimated time of arrival at the sea surface (rise velocity ~1.2 m/s) to measure the distance to the rising OBS with range pings. However, most of the instruments could only be located during it ascend at shallow water depths (shallower than 1000 m).

Already during the release test some units did not work properly. This seemed to be the case for the deployed units as well. During inspection of the recorded data we found in many cases that the final release only took place after the second (or even after the third) release command was sent, however, with the exception of one missed OBS all other 50 deployed OBS were successfully recovered.

In most cases the OBS were quickly located at the surface at the estimated time by the radio receiver of *Polarstern*. Sometimes, if the position of an OBS at the surface was not perfectly upright it was difficult to detect it in the water. Then, a rubber boat was used to recover the OBS. For this kind of operation about 15 to 30 minutes were needed. Back on deck we then stopped the recording manually and synchronized the internal clock with GPS time signal using SENDCOM-3 interface.

During the recovery of profile 20090100 we failed to recover ST111 probably due to foggy conditions. We did not receive any radio signal and no flashlight was seen. After four hours and a second release from the small boat we stopped the attempt to locate the instrument. We revisited the position on Sep 18th, 2009, 16:00 UTC to wait for the auto-release. After 1.5 hours and additional manual release attempts the OBS did not show up and is considered to be lost.

Data quality check

Timing/Recorders

Before deployment and after recovery the internal clock of the OBS were synchronized with GPS time signal to measure the time drift of the internal clock. During the first deployment along profile 20090100 the GPS antenna was placed on the working deck (deployment) and on the first gallery starboard (beneath the safety boats). For some instruments we got unexpectedly large skew values (internal clock drift, see table 3.1.7). Data analysis of teleseismic events showed that the synchronization error was caused by the first synchronization, when the antenna was placed on the working deck. For these stations the second synchronization became valid and the time had to be corrected. For all other stations the synchronization was correct, and we got small skew values as usual. During the second deployment (Table 3.1.8) the antenna was placed on the helicopter deck and no problems with time synchronisation did not occur.

Some recorders showed high-frequency noise or problems with the internal clocks. They were not used during the second deployment.

Seismometer/Levelling

During previous experiments we had problems with levelling of some OBS components (mainly the X horizontal component). Prior to this expedition all deployed seismometers were sent to the manufacturer Guralp Ltd. The repair was mostly successful; problems remained only in two cases where the X-components did not level properly.

Hydrophones

Especially during the first deployment (20090100) we faced major problems with the hydrophone channels. In many cases signals looking like discharging of capacitors disturbed the seismic signals. Sometimes there were no visible signals at all. According to the manufacturer the problem was related to capacities, which could build up during transport of the hydrophones and might be avoided by short-cut connectors (dummies). In addition, we reduced the gain for the hydrophone and the seismometers, which might as well be a reason for the better performance of the instruments during the second deployment.

Data handling

After the recording was stopped the data were retrieved via FireWire (*mcscopy*). Afterwards the raw data were decompressed into s2x format using *mcsread* and then converted to mseed and Passcal format.

Table 3.1.7: Recording parameters of OBS along seismic profile 20090100

OBS	Recorder SN	Start Recording (UTC)	Stop Recording (UTC)	data recorded (kb)	Synchronized (UTC)	synchtime (secs)	skew time (UTC)	skew time (sec)	skew [µs]
st101	050904	07.08.2009 22:22:30	13.08.2009 06:15:22	313514	07.08.2009 22:19:56	297901196	13.08.2009 06:15:35	298361735	-4032
st102	050903	07.08.2009 21:55:48	13.08.2009 09:38:39	313154	07.08.2009 21:53:16	297899596	13.08.2009 09:39:01	298373941	-1125
st103	050926	08.08.2009 00:20:46	13.08.2009 11:13:23	302229	08.08.2009 00:19:03	297908343	13.08.2009 11:13:38	298379618	65750
st104	060741	07.08.2009 23:25:45	13.08.2009 12:47:42	335735	07.08.2009 23:23:18	297904998	13.08.2009 12:48:09	298385289	13875
st105	050924	08.08.2009 05:17:44	13.08.2009 14:43:58	348787	08.08.2009 05:16:18	297926178	13.08.2009 14:44:07	298392247	4625
st106	060729	08.08.2009 06:48:04	13.08.2009 16:10:06	295042	08.08.2009 06:46:38	297931598	13.08.2009 16:10:15	298397415	-6375
st107	060740	08.08.2009 09:05:36	13.08.2009 17:35:42	314830	08.08.2009 09:04:19	297939859	13.08.2009 17:36:00	298402560	6593
st108	060738	08.08.2009 11:19:46	13.08.2009 19:27:15	288902	08.08.2009 11:18:52	297947932	13.08.2009 19:27:28	298409248	-17157
st109	060748	08.08.2009 13:54:52	13.08.2009 20:51:30	301540	08.08.2009 13:54:11	297957251	13.08.2009 20:51:45	298414305	-875
st110	060730	08.08.2009 14:29:10	13.08.2009 23:43:25	347584	08.08.2009 14:15:30	297958530	13.08.2009 23:44:19	298424659	-875
st111	-	-	-	-	-	-	-	-	-
st112	060728	08.08.2009 19:19:59	14.08.2009 06:46:35	342441	08.08.2009 19:16:08	297976568	14.08.2009 06:46:57	298450017	-3782
st113	060734	08.08.2009 20:54:12	14.08.2009 10:11:24	356680	08.08.2009 20:09:23	297979763	14.08.2009 10:11:40	298462300	10875
st114	060753	08.08.2009 21:51:29	14.08.2009 11:24:49	335824	08.08.2009 21:41:57	297985317	14.08.2009 11:28:16	298466896	-4107313*
st115	060735	08.08.2009 22:40:31	14.08.2009 13:40:52	356503	08.08.2009 22:08:18	297986898	14.08.2009 13:42:07	298474927	-9448157*
st116	050919	08.08.2009 23:50:16	14.08.2009 16:52:10	376566	08.08.2009 23:43:03	297992583	14.08.2009 18:39:57	298492797	-7320938*
st117	050921	09.08.2009 02:34:49	14.08.2009 19:08:17	362682	09.08.2009 02:33:46	298002826	14.08.2009 19:08:31	298494511	-4125
st118	050915	09.08.2009 03:08:32	14.08.2009 20:28:53	351315	09.08.2009 03:07:42	298004862	14.08.2009 20:29:11	298499351	-11688
st119	050923	09.08.2009 06:36:28	15.08.2009 02:24:35	335911	09.08.2009 06:33:51	298017231	15.08.2009 02:25:00	298502935	584876847?
st120	050913	09.08.2009 07:27:37	14.08.2009 23:20:14	361572	09.08.2009 07:26:38	298020398	14.08.2009 23:20:37	298509637	1468
st121	050906	09.08.2009 08:33:21	15.08.2009 00:38:57	357312	09.08.2009 08:27:53	298024073	15.08.2009 00:47:33	298514861	-7848157*
st122	050930	09.08.2009 09:33:38	15.08.2009 02:12:32	401817	09.08.2009 09:29:39	298027779	15.08.2009 02:13:05	298519985	11906
st123	060710	10.08.2009 14:07:15	15.08.2009 07:15:43	251847	10.08.2009 14:00:29	298130429	15.08.2009 07:16:21	298538195	-13557719*

* Problems during first synchronization, skew time valid for processing

Table 3.1.8: Recording parameters of OBS along seismic profiles 20090200 and 20090250

OBS	Recorder SN	Start Recording (UTC)	Stop Recording (UTC)	data recorded (kb)	Synchronized (UTC)	synchtime (secs)	skew time (UTC)	skew time (sec)	skew [µs]
st201	050915	25.08.2009 22:03:02	04.09.2009 09:00:44	569663	25.08.2009 22:01:54	299455314	04.09.2009 09:00:53	300272453	-5657
st202	050914	25.08.2009 22:47:44	04.09.2009 11:01:36	632337	25.08.2009 22:45:49	299457949	04.09.2009 11:02:01	300279721	32718
st203	050909	25.08.2009 23:18:32	04.09.2009 19:51:12	611094	25.08.2009 23:16:02	299459762	04.09.2009 19:51:40	300311500	34218
st204	050906	26.08.2009 02:29:32	04.09.2009 23:13:33	639670	26.08.2009 02:28:51	299471331	04.09.2009 23:14:09	300323649	27562
st205	060710	26.08.2009 05:01:09	05.09.2009 02:21:32	592785	26.08.2009 05:00:05	299480405	05.09.2009 02:21:56	300334916	38718
st206	050930	26.08.2009 13:13:53	05.09.2009 04:38:31	691862	26.08.2009 13:12:45	299509965	05.09.2009 04:39:10	300343150	35781
st207	060739	26.08.2009 14:49:17	05.09.2009 06:46:18	505214	26.08.2009 14:47:23	299515643	05.09.2009 06:47:36	300350856	-11188
st208	050917	26.08.2009 16:38:10	05.09.2009 09:06:07	491741	26.08.2009 16:37:01	299522221	05.09.2009 09:06:50	300359210	16343
st209	050919	26.08.2009 17:50:30	05.09.2009 11:12:56	553956	26.08.2009 17:48:57	299526537	05.09.2009 11:13:20	300366800	40218
st210	050921	26.08.2009 21:00:10	05.09.2009 13:03:26	529161	26.08.2009 20:56:36	299537796	05.09.2009 13:04:00	300373440	2593
st211	050913	26.08.2009 21:49:27	05.09.2009 15:29:11	572629	26.08.2009 21:48:05	299540885	05.09.2009 15:30:06	300382206	21250
st212	060748	26.08.2009 22:44:08	05.09.2009 19:02:22	558175	26.08.2009 22:41:53	299544113	05.09.2009 19:04:51	300395091	1031
st213	060709	27.08.2009 02:08:38	05.09.2009 20:00:55	540021	27.08.2009 02:07:41	299556461	05.09.2009 20:02:00	300398520	26093
st214	060729	27.08.2009 07:58:09	08.09.2009 04:55:13	692513	27.08.2009 07:56:37	299577397	08.09.2009 04:56:53	300603413	-6782
st215	050903	27.08.2009 10:43:48	08.09.2009 00:41:07	650328	27.08.2009 10:42:59	299587379	08.09.2009 00:42:13	300588133	8000
st216	050904	27.08.2009 11:49:51	07.09.2009 23:00:58	585571	27.08.2009 11:48:05	299591285	07.09.2009 23:01:25	300582085	-5625
st217	050926	27.08.2009 13:35:36	06.09.2009 18:45:21	595736	27.08.2009 13:32:41	299597561	06.09.2009 18:45:59	300480359	130000
st218	050916	27.08.2009 15:31:28	06.09.2009 20:40:14	635286	27.08.2009 15:29:52	299604592	06.09.2009 20:41:33	300487293	12687
st219	060741	27.08.2009 17:02:44	06.09.2009 23:03:47	450790	27.08.2009 17:01:48	299610108	06.09.2009 23:04:41	300495881	27343
st220	060753	27.08.2009 18:48:38	07.09.2009 02:17:43	580034	27.08.2009 18:46:39	299616399	07.09.2009 02:18:22	300507502	26187
st221	050901	27.08.2009 19:25:30	07.09.2009 03:53:27	542237	27.08.2009 19:23:56	299618636	07.09.2009 03:54:02	300513242	-23782
st222	050924	27.08.2009 20:25:01	07.09.2009 08:06:51	546572	27.08.2009 20:23:49	299622229	07.09.2009 08:07:14	300528434	13343
st223	060734	27.08.2009 23:21:14	07.09.2009 11:51:37	572244	27.08.2009 23:19:55	299632795	07.09.2009 11:51:52	300541912	22437
st224	060735	27.08.2009 23:37:35	07.09.2009 12:18:05	559980	27.08.2009 23:36:27	299633787	07.09.2009 12:18:59	300543539	-4875
st225	060740	28.08.2009 00:42:45	07.09.2009 14:26:01	599258	28.08.2009 00:41:35	299637695	07.09.2009 14:26:50	300551210	16156
st226	060728	28.08.2009 01:12:28	07.09.2009 18:32:24	575909	28.08.2009 01:10:38	299639438	07.09.2009 18:32:57	300565977	-2719
st227	060730	28.08.2009 09:51:10	07.09.2009 20:28:34	441263	28.08.2009 09:50:34	299670634	07.09.2009 20:28:59	300572939	1625
st228	060738	28.08.2009 11:03:06	06.09.2009 16:43:10	464894	28.08.2009 10:49:29	299674169	06.09.2009 16:44:08	300473048	-27875

Data examples

In general, at least one of the sensors of each OBS worked properly, we could record all wanted signals (airgun shots), teleseismic and local earthquakes, low-frequency calls of marine mammals as well as many unidentified seismic events. The latter ones are usually observed only at single stations, so it is difficult to locate the source.

Examples of the different data types are shown in figures 3.1.6 – 3.1.16

Teleseismic earthquakes

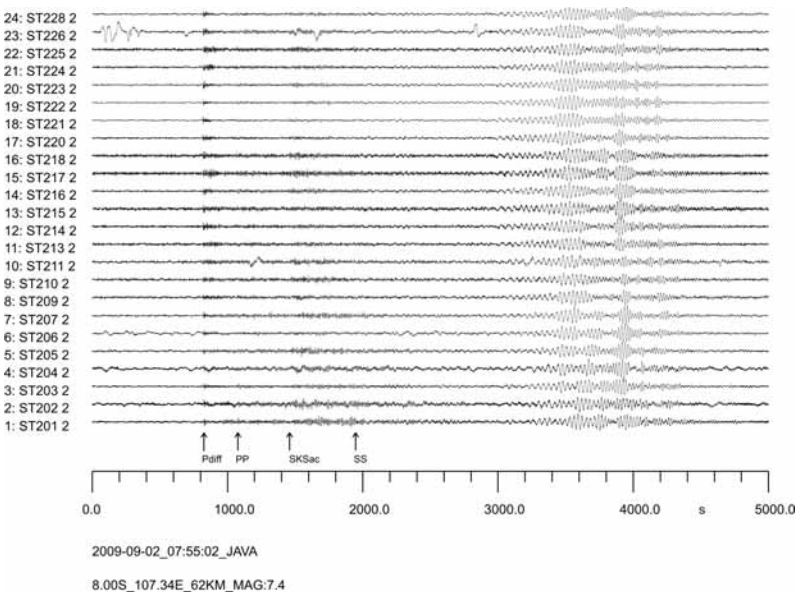

Fig. 3.1.6: Seismogram (vertical seismometer components) of the largest teleseismic earthquake that occurred during the 2nd OBS deployment. Stations are sorted by station name.

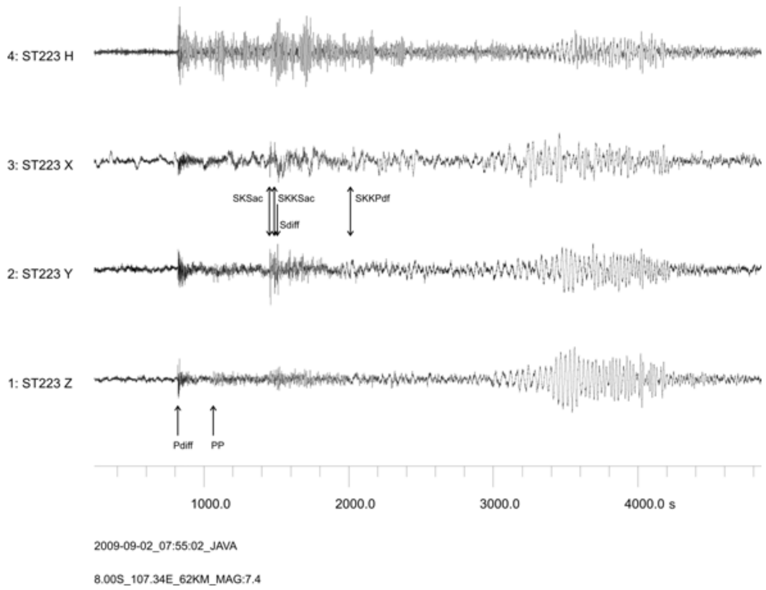

Fig. 3.1.7: 4-component data of the largest teleseismic earthquake that was recorded during the 2nd OBS deployment at OBS ST223.

Regional and local earthquakes

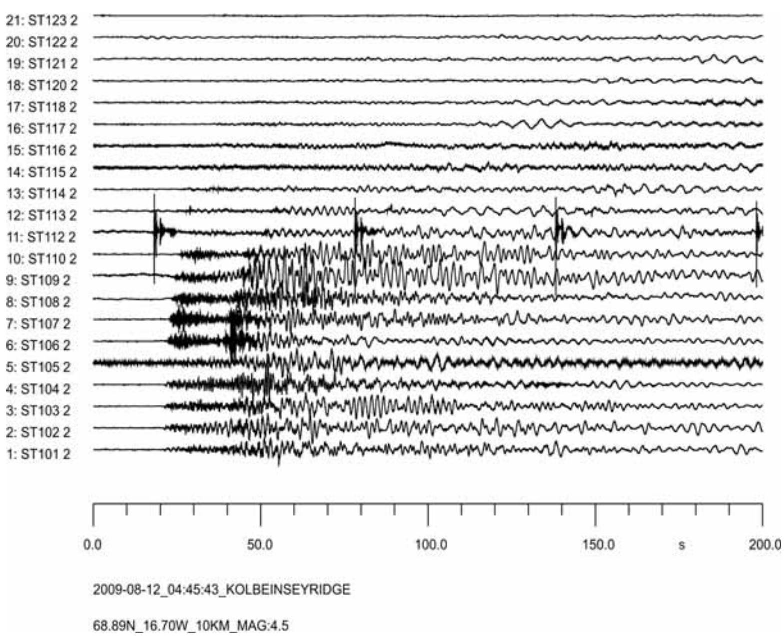

Fig. 3.1.8: Seismogram (vertical seismometer components) of the largest regional earthquake recorcdc during the 1st OBS deployment. Stations are sorted by station name.

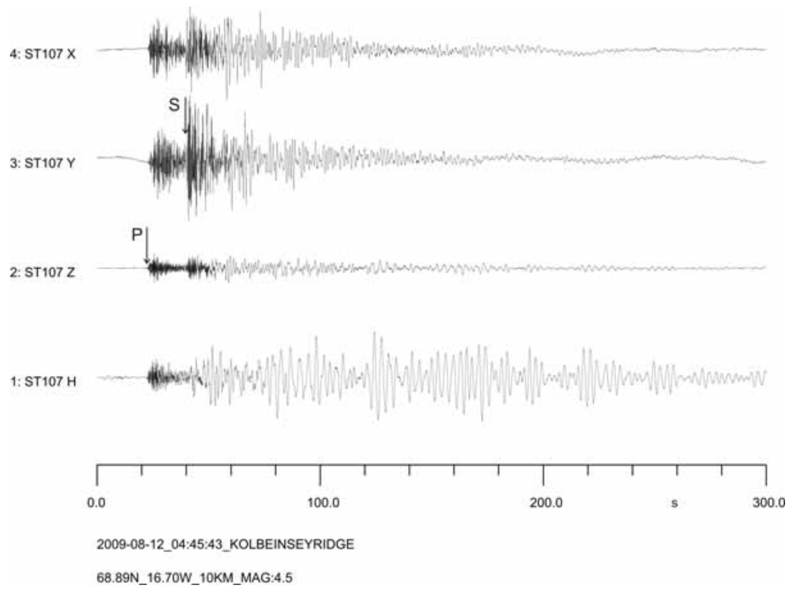

Fig. 3.1.9: 4-component recording of the largest regional earthquake detected during the 1st OBS deployment at OBS ST107.

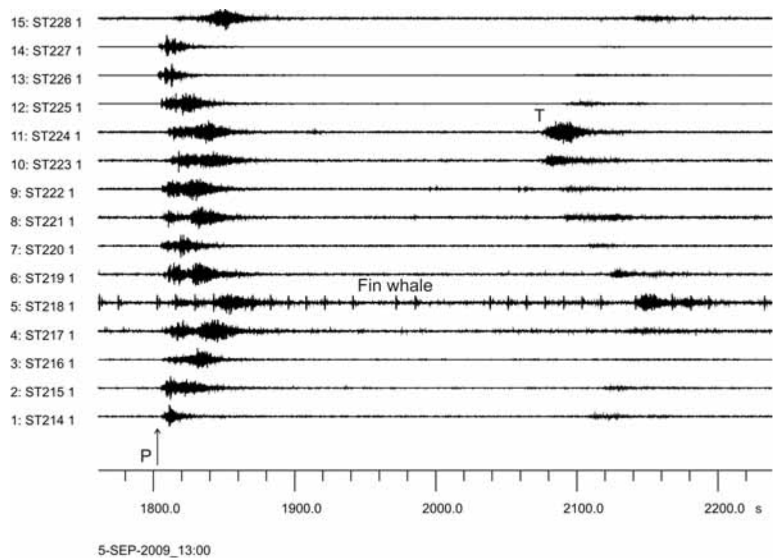

Fig. 3.1.10: Hydrophone recordings of a local earthquake, which occurred on Sep 5th, 2009, 13:30 UTC at the Knipovich Ridge (T-T-phase; P-P-wave).

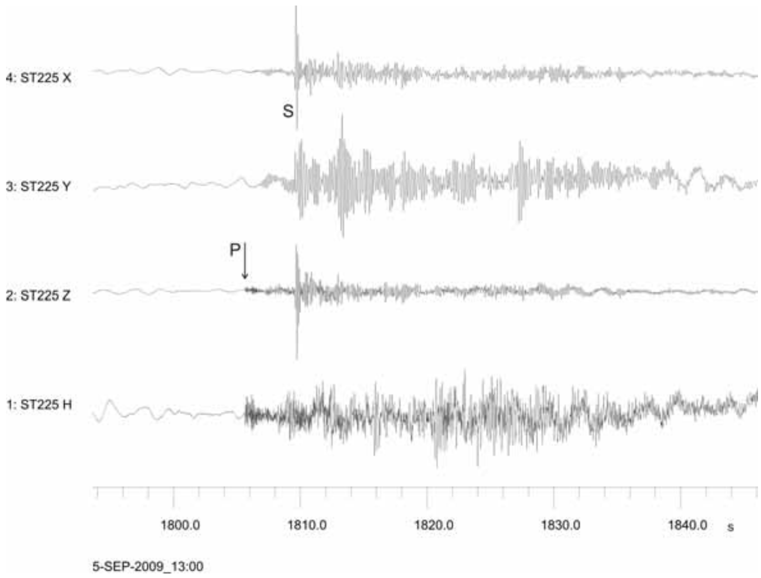

Fig. 3.1.11: Recordings (ST225) of a local earthquake, which occurred on Sep 5th, 2009, 13:30 UTC at the Knipovich ridge (P+S).

Whale communication signals

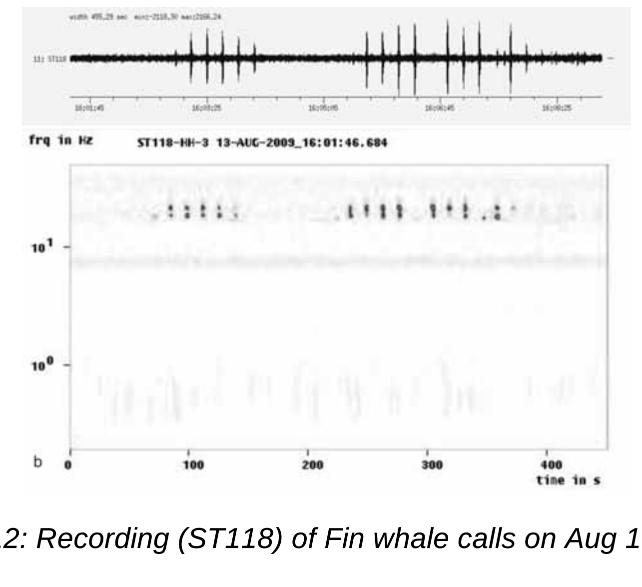

Fig. 3.1.12: Recording (ST118) of Fin whale calls on Aug 13th, 2009.

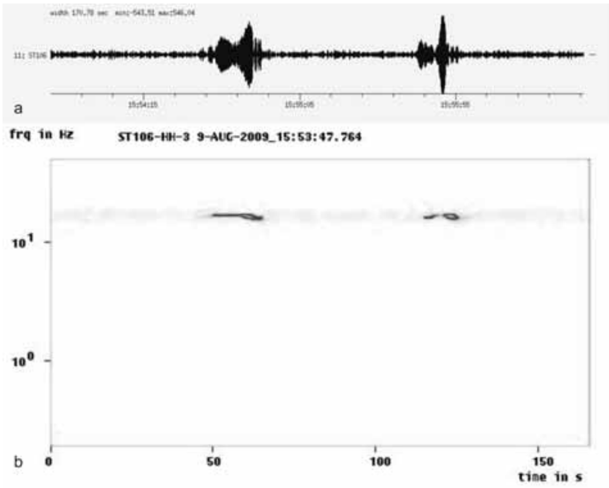

Fig. 3.1.13: Recording (ST106) of potential Blue whale calls on Aug 09th, 2009.

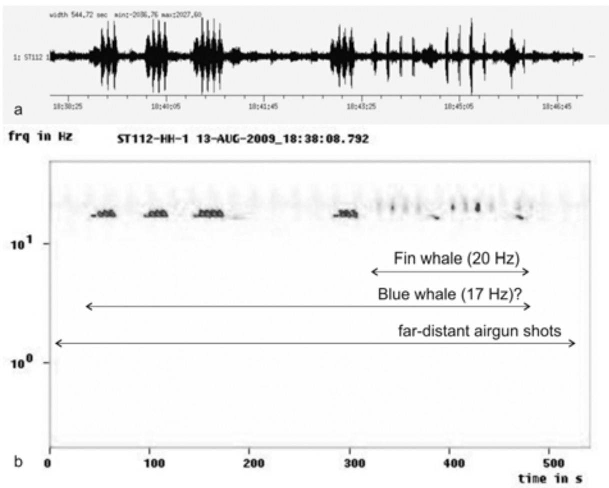

Fig. 3.1.14: Recording (ST112) of potential Blue whale and Fin whale calls on Aug 13th, 2009.

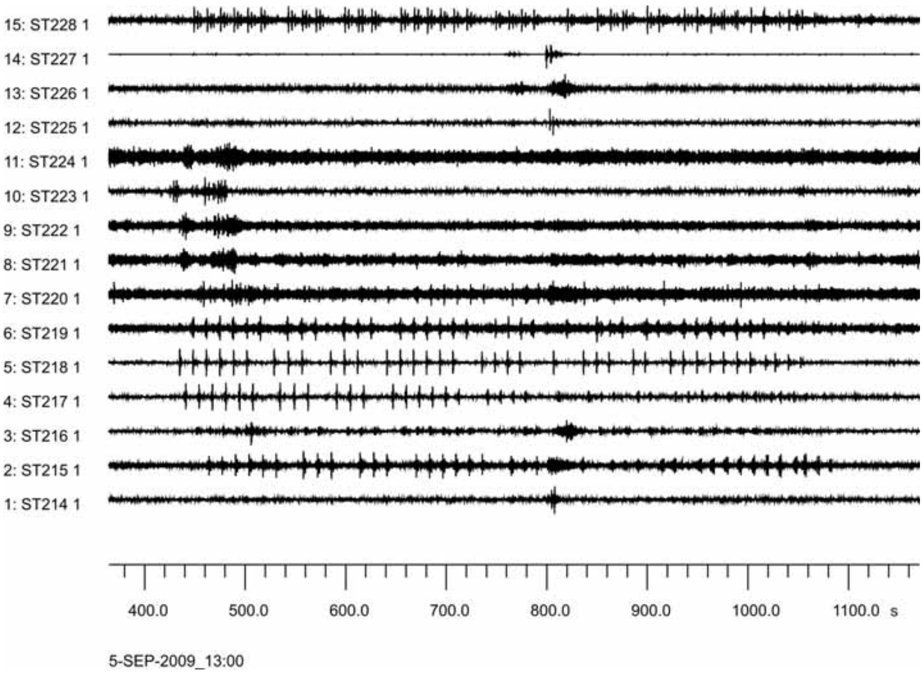

Fig. 3.1.15: Hydrophone recordings of Fin whale calls on Sep 05th, 2009. The detection of the calls on several OBS will allow the location and tracking of the whale.

Unidentified seismic events

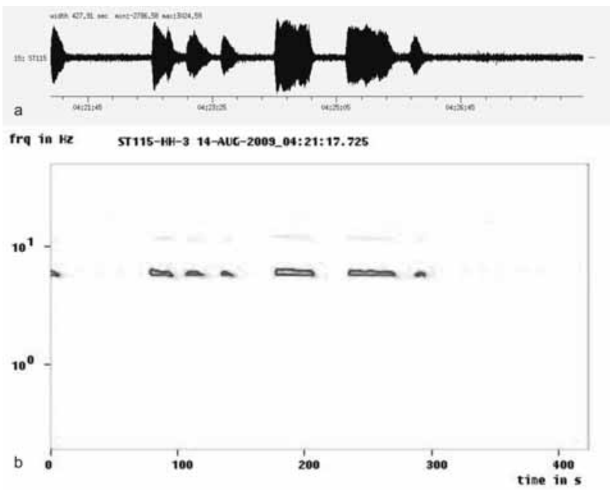

Fig. 3.1.16: Recordings of almost monofrequent (app. 6 Hz) signals at ST115, Y component. Normally the signals are only observed on seismometer components, not on the hydrophone. Similar signals were previously recorded at OBS in the Gulf of Cadiz (NEAREST project, Geissler; pers. comm.).

3.2 Seismicity of the Lena Trough

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Schlindwein, Vera (not on board)
Alfred Wegener Institute, Bremerhaven

Objectives

The Lena Trough is the southern continuation of the ultra-slow spreading Gakkel Ridge, and with its position in the Fram Strait it is the only deep-sea gateway to the Arctic Ocean (Fig. 3.2.1). Dredges and multibeam data from *Polarstern* cruise ARK-XX/2 allowed a new insight on the evolution this poorly known ridge. Two additional cruises to the Gakkel Ridge in 2001 and 2007 (AMORE 2001 and AGAVE 2007) have shown that the mid-ocean ridge consists of different segments with active volcanism and segments without any signs of melting. The Lena Trough as a bathymetric low represents a spreading rift in a young evolution state, and its role in the planet wide system of mid-ocean ridges is not well understood. To the south the Lena Trough is connected with the Spitsbergen Fracture Zone and this is also indicating that Lena Trough shows the very beginning in the evolution of a spreading ridge. The characterisation of seismicity and the tectonic settings of Lena Trough is the key to understand the processes that drive the formation of young spreading ridges.

The DFG-funded Emmy Noether group MOVE (Mid-Ocean Volcanoes and Earthquakes) intends to investigate the processes of amagmatic spreading in order to compare it to magmatic spreading in segments of the Gakkel Ridge.

The only way to record seismicity of the Lena Trough is to deploy seismometers on ice floes as the seismological land stations on Svalbard and Greenland are too far away from the ridge axis to record micro-seismicity. The northern position of the Lena Trough (above 80°N) does not allow the deployment of ocean bottom seismometers as the ice cover might not allow recovering the instruments. The set up of seismological arrays on ice floes during some days provides an efficient method to obtain data containing small-scale earthquakes, which can only be recorded within a certain distance from the ridge axis.

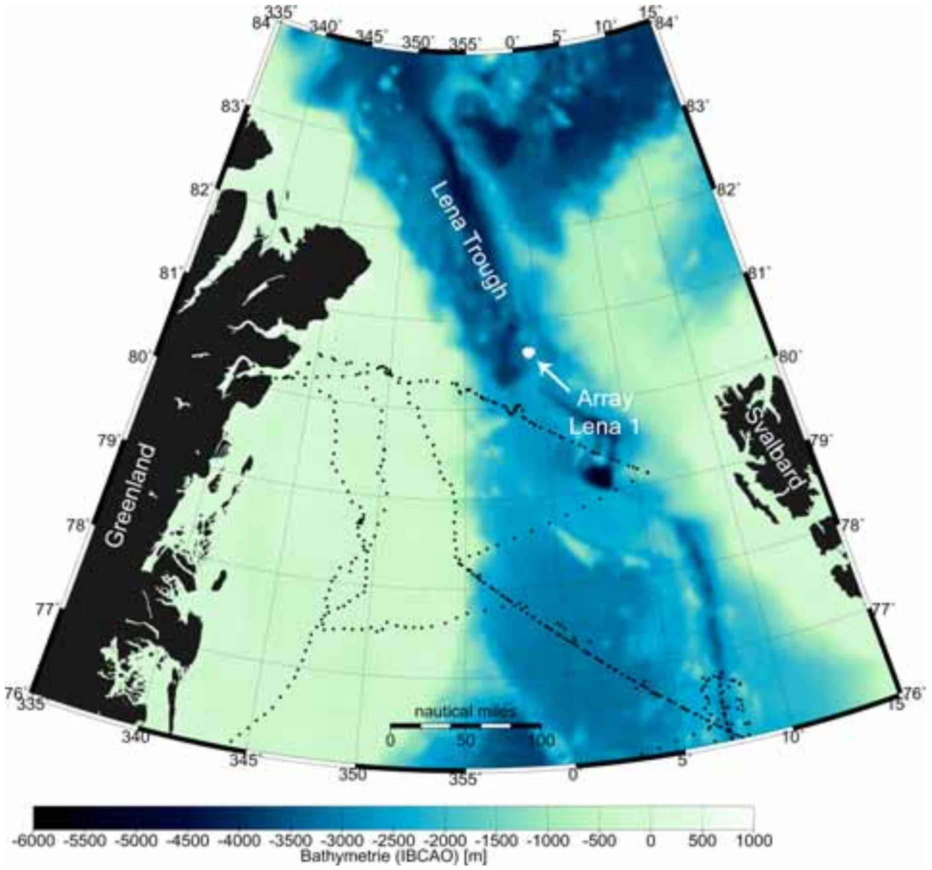

Fig. 3.2.1: Bathymetric map of the Fram Strait with the location of the array elements Lena1-1, Lena1-2 and Lena1-3. Black dots mark the cruise track of R/V Polarstern.

The first deployment of three seismological arrays above Lena Trough was carried out on *Polarstern* cruise ARK-XXIII/2 in July 2008, and provided data during 15 days containing several local earthquakes. However, there were some failures of single channel traces, mostly the horizontal channels. Discussions with other seismologists and the manufacturers of the seismometers led to the assumption that the horizontal acceleration of the ice floe due to swell and collisions between ice floes was the cause of defect.

On *Polarstern* cruise ARK-XXIV/3 further data were collected to get a better temporal resolution of the seismological activity and to improve the data quality of the stations by testing the automatic levelling function of the seismometer.

Work at Sea

Under harsh and foggy weather conditions we deployed three seismometers on one ice floe with a diameter of about 4.0 km on 21/08/2009 afternoon, and recovered the array on a windy morning on 31/08/2009 (Table 3.2.1).

Table 3.2.1: Station list of the three array elements with coordinates for deployment and recovery.

	Deployment			Recovery		
Station	Date/Time	Lat	Lon	Date/Time	Lat	Lon
Lena1-1	21.08.09, 16:30	81°01.94'N	002°31.18'W	31.08.09, 11:50	80°36.33'N	000°47.84'W
Lena1-2	21.08.09, 17:15	81°02.41'N	002°44.03'W	31.08.09, 11:20	80°36.17'N	000°58.92'W
Lena1-3	21.08.09, 18:22	81°00.88'N	002°40.30'W	31.08.09, 10:50	80°35.09'N	000°51.81'W

The array elements were deployed and recovered by helicopter operating from *Polarstern*. To deploy the three array elements the flight range of the helicopter was extended by an extra fuel tank from 60 to 100 nautical miles.

The three array elements were equipped with an Argos transmitter sending its position from the drifting ice floes to relocalize the stations after several days. The Argos system was communicating with several satellites including the weather satellites, which sent the meteorological satellite images onboard *Polarstern*. The position messages of the Argos transmitters were decoded by a script of Optimare, then bundled and sent onboard four times a day.

Each array element was equipped with a broadband seismometer (GURALP CMG-3ESPC, 60s – 50Hz), a Reftek 130 datalogger, GPS antenna, Argos transmitter and three batteries. The datalogger and the batteries were stored in a red Zarges box (80x60x40cm) to protect it from snow and moisture. The seismometer was placed on a wooden plate and properly levelled on the ice floe. To protect it from solar radiation and temerature changes a plastic bucket and a little snow hill covered it. The waterproof Argos transmitter was placed outside the Zarges box, and the antennas of the GPS and the Argos system were fixed on the side with lashing straps and tape. To increase visibility a red bamboo flag was installed nearby. On station Lena1-2 we installed a solar panel constantly charging the battery connected to the Reftek datalogger. The set-up of one array element took about 40 minutes (Fig. 3.2.2).

Fig. 3.2.2: Picture of station Lena1-2 after deployment. The seismometer is covered by a plastic bucket and snow to protect it from temperature changes. The Reftek datalogger and the batteries are stored in the red Zarges box. Argos transmitter and the antennas of GPS and Argos are visible at the right side of the Zarges box. Note the solar panel mounted on the Zarges box.

The recovery of the array was a challenging task as the red Zarges box and the bamboo flag had been almost hidden in the monotonous landscape of hundreds of ice floes. We took the latest Argos positions with us as well as the latest information about the expected drift of the stations, but still we could not spot the stations any more. After 15 minutes search we landed on one ice floe and called Bremerhaven by Iridium cell phone to get the most recent Argos position from the Argos webpage being beyond reach of *Polarstern* due to limited satellite coverage. With this information it was very easy to locate the array elements, although they drifted much faster than the hours before (7 km in 5 hours).

Preliminary results

The array drifted about 35 miles within ten days. During the first days there was a predominant but small northward drift due to southerly winds. As the wind direction changed, the drift accelerated and started in a southward direction. The plot of the stations drift is shown in figure 3.2.3.

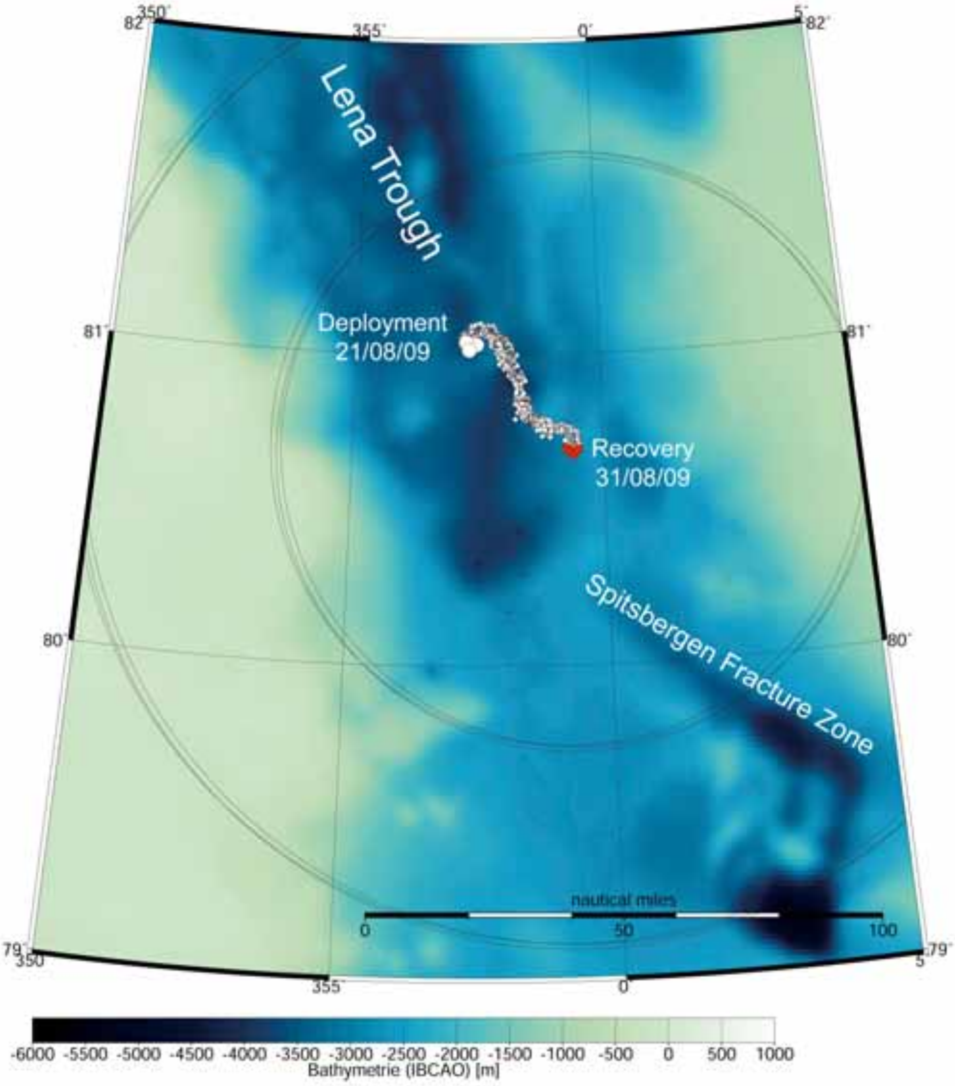

Fig. 3.2.3: Driftpath of the three stations during 10 days from 21/08/09 to 31/08/09. Big white dots mark the place of deployment, red dots the place of recovery, small white dots show all the Argos positions during the experiment. Big circles mark the radius of 60 and 100 nautical miles, which corresponds to the operation radius of Polarstern helicopter without and with extra fuel tank. IBCAO bathymetry is displayed.

The first overview of the data showed several signals caused by ice movements and earthquakes (Fig. 3.2.4). The levelling function of the GURALP seismometers was programmed to level the masses daily, if necessary. The two horizontal channels failed on most days between 05:00 and 12:00, the levelling was programmed at 17:00. Thus, one or even both of the horizontal channels did not provide any useful signal during 12 hours per day at maxmum. The vertical channels remained very stable during the entire ten days being levelled whenever necessary.

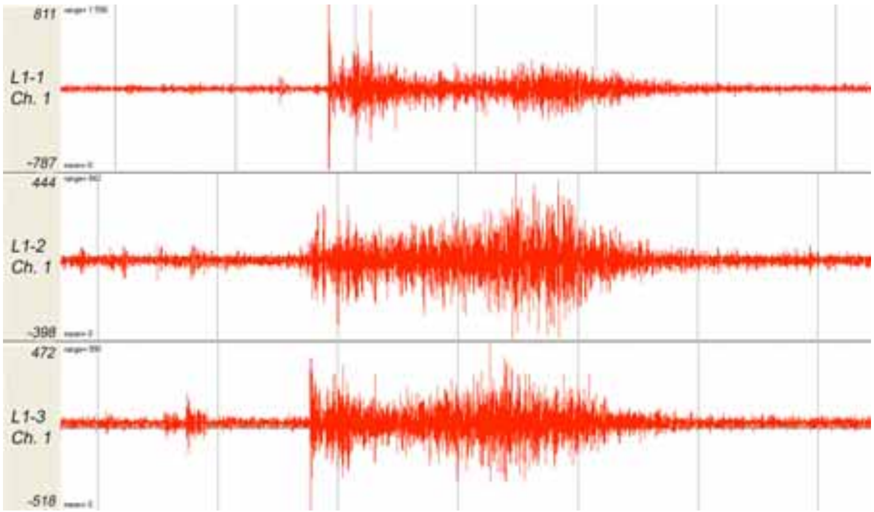

Fig. 3.2.4: Local earthquake recorded at 28/08/09, 03:32:23. From a P-S-delay time of 6 seconds, we calculated a distance of around 60 km to the earthquake epicentre. Vertical channels of Lena1-1 (L1-1), Lena1-2 (L1-2) and Lena1-3 (L1-3) are filtered from 2 to 12 Hz. Display length of window is 200 seconds.

Two of the three stations were visited by polar bears. On station Lena1-3 the red bamboo flag was torn down and the flag of station Lena1-2 was slightly damaged. The snow above the seismometer was partly removed and the plastic bucket was found two meters apart (Fig. 3.2.5).

Fig. 3.2.5: Station Lena1-2 after the visit of a polar bear. The frozen snow heap was opened and the plastic bucket lifted and set down beside the heap. The seismometer was tilted when the bucket was lifted. Picture was taken during the recovery of the station on 31/08/09.

Caused by the lift of the bucket the seismometer was tilted and the masses were locked to protect the instrument. In the seismograms the visit of the polar bear could be seen just before the seismometer failed. On the seismometer the signal of the polar bear was visible for some minutes only, probably the steps of the animal were masked by the noise of the ice floe (Fig. 3.2.6a and 3.2.6b).

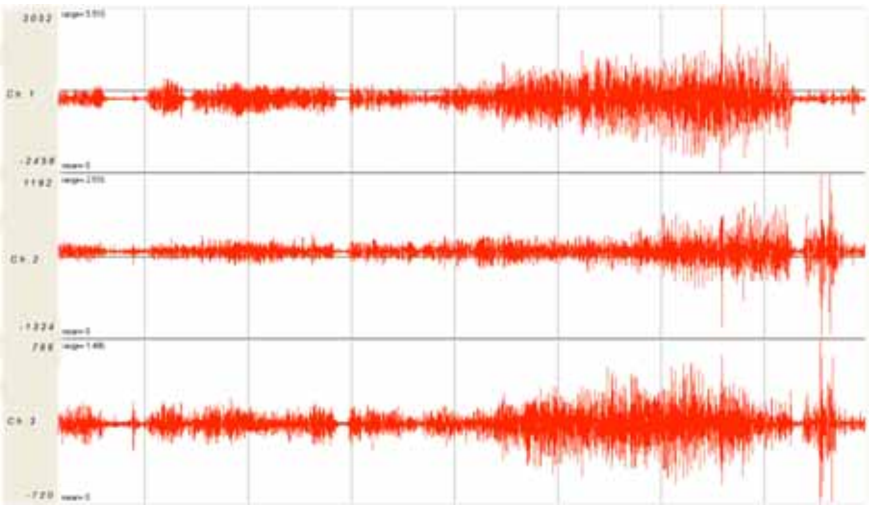

Fig. 3.2.6a: Signal of a polar bear on the seismometer of station Lena1-2 at about 06:30, 28/08/09. Vertical component (Ch. 1) and the two horizontal components (Ch.2 and 3) are filtered from 2 – 12 Hz. Display length of window is 240 seconds.

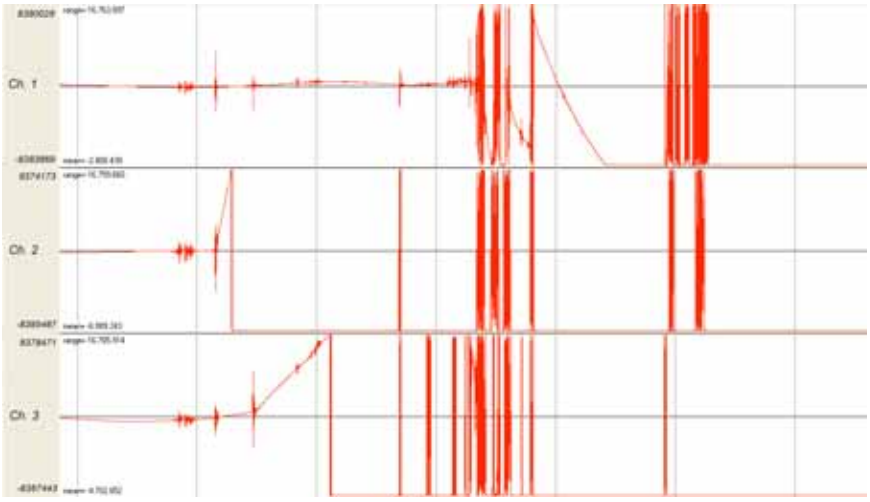

Fig. 3.2.6b: Failure of the seismometer of station Lena1-2 after it was tilted by a polar bear, 28/08/09. Vertical component (Ch. 1) and the two horizontal components (Ch.2 and 3) are unfiltered. The display lenght of window is 100 seconds.

After the cruise the data will be investigated and the recorded earthquakes will be localized and quantified in order to understand, which processes are responsible for the opening of the Lena Trough.

3.3 Heat flow measurements

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Objectives

Since 1939 heat flow of the earth has been measured at locations all over the world. In 1991 a database was created by Pollack et al. (1991) with more than 24420 heat flow values, which were recorded on land as well as in the oceans. One result of using this database is a mean heat flow value of about 90 mW/m² for the oceanic crust and about 60 mW/m² for the continental crust.

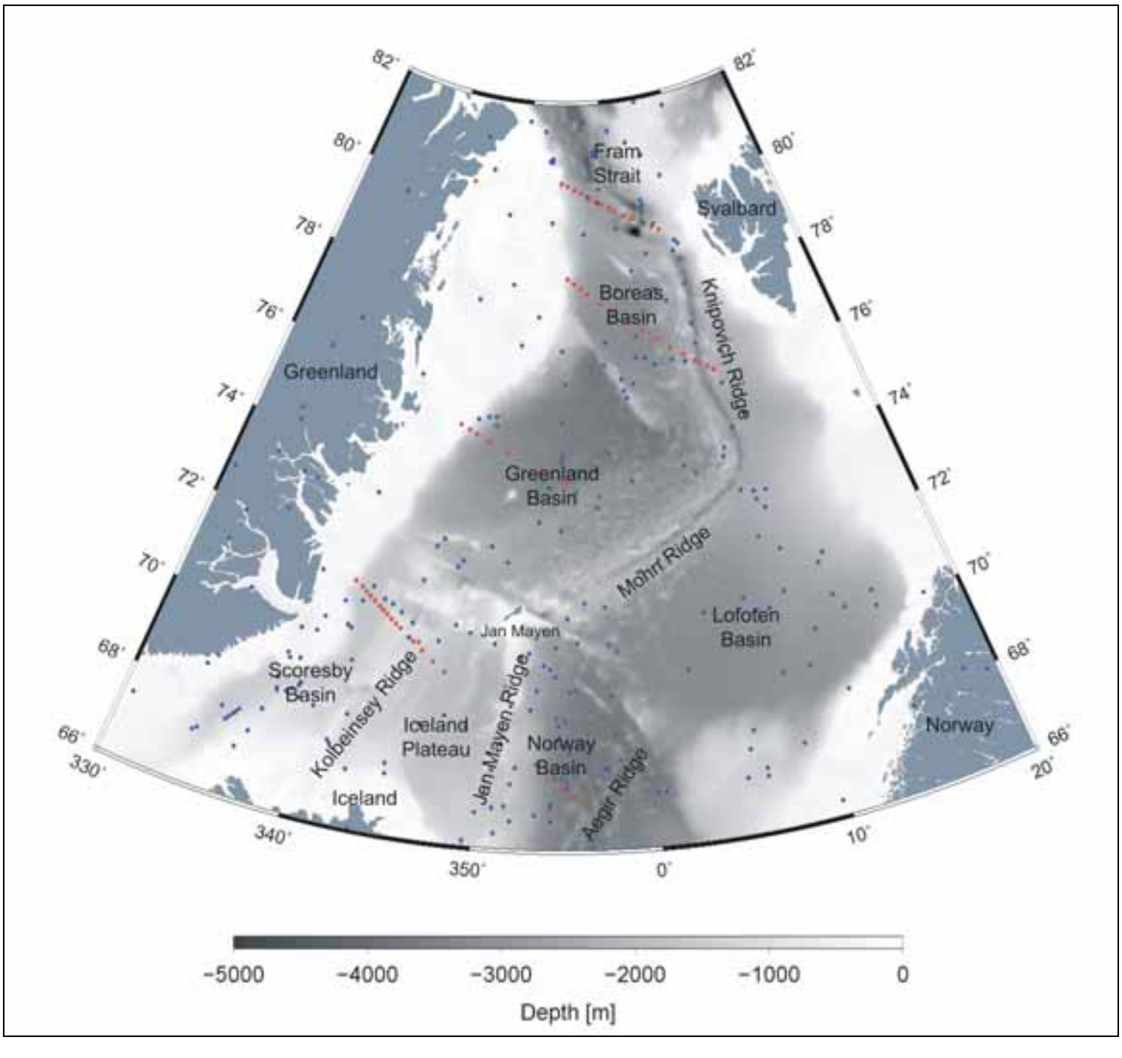

Fig. 3.3.1: Region of heat flow measurements. The red dots are measurements of the expedition ARK XXIV-3 and the blue dots are existing measurements since 1939 (Pollack et al., 1991)

In the North Atlantic and the adjacent continental regions more than 8250 heat flow values has been recorded until today. Figure 3.3.1 shows the northern North Atlantic with the heat flow stations of the mentioned database (blue dots) and the 58 new heat flow stations along 5 profiles that have been gathered during this expedition (red dots). The heat flow profiles are located on seismic reflection profiles of *Polarstern* expeditions in 2002 and 2003 and along one seismic refraction profile of this expedition.

The area of the northern North Atlantic is dominated by mid-ocean ridges and basins (Fig. 3.3.1). These ultra-slow ridges have spreading rates of 7 mm/a for the Fram Strait (Ehlers and Jokat, 2009), 13 mm/a for the Knipovich Ridge (Ehlers and Jokat, 2009), 16 mm/a for the Mohn Ridge (Klingelhöfer et al., 2000) and 5-10 mm/a for the Kolbeinsey Ridge (Vogt, 1986). Based on seismic refraction measurements the mean oceanic crust thickness in the northern North Atlantic was modelled up to 4 km (Klingelhöfer el al., 2000), which is not much compared to the usual averaged oceanic crust thickness of 7 km. Furthermore, the oceanic basins have different tectonic ages: The Greenland Basin and the Norwegian Basin are the oldest ones with 55 Ma followed by the Boreas Basin and the Scoresby Basin (Fig. 3.3.1), which opened 35 Ma ago and the Fram Strait with an age of 20 Ma (Ehlers and Jokat, 2009).

Work at sea

To determine the heat flow values from our measurements the temperature gradient in the sediments was measured. The heat flow (HF) was calculated by the following equation:

$$HF = \lambda * (dT/dz).$$

λ was the conductivity of the sediment and assumed as 1 W/(K*m). The temperature gradient (dT/dz) was measured along the entire probe (Fig. 3.3.2) with a length of 6 m.

The probe (Fig. 3.3.2) has a length of 8 m and a weight of 1.2 t. The string (thin pipe mounted to the probe) contained 21 temperature sensors over a length of 6 m (distance between two sensors close to each other is 0.26 m). The recording device was mounted on the top of the probe. During the whole measurement the temperature variations of the sensors were visualised in realtime and recorded onboard *Polarstern*.

Before the measurement started, the probe was heaved over board, put into vertical position (Fig. 3.3.3) and lowered with a speed of 1.2 m/s down to 100 m over ground (Fig. 3.3.4). The horizontal tilt meter (two perpendicular directions) in the recording device allowed verifying when the probe stopped swinging. Then the probe was lowered into the ground with 0.8 m/s. The friction heat resulting from penetration (Fig. 3.3.4) caused a temperature rise. Therefore, the measurement in the sediment took between 7 and 10 minutes until the temperatures of the 21 sensors were stable. After that the probe was pulled out of the sea floor with 0.2 m/s, and the procedure was repeated for a second measurement. Finally, the instrument was heaved with 1.2 m/s trough the water column back to the surface.

Based on the temperature gradients of the stabilised values the heat flow was calculated by linear regression (Fig. 3.3.5). The slope of the regression line is the heat flow value in [W/m²].

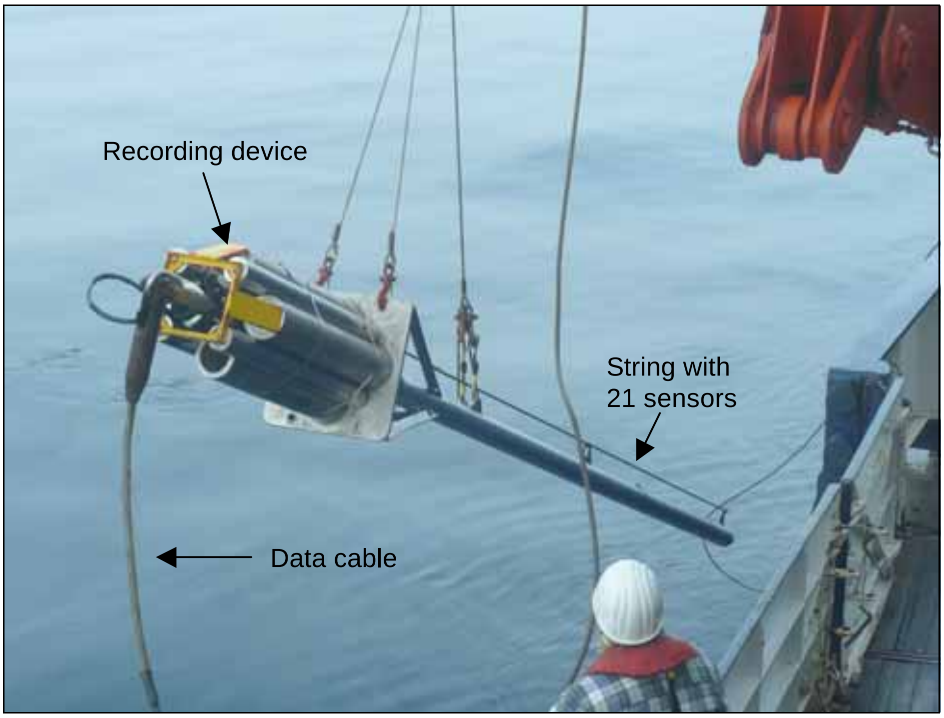

Fig. 3.3.2: Heat flow probe over board.

Fig. 3.3.3: Heat flow measurement in the ice.

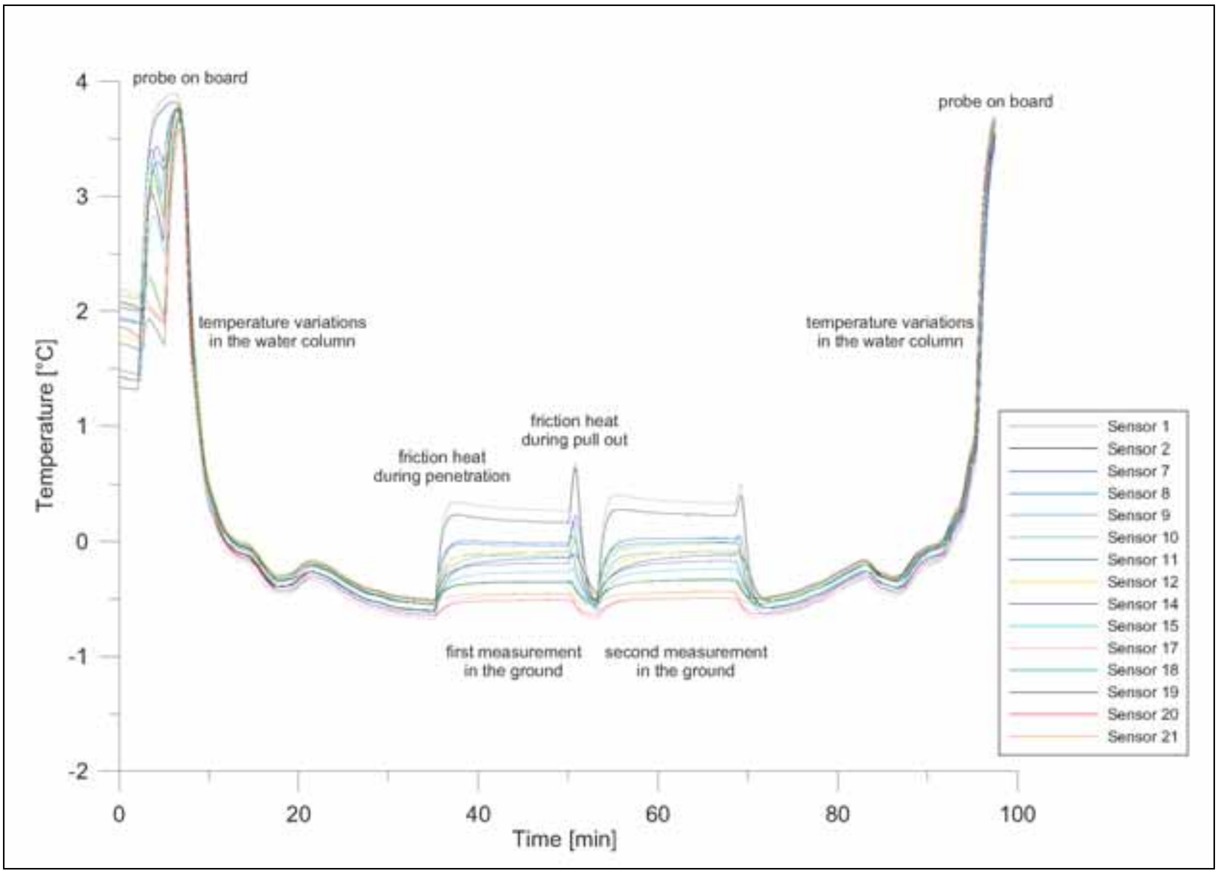

Fig. 3.3.4: Heat flow measurement number 48 with the temperature graphs of 21 sensors from the deployment to the seafloor, two measurements of 7 minutes in the ground and back through the water column on board.

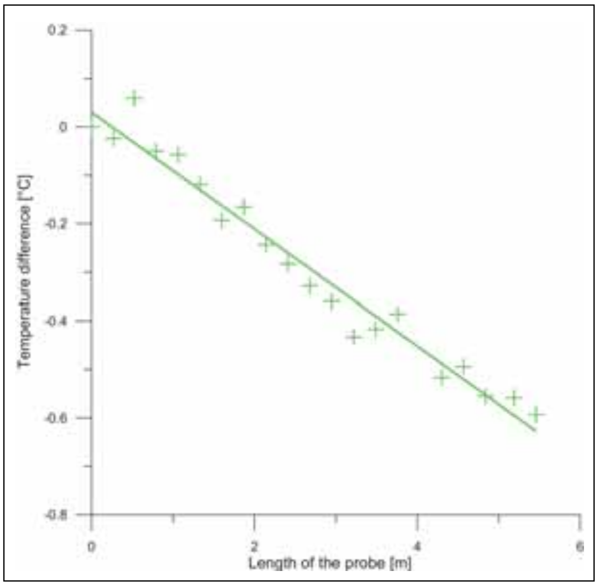

Fig. 3.3.5: Estimation of the heat flow by linear regression for station 58. The slope of the regression line is the heat flow value in [W/m²].

Preliminary (expected) results

During this expedition ARK XXIV-3 in total 58 heat flow stations were performed (Table 3.3.1). One station (HF42) was measured for calibration calculations. At seven stations the device did not penetrate the sediments. At 50 stations the heat flow was successfully measured. The deepest station was HF58 in 3656 m depth.

Future analyses will include the calculation of the heat flow values from the 50 stations and inspection of the results in view of the existing seismic reflection profiles from 2002 and 2003, the seismic refraction profile from this expedition, the crustal ages, the sediment thickness and the distance to the mid-ocean ridges.

Table 3.3.1: List of 58 heat flow stations with position, water depth and comments.

Station	Station-no.	Date	Latitude	Longitude	depth [m]	comments
Scoresby Basin and Iceland Plateau						
HF1	PS74/240	13.08.2009	70,627	-16,589	1550	
HF2	PS74/243	14.08.2009	70,857	-17,547	1678	
HF3	PS74/246	14.08.2009	71,089	-18,550	1555	
HF42	PS74/347	18.09.2009	70,935	-17,901	1680	calibration for sensor-string 2
HF43	PS74/348	18.09.2009	71,010	-18,225	1665	sensor 16 high noise level
HF44	PS74/349	18.09.2009	71,183	-19,060	577	sensor 5 and 16 high noise level
HF45	PS74/350	18.09.2009	70,699	-16,892	1455	sensor 16 high noise level
HF46	PS74/351	18.09.2009	70,763	-17,161	1612	sensor 4, 5 and 16 high noise level
HF47	PS74/352	18.09.2009	70,541	-16,266	1190	sensor 5 and 16 high noise level
HF48	PS74/353	18.09.2009	70,465	-15,929	1160	sensor 16 high noise level
HF49	PS74/354	19.09.2009	70,389	-15,589	990	sensor 16 high noise level
HF50	PS74/355	19.09.2009	70,226	-14,994	1120	sensor 4 and 16 high noise level
HF51	PS74/356	19.09.2009	70,155	-14,650	1260	sensor 4, 16 and 21 high noise level
HF52	PS74/357	19.09.2009	70,160	-14,320	1320	sensor 4 and 16 high noise level
HF53	PS74/358	19.09.2009	70,000	-14,015	1565	sensor 3, 4 and 16 high noise level
HF54	PS74/359	19.09.2009	69,804	-13,239	1555	sensor 3, 4 and 16 high noise level
HF55	PS74/360	19.09.2009	69,616	-12,457	1820	sensor 16 high noise level
Fram Strait						
HF4	-	20.08.2009	80,157	-16,627	-	calibration for sensor-string 1
HF5	PS74/255	21.08.2009	80,290	-5,584	792	penetration until sensor 12
HF6	PS74/256	21.08.2009	80,232	-4,837	-	no penetration into ground
HF7	PS74/257	21.08.2009	80,145	-4,013	2145	no penetration into ground
HF8	PS74/258	22.08.2009	80,085	-3,145	2537	no penetration into ground
HF9	PS74/259	22.08.2009	79,945	-2,129	2713	
HF10	PS74/260	23.08.2009	79,881	-1,315	2770	
HF11	PS74/261	23.08.2009	79,840	-0,949	2742	
HF12	PS74/262	23.08.2009	79,809	-0,667	2750	
HF13	PS74/263	24.08.2009	79,717	0,223	2765	
HF14	PS74/264	24.08.2009	79,652	0,770	2605	
HF15	PS74/265	24.08.2009	79,531	1,946	2726	
HF16	PS74/266	24.08.2009	79,434	2,792	2660	
HF17	PS74/267	24.08.2009	79,297	4,119	2520	
HF18	PS74/268	24.08.2009	79,208	4,917	1556	sensor 2 high noise level

Station	Station-no.	Date	Latitude	Longitude	depth [m]	comments
HF19	PS74/269	24.08.2009	79,125	5,715	1278	sensor 2 high noise level
Boreas Basin						
HF20	PS74/270	25.08.2009	78,219	-4,876	969	sensor 2 high noise level
HF21	PS74/271	25.08.2009	78,104	-4,234	2245	no penetration into ground
HF22	PS74/272	25.08.2009	78,000	-3,537	2685	penetration until sensor 12; sensor 10 high noise level
HF23	PS74/273	25.08.2009	77,890	-2,869	2835	penetration until sensor 16
HF24	PS74/274	26.08.2009	77,666	-1,531	3012	
HF25	PS74/276	26.08.2009	77,445	-0,238	3131	
HF26	PS74/278	26.08.2009	77,223	1,041	3184	
HF27	PS74/280	26.08.2009	77,002	2,283	3201	
HF28	PS74/282	26.08.2009	76,781	3,527	3220	
HF29	PS74/284	27.08.2009	76,557	4,738	3000	
HF30	PS74/286	27.08.2009	76,365	5,767	2615	
HF31	PS74/288	27.08.2009	76,182	6,742	2526	
HF32	PS74/290	27.08.2009	76,004	7,684	2665	
HF33	PS74/291	27.08.2009	75,903	8,217	2279	penetration until sensor 16
Greenland Basin						
HF34	PS74/335	10.09.2009	73,499	-2,499	3147	easy penetration, sediment extremely soft
HF35	PS74/336	10.09.2009	73,829	-4,908	3575	
HF36	PS74/337	10.09.2009	74,100	-7,001	3312	no penetration into ground
HF37	PS74/338	10.09.2009	74,417	-9,641	3150	
HF38	PS74/339	11.09.2009	74,618	-11,304	2995	
HF39	PS74/340	11.09.2009	74,751	-12,335	2050	
HF40	PS74/341	11.09.2009	74,808	-12,796	1350	sensor 2 high noise level
HF41	PS74/342	11.09.2009	74,900	-13,620	-	no penetration into ground
Norway Basin						
HF56	PS74/363	21.09.2009	67,499	-6,003	3195	sensor 4 and 16 high noise level
HF57	PS74/364	21.09.2009	67,300	-5,189	3544	sensor 16 high noise level
HF58	PS74/365	21.09.2009	67,140	-4,537	3656	sensor 16 high noise level

The final heatflow measurements will be caluculated back in the labs and are, thus, not mentioned here.

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3.4 Gravity measurements

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Objectives

In the beginning of the cruise in Reykjavik and at the end of the cruise in Bremerhaven, gravity measurements were conducted with a LaCoste & Romberg land gravity meter (model no. G-1031). This was necessary to tie the relative gravity measurements at sea to the International Gravity Standardisation Network and to correct these measurements for instrumental drift. At sea, a KSS31 Bodenseewerke gravity meter was used.

3.4.1 Gravity tie measurements

Measurements in Reykjavik

Overview

In Reykjavik, four measurements were conducted at three different points:

Table 3.4.1

Station	Description	Date	Time	LCR-gravity, measured [mGal]	absolute gravity after BGI [mGal]
REYK A	Catholic Cathedral, IGSN point 00126B	04.08.2009	11:75 - 12:08	5910,12	**982262,46**
REYK B	At ship, Kai Skarfabakki	04.08.2009	13:47 - 14:03	5923,52	s.u.
REYK A	Catholic Cathedral, IGSN point 00126 B	04.08.2009	15:13 - 15:27	5910,22	**982262,46**
REYK C	Hallgrimmskirkja, IGSN point 001261	04.08.2009	15:43 – 15:49	5906,44	**982258,79**

REYK A and REYK C are points belonging to the IGSN network, where the absolute gravity value is known. REYK B was located next to the ship, at minimum distance to the onboard fix-installed marine gravimeter, which was measuring simultaneously. Using these measurements, we were able to connect the relative gravity measurements during the cruise to the absolute gravity values at the IGSN points.

Problems arose with the portable LCR gravity meter during the tie measurements in Reykjavik. The battery pack, which is used to maintain the internal instrument temperature at 50°C, was weak and after about 1 hour, the temperature started to decrease, which led to strong instrument drift. Therefore, we had to cancel two of three measurements at the IGSN-points earlier as projected.

REYK A, Catholic Cathedral Christ-King, Reykjavik, IGSN point 00126B
Gravity: 982262,46 mgal

The IGSN point 00126 B was located just behind a fence at the rear of the catholic church Christ King. Following the IGSN point description, the point was in former times located at the top of a massive large rock. This stone wasn't there anymore, but we found its base and conducted the measurement on top of it.

Fig. 3.4.1: Point REYK A, ¼

Fig. 3.4.2: Point REYK A, 2/4

Fig. 3.4.3: Point REYK A, ¾

Fig. 3.4.4: Point REYK A, 4/4

REYK B, Kai Skarfabakki, next to ship

Polarstern was docked at Kai Skarfabakki in Reykjavik. We conducted one measurement just next to the ship, just parallel to the position of the marine gravimeter.

Sea level:

Fig. 3.4.5: Point REYK B, 1/2

Fig. 3.4.6. Point REYK B, 2/2

REYK C, Hallgrimmskirkja, IGSN point 001261
Gravity: 982258,79 mgal

We conducted one additional tie measurement at a third point, at IGSN point 001261 next to the famous Hallgrimskirkja in the centre of Reykjavik.

Fig. 3.4.7: Point REYK C, 1/2

Fig. 3.4.8: Point REYK C, 2/2

Table 3.4.2

04.08.2009 Reykjavik, Catholic Church on top of the stone, without baseplate				**Resulting Gravity [mGal]:**	**REYK A 5910,12**	
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
11:57:00	5782,79	manuell	0,000	0,000	5910,26	5910,26
11:59:00	5782,79	Feedback	-0,090	-0,090	5910,26	5910,17
12:01:00	5783,00	Feedback	-0,350	-0,352	5910,48	5910,13
12:03:00	5783,25	Feedback	-0,592	-0,595	5910,73	5910,14
12:08:00	5783,50	Feedback	-0,930	-0,934	5910,99	5910,06

The measurement was cancelled, because of a battery problem, which caused temperature drift. Temperature started to decrease slowly and the feedback values drifted away. The listed measurements were measured prior to this defect.

Table 3.4.3

04.08.2009 Reykjavik, Kai Skarfabakki next to the ship, on baseplate				**Resulting Gravity [mGal]:**	**REYK B 5923,52**	
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
13:47:00	5795,89	manuell	0,000	0,000	5923,65	5923,65
13:48:30	5795,75	Feedback	0,025	0,025	5923,51	5923,53
13:51:30	5795,50	Feedback	0,275	0,276	5923,25	5923,53
13:53:00	5795,25	Feedback	0,500	0,502	5923,00	5923,50
13:56:00	5795,00	Feedback	0,770	0,774	5922,74	5923,51
13:58:00	5796,00	Feedback	-0,193	-0,194	5923,76	5923,57
13:59:00	5796,25	Feedback	-0,430	-0,432	5924,02	5923,58
14:00:45	5796,50	Feedback	-0,690	-0,693	5924,27	5923,58
14:02:30	5795,83	manuell	0,000	0,000	5923,59	5923,59

Table 3.4.4

04.08.2009 Reykjavik, Catholic Church on top of the stone, without baseplate				**Resulting Gravity REYK A [mGal]: 5910,22**		
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
15:13:30	5782,87	manuell	0,000	0,000	5910,34	5910,34
15:15:00	5782,87	Feedback	-0,060	-0,060	5910,34	5910,28
15:16:00	5782,75	Feedback	-0,020	-0,020	5910,22	5910,20
15:17:30	5782,50	Feedback	0,230	0,231	5909,97	5910,20
15:19:30	5782,25	Feedback	0,476	0,478	5909,71	5910,19
15:21:00	5782,00	Feedback	0,710	0,713	5909,46	5910,17
15:23:00	5783,00	Feedback	-0,247	-0,248	5910,48	5910,23
15:24:30	5783,25	Feedback	-0,490	-0,492	5910,73	5910,24
15:26:00	5783,50	Feedback	-0,735	-0,738	5910,99	5910,25
15:27:00	5782,84	manuell	0,000	0,000	5910,31	5910,31

Table 3.4.5

04.08.2009 Reykjavik, Hallgrimskirkja next to the memorial stone without baseplate				**Resulting Gravity REYK C [mGal]: 5906,44**		
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
15:43:00	5778,99	manuell	0,000	0,000	5906,38	5906,38
15:44:00	5778,99	Feedback	-0,040	-0,040	5906,38	5906,34
15:46:00	5779,25	Feedback	-0,210	-0,211	5906,65	5906,44
15:48:00	5779,50	Feedback	-0,416	-0,418	5906,90	5906,49
15:49:00	5779,75	Feedback	-0,650	-0,653	5907,16	5906,51

Again, the measurement had to be cancelled due to battery problems. The listed values were acquired before the problem occured.

Connecting the three measurements at the ISGN points, we got the following values for the absolute gravity at Kai Skarfabakki, location of LCR gravity meter:

<u>REYK A, first measurement:</u>

982262,46 mGal+ (5923,52 mGal - 5910,12 mGal) = **982275,86 mGal**

<u>REYK A, second measurement:</u>

982262,46 mGal+ (5923,52 mGal - 5910,22 mGal) = **982275,76 mGal**

REYK C:

982258,79 mGal+ (5923,52 mGal - 5906,44 mGal) = **982275,87 mGal**

We calculated the mean value, the three absolute gravity values and used the result as absolute gravity at Kai Skarfabakki:

982275,83 mGal

During measurement at REYK B, the LCR gravity meter was located 4.10 m above the water line. With a ships draught of 10,80 m and a height of the KSS31 gravity meter of 11.26 m above the keel, the LCR gravity meter was located 3.64 m above the marine gravity meter.

Using the free-air correction we calculated the absolute Gravity at the location of the KSS31 marine gravity meter onboard Polarstern:

982275.83 mgal + 0.3086 mgal/m * 3.64 m = **982276,95 mGal**

Reading of the KSS31 marine gravity meter during the tie measurement at Kai Skarfabakki was:

04.08.2009, 13:54:37 GV = **2019,05 mGal**

Both values correspond to the same absolute gravity value at the same location.

Work at sea

During the cruise, the gravity meter recorded data continuously each second. Sometimes, when the system lost the navigation information, the sampling rate changed spontaneously to 240 ms. No further problems arose.

Measurements in Bremerhaven

Overview

At the end of the cruise, two measurements were conducted in Bremerhaven:

Table 3.4.6

Station	**Description**	**Date**	**Time**	**LCR-gravity, measured [mGal]**	**absolute gravity**
BREM A	next to Polarstern, Lloyd shipyard, Dalbenpier	25.09.2009	05:19 - 05:34	5005,30	s.u.

BREM B	AWI, Building D	25.09.2009	08:31 - 08:50	5005,55	**981356,72**

BREM B is a point with known absolute gravity, located at the ground floor in building D of the AWI in Bremerhaven. **BREM A** was located next to Polarstern, at minimum distance to the onboard fix-installed marine gravity meter, which was measuring simultaneously.

Table 3.4.7

25.09.2009 Bremerhaven, Lloyd shipyard, Dalbenpier, next to Polarstern				**Resulting Gravity [mGal]: 5005,30**		**BREM A**
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
05:19:00	4897,45	manuell	0,000	0,000	5005,31	5005,31
05:21:30	4898,00	Feedback	-0,533	-0,536	5005,88	5005,35
05:22:45	4898,50	Feedback	-0,988	-0,993	5006,39	5005,40
05:24:00	4898,25	Feedback	-0,838	-0,842	5006,14	5005,29
05:26:15	4897,75	Feedback	-0,370	-0,372	5005,63	5005,25
05:27:30	4897,50	Feedback	-0,085	-0,085	5005,37	5005,28
05:29:30	4897,00	Feedback	0,365	0,367	5004,86	5005,23
05:31:00	4896,75	Feedback	0,619	0,622	5004,60	5005,22
05:32:30	4897,25	Feedback	0,230	0,231	5005,11	5005,35
05:33:30	4897,48	manuell	0,000	0,000	5005,35	5005,35

Table 3.4.8, measurement BREM B

25.09.2009 Bremerhaven, AWI, Building D, ground floor				**Resulting Gravity [mGal]: 5005,55**		**BREM B**
Time (UTC)	**Counter reading [CU]**	**Kind of measurement**	**Feedback [mV]**	**Feedback [mGal]**	**Counter reading [mGal]**	**Total gravity [mGal]**
08:31:45	4897,73	manuell	0,000	0,000	5005,60	5005,60
08:33:30	4897,75	Feedback	-0,079	-0,079	5005,63	5005,55
08:35:30	4898,00	Feedback	-0,323	-0,325	5005,88	5005,56
08:37:00	4898,25	Feedback	-0,571	-0,574	5006,14	5005,56
08:39:00	4898,50	Feedback	-0,816	-0,820	5006,39	5005,57
08:41:30	4897,50	Feedback	0,154	0,155	5005,37	5005,52
08:43:30	4897,25	Feedback	0,403	0,405	5005,11	5005,52
08:44:15	4897,00	Feedback	0,644	0,647	5004,86	5005,51
08:46:00	4896,75	Feedback	0,987	0,992	5004,60	5005,59
08:50:00	4897,65	manuell	0,000	0,000	5005,52	5005,52

Connecting the measurement at BREM A to the absolute gravity value at BREM B via the according measurement at this point, we got following result for the absolute gravity value at BREM A:

981356,72 mGal + (5005,30 mGal - 5005,55 mGal) = **981356,47 mGal**

During the measurement at BREM A, the LCR gravity meter was located 3,75 m below a prominent seam on the ships hull, which was located 0,60 m above the LCR gravity meter during the measurement REYK B in Reykjavik at the beginning of the cruise. Though, the height, at which the LCR gravity meter had above the marine gravity meter onboard Polarstern was estimated to 3,64 + 0,60 - 3,75 m ~ 0,50 m for measurement BREM A.

Using the free-air correction to calculate the absolute gravity at the location of the KSS31 sea gravity meter:

981356,47 mGal + 0,3086 mGal/m * 0,50 m= **981356,62 mGal**

Reading of the KSS31 marine gravity meter during the tie measurement at BREM A was

25.09.2009, 05:26:15, GV = **1094,59 mGal**

Both values correspond to each other.

Using the tie measurements at the beginning and at the end of the cruise, we calculated the instrument drift of the KSS31 sea gravity meter during the cruise:

982276,95 mGal - (2019,05 mGal - 1094,59 mGal) - 981356,62 mGal= -**4,13 mGal**

Thus, the KSS31 sea gravity meter measured 4,13 mGal less than the correct value at the end of the cruise, which means a negative drift for the duration of the entire cruise.

3.5 Echo-sounder Investigation and geological Sampling

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Objectives

The parametric sediment echo-sounder PARASOUND installed aboard *Polarstern* generates two primary frequencies (PHF, PLF) that form two secondary frequencies (SLF, SHF). The secondary low frequency (SLF) is able to penetrate the sediment column as deep as a 4 kHz with the resolution of a 22 kHz signal. The secondary high frequency (SHF, 40 kHz) can be used for detection of bubbles in the water column.

The objectives of our acoustic investigation included: (a) identification and evaluation of sites suitable for coring/heat flow penetration measurement, (b) identification of shallow sub-surface structures (e.g. diapirs, sediment waves, drifts, faults, gas, etc.) and (c) identification of reflections within the water column (e.g. flares) indicating ongoing degassing.

Work at Sea

The parametric echo-sounder system aboard *Polarstern* worked throughout the cruise with little complications (before and after the software update of the HYDROMAP CONTROL software component). Based upon its online data, locations have been chosen for application of the heat flow lancet or the multicorer (MUC) respectively.

Preliminary Results

Mud Hill Field

Findings from the previous arctic expedition ARK-XX/3 in 2004 (Stein, 2005) revealed diapiric structures of unknown origin along the Boreas Basin. The structures have been termed mud diapirs and been discussed, whether they represent up-doming older low-density debris flows as a result from differential compaction or convective structures with higher flux like mud volcanoes.

The area was targeted for detailed acoustic investigation during our cruise. Preliminary results included the discovery and a first detailed investigation of a mud hill field in the Greenland Sea. The individual mud hills were mostly characterised by acoustically stratified sediments that have been domed up. Several individuals displayed degassing into the water column (Fig. 3.5.1). However, this activity is comparatively weak, therefore no pronounced flares were observed.

Based on the acoustic data, one mud hill was targeted for geological sampling by the multicorer (MUC). Synoptic investigation of the recovered undisturbed surfaces indicated high abundances of benthic foraminifera thriving on the upper sediment. This may indicate higher nutrient fluxes at site. In summary, the structures resembled a pockmark field but had a much lower, apparently more continuous degassing activity. The nature of the mud hill field remained speculative since neither of the discussed genetic interpretations could be ruled out.

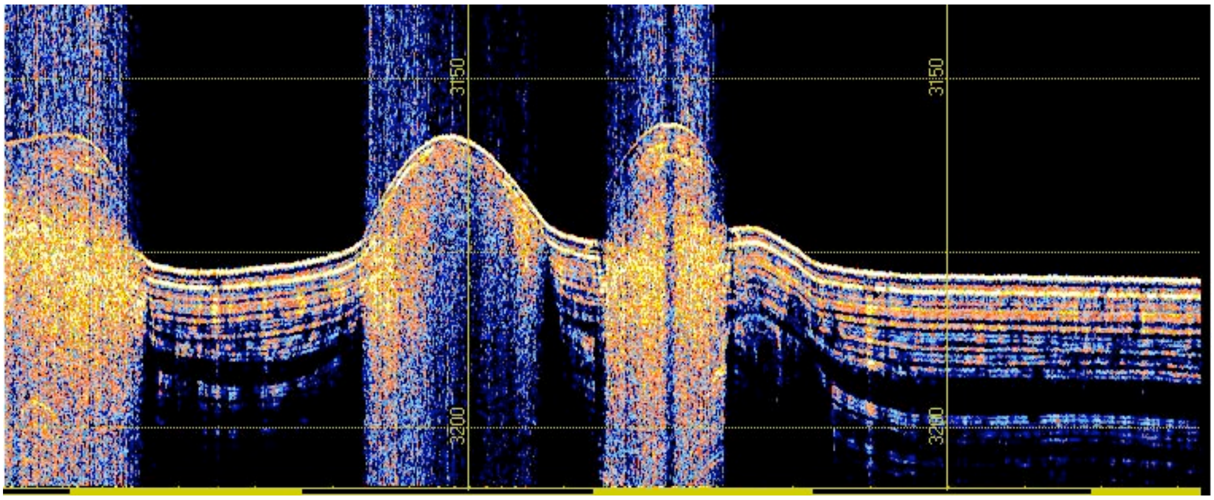

Fig. 3.5.1: PARASOUND profile across a mud hill field (0.23° W, 77.55° N) at 3175 m water depth. Diapiric nature of the hills is evident by up-domed sediment (horizontal bars indicate distance in km).

Channels along Greenland's Continental Slope

On one PARASOUND profile crossing the continental slope, two channels have been recorded in the 4 kHz data at 3200 metres water depth (Fig. 3.5.2). The sub-bottom structures imaged in the SLF data displayed an erosive channel with little infill, developed levees on its flanks and sediment waves in the more distant neighbourhood. The channels may belong to the Ardencaple Channel System.

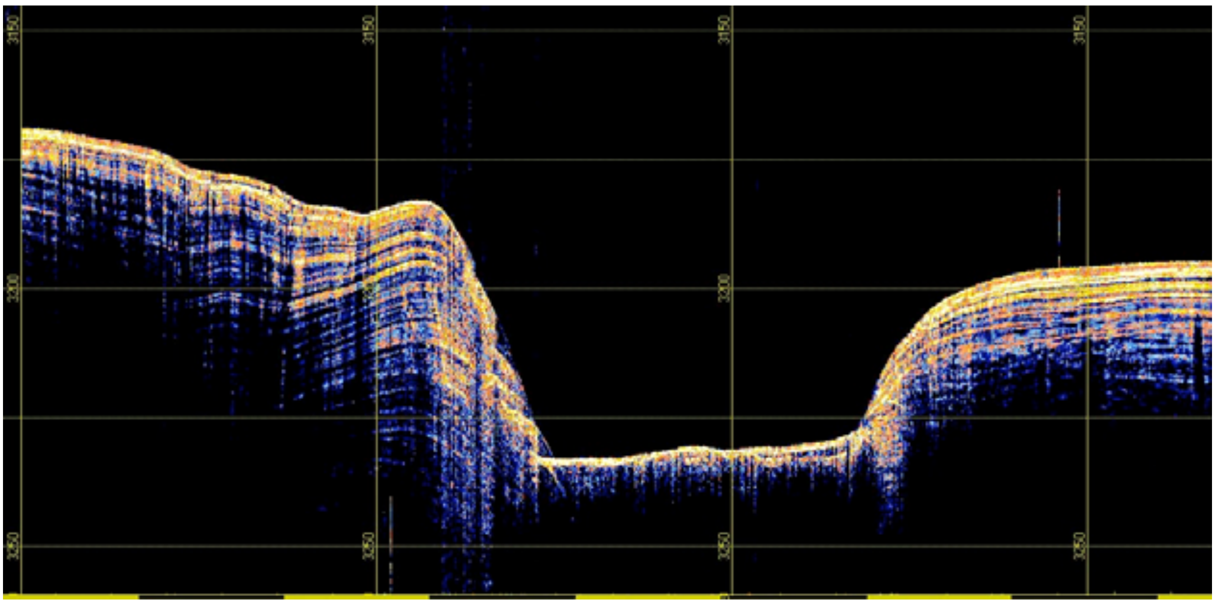

Fig. 3.5.2: Channel incision on the continental slope (10.07° W, 74.46° N) at 3200 m water depth. Channel fill as well as levee deposits are clearly visible (horizontal bars indicate distance in km).

Submarine Mass Wasting

Evidence for submarine mass wasting was found on different scales in most of the profiles. Debrites were identified to be a common phenomenon on steep slopes of submarine ridges, at the continental slope and within fjord environments. However, large-scale submarine slides comparable to the slides offshore Norway were not found to be common sediment transport process on the continental margin off NE-Greenland. Instead, slow slope failures e.g. creeping sediment were identified in few locations (Fig. 3.5.3).

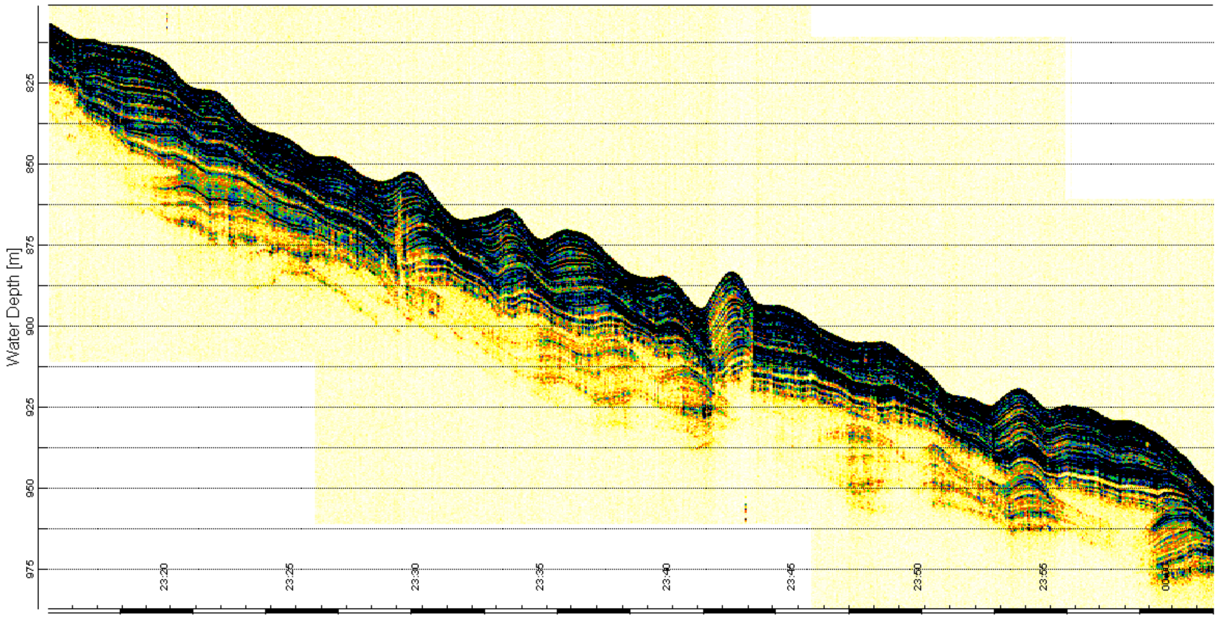

Fig. 3.5.3: Slow slope failure: creeping sediments form staircase structures resembling sediment waves of current dominated areas.

Mud Volcano

During our cruise we discovered a volcanic structure near the spreading ridge. It is app. 2 km wide and long, and has a maximum elevation of 27 m. Due to the water depth of app. 2450 metres and the low relief, the high-resolution bathymetry data of the HYDROSWEEP DS2 system aboard *Polarstern* could not contribute additional information to this feature except that it appeared to be circular (Fig. 3.5.4).

Internal structures clearly indicated vertical convective mass transport towards the sea floor resulting in a positive relief of sedimentary structures on the neighbouring stratified sediments (Fig. 3.5.5).

Whether this feature is a mud volcano or a real volcano is not clear from acoustic data. The hyperbolic reflection on top and the downward dipping strata next to the structure may point to a higher density of the ascending material. This and the position in the direct neighbourhood of the active spreading ridge favour the interpretation of a basaltic extrusion feature. However, it could also be a mud volcano hosted on an intra-ridge basin with higher heat flow, which stimulates the vertical transport of sediments and fluids to the sea floor. Future geological sampling, e.g. by gravity coring, would recover material from the structure indicative of its origin.

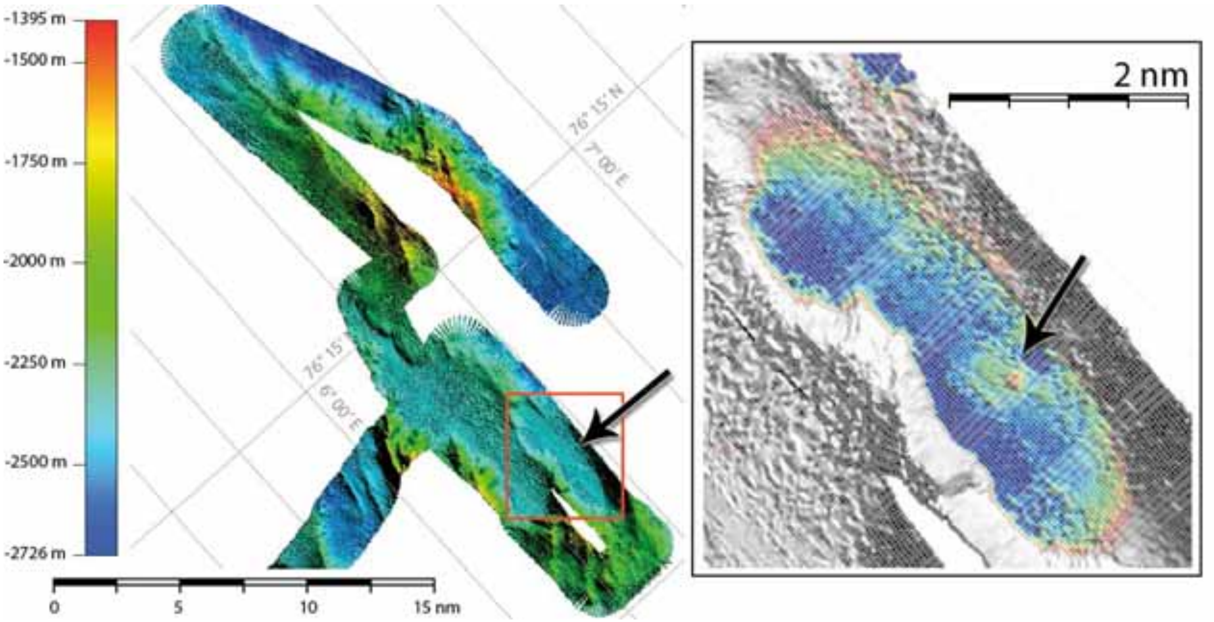

Fig. 3.5.4: HYDROSWEEP DS2 high-resolution bathymetry data at and near the volcanic structure. Left: overview map of bathymetry along cruise track (arrow indicating position of intra-ridge basin). Right: detailed view of this basin (dynamic shader for depth range between 2400 m and 2375 m; soundings indicated with higher saturation). The right arrow points to the small volcanic structure.

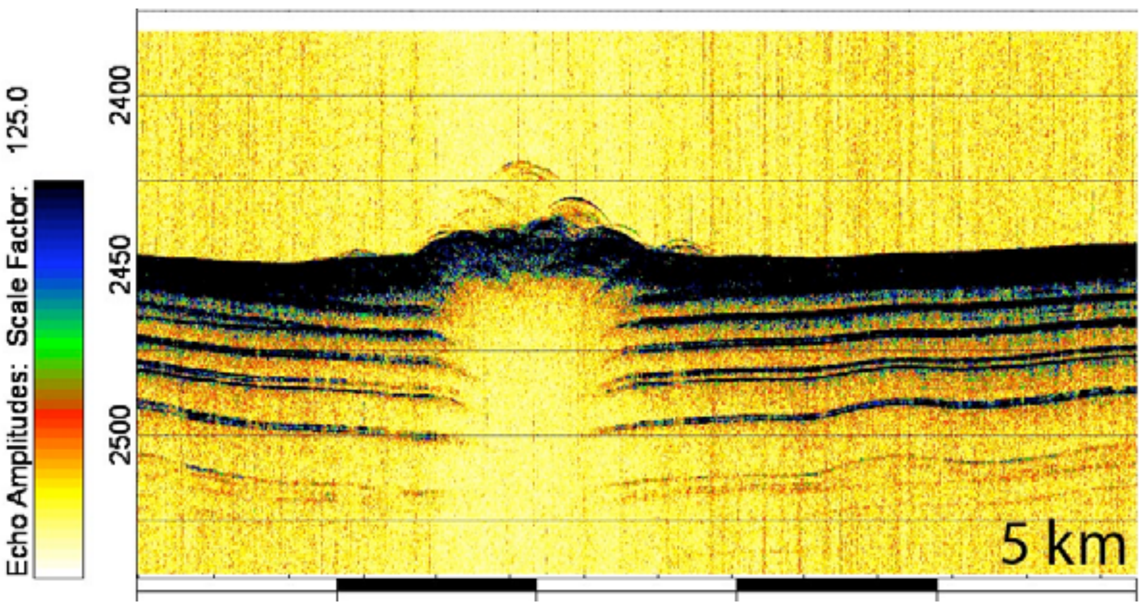

Fig. 3.5.5: PARASOUND profile across volcanic structure – mud volcano or basaltic extrusion?

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3.6 Bathymetry

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Objectives

The main task of the bathymetric group was to monitor the acquisition of bathymetry data using the multibeam sonar system Hydrosweep DS-2 *(ATLAS HYDROGRAPHIC)*. Besides data acquisition and data processing, the bathymetric group was also responsible for providing bathymetric maps for geophysical and geological working groups. High-resolution bathymetry is used for planning station locations and supplies important information for geological and geophysical interpretation.

Existing data in the main operation area of this cruise were limited, due to remote location and heavy ice conditions, which makes bathymetric measurements for most of the ships except icebreakers impossible. During previous Polarstern expeditions, bathymetric data were collected in this region as well. In order to avoid redundant measurements of the seafloor topography by *Polarstern*, the bathymetry group was responsible for a reasonable track planning.

The collected data are a valuable contribution for bathymetric databases and will be included in the International Bathymetric Chart of the Arctic Ocean (IBCAO).

Work at sea

Data acquisition was carried out from 6th of August 2009 at 09.00 UTC until 22nd of September 2009 at 00.00 UTC.

The ocean seafloor topography was measured with the deep-sea multibeam echo sounding system *Hydrosweep DS2* from *ATLAS HYDROGRAPHIC*, which is currently installed on *Polarstern*. The system was running in the hardbeam mode, sending out a signal with a frequency of 15.5 kHz and a spectrum of 1.2 kHz and receiving the reflected signal in 59 preformed beams.

It was possible to change the swath angle between 90° to 120°. Due to the low resolution and poor data quality using 120° the angle was set to 90° most of the time. The along track seafloor coverage with the 90° swath had a width about twice the water depth.

The accuracy of the measured water depth was about 1% of the depth in case of the center beam and about 2% in case of the outer beams. To achieve this accuracy the knowledge of the sound velocity throughout the water column was needed. The Hydrosweep system has a patented function to perform a cross fan calibration for determining the mean sound speed within the water column. The system was running in the calibration mode “standard” during the whole cruise, accomplishing a cross fan calibration every two nautical miles (NM).

A more precise but also time-consuming possibility to determine the sound velocity is to perform a CTD- (conductivity-temperature-depth) measurement, whereby the sound velocity is calculated by measuring the parameters conductivity, temperature and pressure directly in the water column. During this cruise leg two CTD-measurements were taken: one on 28th of August at 75°53’ N / 8°19’ E down to a water depth of 1200 m and the other on 18th of September at 70°47’ N / 17°14’ W down to a water depth of 1300 m. Due to physical changes of the parameters of sea water the actual sound velocity was valid only locally. During the cruise the CTD-data was not uploaded into the Hydrosweep system, but it can be applied during post-processing.

The acquisition of multibeam data was conducted using *HYDROMAP ONLINE* provided by *ATLAS HYDROGRAPHIC*. The recorded data were stored in the *ATLAS* raw data format *SURF*, each file containing a measurement period of eight hours.

During data acquisition the measured bathymetry had big errors in depth and position values due to ship movement or ice floes below the transducer, so the acquired data were edited during the on-board processing.

The main data processing was already done during the cruise in order to produce good quality bathymetric maps.

At first, the navigation data were checked with the program *HYDROMAP OFFLINE* to exclude coarse positioning errors. After converting into the dux-format, errors in depth were removed using *CARIS HIPS and SIPS version 6.1.* The wrost data were recorded during surveying through ice, where up to 50 % of the beams had to be rejected.

The cleaned data were daily converted into ASCII format-xyz (longitude, latitude, depth) for plotting maps with the *Generic Mapping Tools* (GMT). Bathymetric maps were provided to other working groups, by combining “old” Polarstern data (if available) with the new ones.

Figure 3.6.1 shows the simplified workflow process on board of *Polarstern* as it was carried out during this cruise leg.

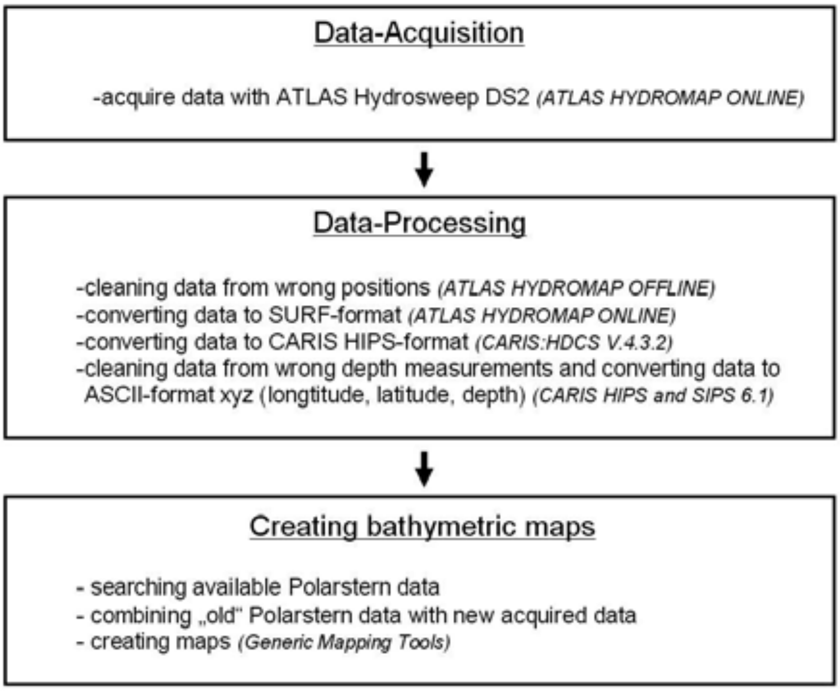

Fig. 3.6.1: Workflow process at sea on board of RV Polarstern

Results

General results

A continuous recording of data was achieved during the cruise, except for the associated data gaps due to system crashes. All data were processed by the end of the cruise. The complete track length of the multibeam data was 6768 NM, recorded during 47 days. The data volume was about 4.28 GB divided into 141 separate files, what sums up to 659,270 single pings, 77,138,515 beams (before editing). The minimum depth measured was 25 m and the maximum depth was 3927 m.

Apart from continuous data recording during transits, several systematic bathymetric surveys had been carried out. The results are described below. Figure 3.6.2 shows the location of the main bathymetric surveys accomplished during this cruise leg.

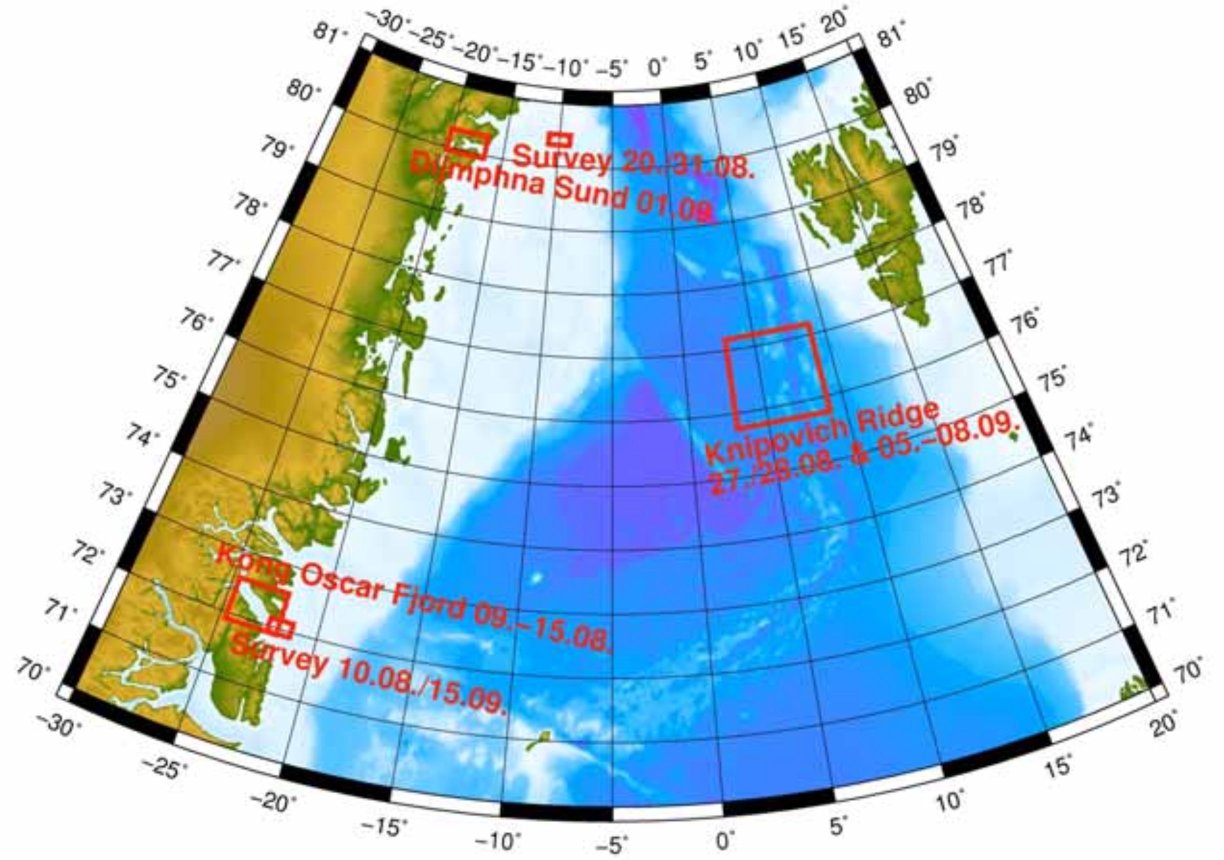

Fig. 3.6.2: The red boxes indicate the areas of detailedbathymetric surveys during leg ARKXXIV/3

Entrance of Kong Oscar Fjord

The first systematic survey was conducted in front of the entrance of the Kong Oscar Fjord. This area is of particular interest, because of the occurrence of seabed features caused by former ice sheet movements. The survey was carried out on 10th of August lasting 8 hours and was continued another 10 hours on 15th to 16th of September. Due to comparably shallow water depth with a range from 100 to 700 m and cruising speed of about 10 kn, the covered seafloor surface was finally about 435 km².

Prior to plotting, a smoothing of the data was done and applied with a grid spacing of 50 m to reduce noise. Gaps in the coverage of the seafloor smaller than 200 m were interpolated from surrounding data points. The map shown in figure 3.6.3 is created with a lateral resolution of 50 m.

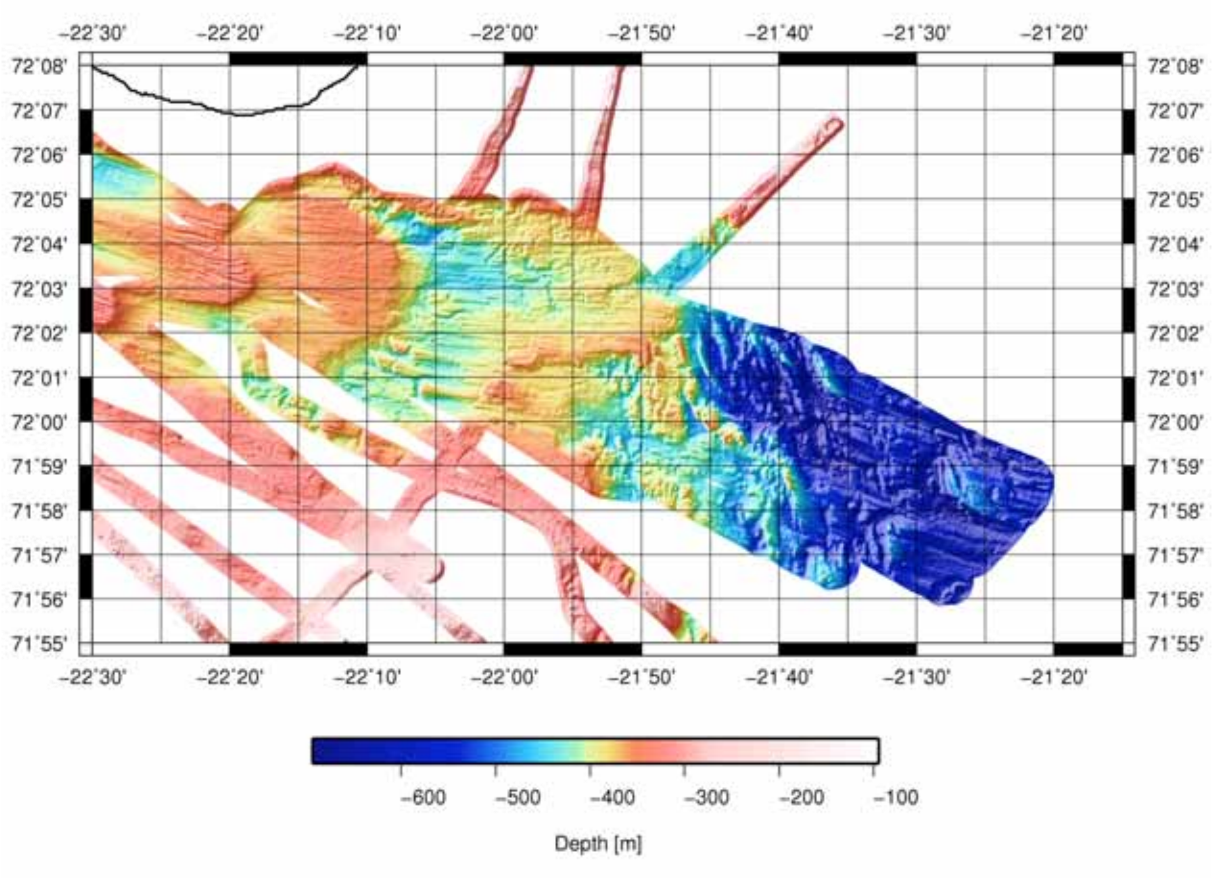

Fig. 3.6.3: Bathymetric survey in front of the Kong Oscar Fjord

Kong Oscar Fjord

During the geophysical, geological and geodetic work in the Kong Oscar Fjord from 9th to 15th of August, the ship time was used to enlarge the bathymetric dataset collected on *Polarstern* expedition ARK-X/2 in 1994. The combined dataset covers major inner parts of the fjord. Recorded seafloor depths range from 40 to 620 m. The morphology shows several fjord parallel glacial features on the seafloor particularly near the entrance of the fjord.

In figure 3.6.4 the complete bathymetric data of the Kong Oscar Fjord from the years 1994 and 2009 is shown. The data were smoothed with a grid spacing of 200 m and plotted with a ground resolution of 100 m. Gaps up to 200 m were interpolated in the map.

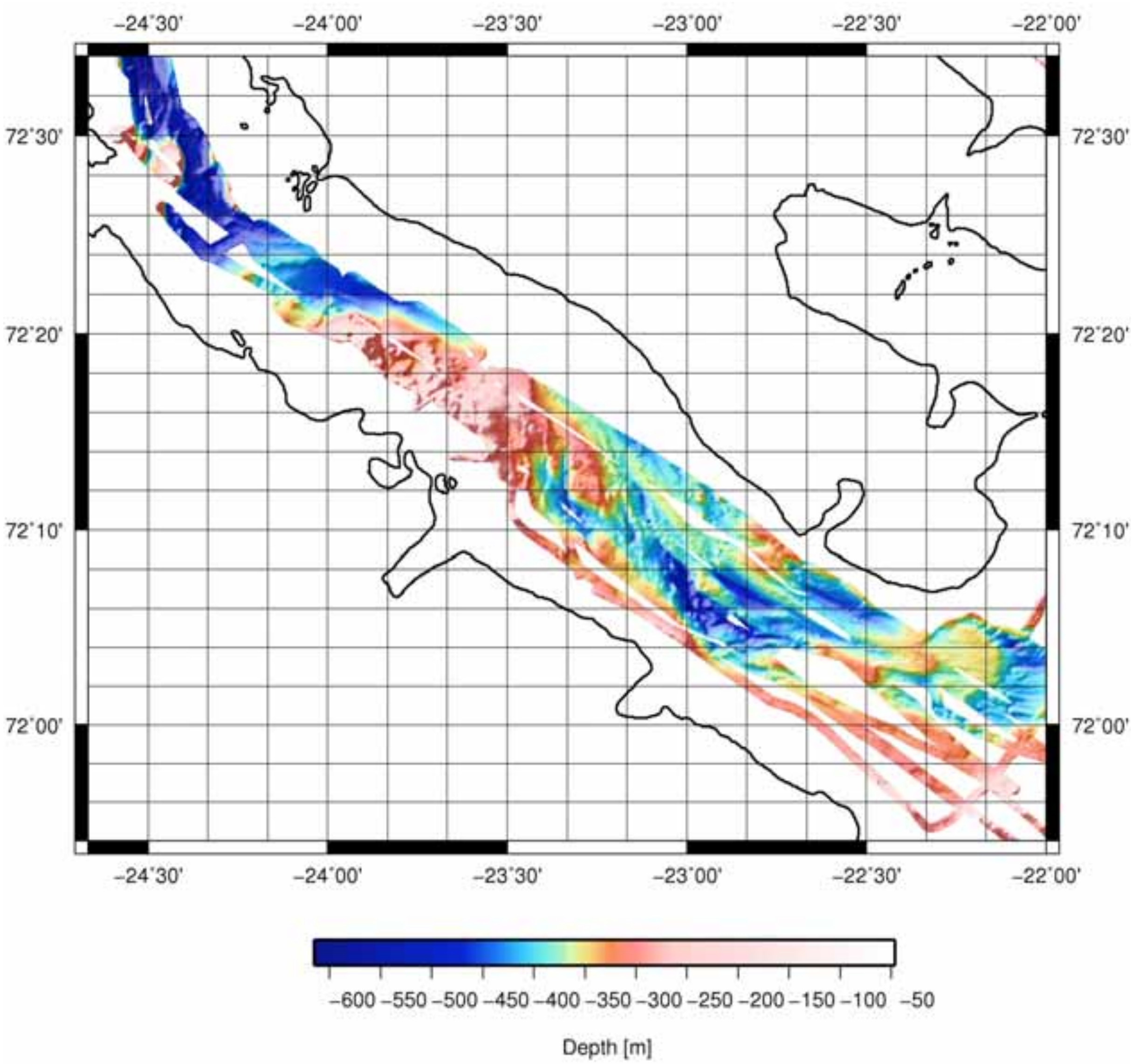

Fig. 3.6.4: Bathymetry of the Kong Oscar Fjord

Shelf East of Dijmphna Sund

During the *Polarstern* expedition ARK-XIII on 2nd of September 1997 interesting morphological structures of about 20 m height in regular distances along the track were discovered at 80°24' N / 10°20' W. In order to better understand the nature of those small submarine ridges, a systematic survey was done on 20th of August for about 4 hours and on 31st of August for about 7 hours. In the southern part, two track lines with a length of about 8 NM were added to the old one, in the northern part, eight track lines with a length of 6 to 9 NM were added. Thus, an area of altogether 118 km² was surveyed.

Due to the ice conditions the tracks were not always parallel to each other leading to some gaps in the coverage. The resulting map is shown in figure 3.6.5. A smoothing with a grid spacing of 50 m was applied; the lateral resolution was 15 m. Gaps not larger than 150 m were interpolated in the plot. The minimum depth in this area was about 260 m and the maximum 340 m.

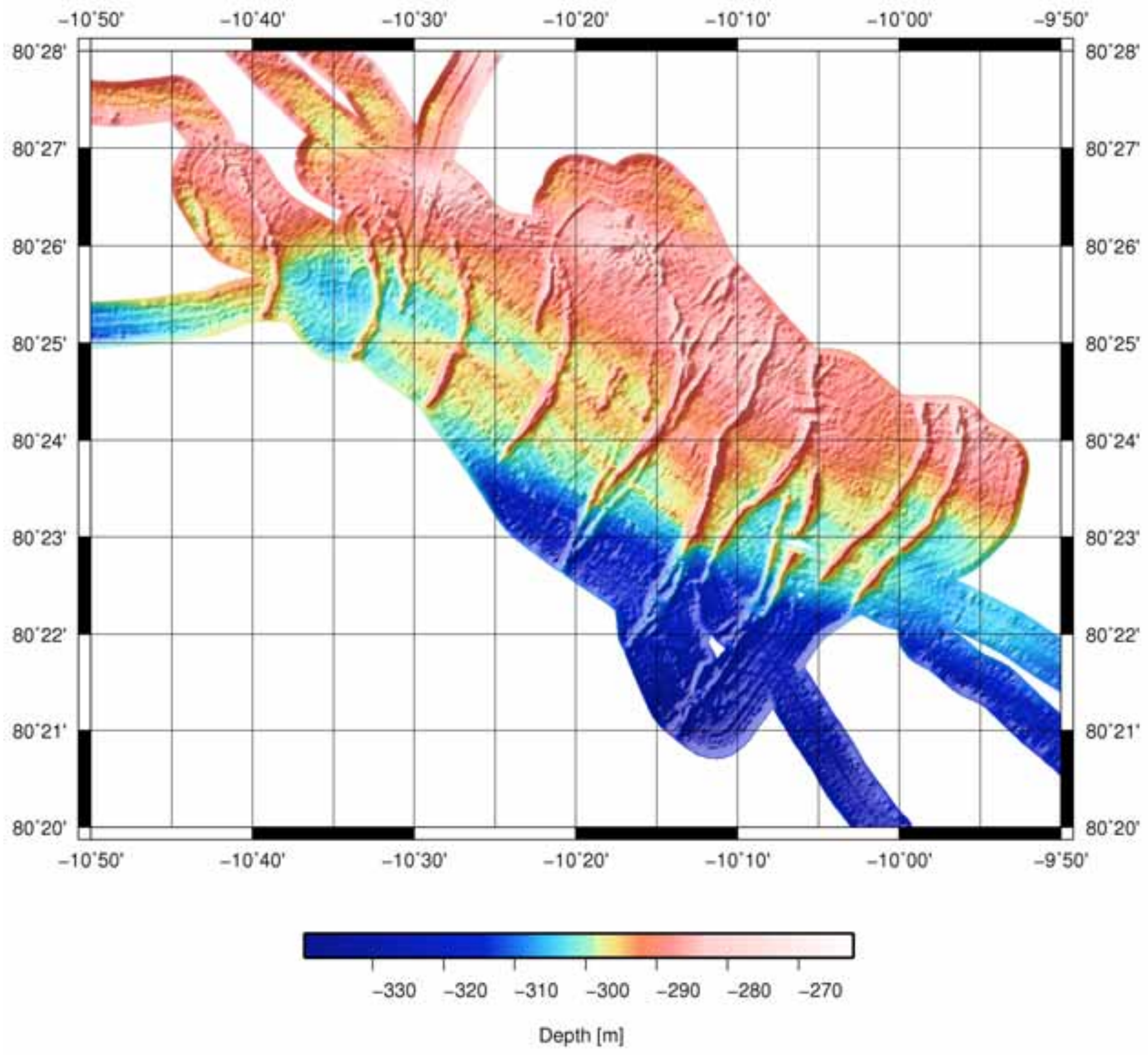

Fig. 3.6.5: Morphological structures on the shelf at 80°24' N / 10°20' W

Dijmphna Sund

On 1st of September bathymetric measurements were conducted in Dijmphna Sund by *Polarstern* for the first time. The 15 hour survey led through Dijmphna Sund, around Lynn Ö and through Hekla Sund into the open sea. The recorded depths ranged between 80 and 600 m. Figure 3.6.6 shows the bathymetry along the track. The smoothing grid spacing is 200 m and lateral resolution 100 m.

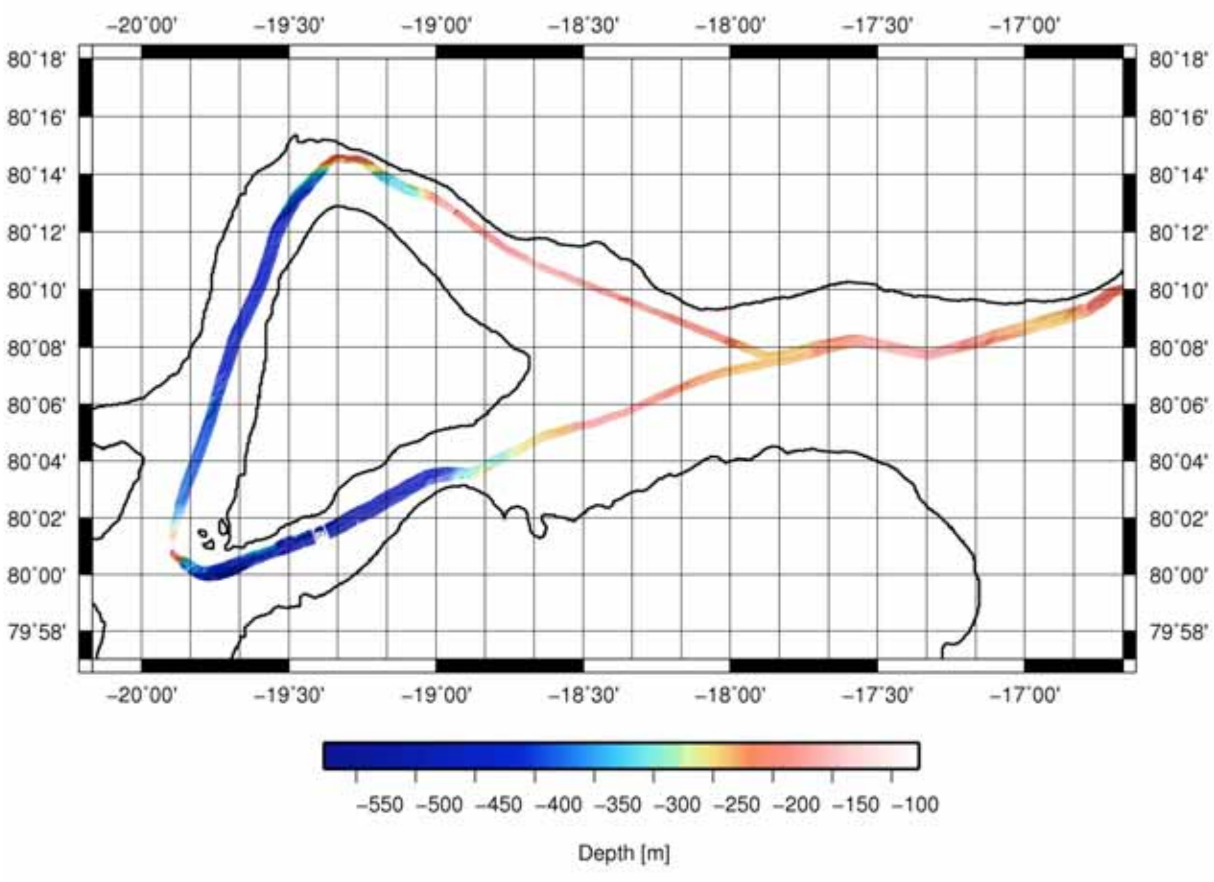

Fig. 3.6.6: Bathymetry of the Dijmphna Sund and Hekla Sund

Knipovich Ridge

During the deployment and the recovery of ocean bottom seismometers a survey of Knipovich Ridge was completed on the 27th and 28th of August and 5th to 8th of September 2009. The acquired data were added to the systematic survey of the area west of the Knipovich Ridge performed during *Polarstern* expedition ARK-XVIII/2 in 2002, so the survey was extended to the east. In total, an area of about 15,137 km² is mapped in this region to date. The depth ranges from 1100 down to 3800 m. The acquired data will assist the interpretation of the morphology of the oceanic ridge.

The map in figure 3.6.7 shows all available bathymetric data from previous *Polarstern* expeditions from the years 1990, 1995, 1997, 2002, 2003 and 2004. The applied smoothing uses a grid spacing of 200 m. Interpolation was done for gaps up to 1.5 km and the lateral resolution was about 200 m.

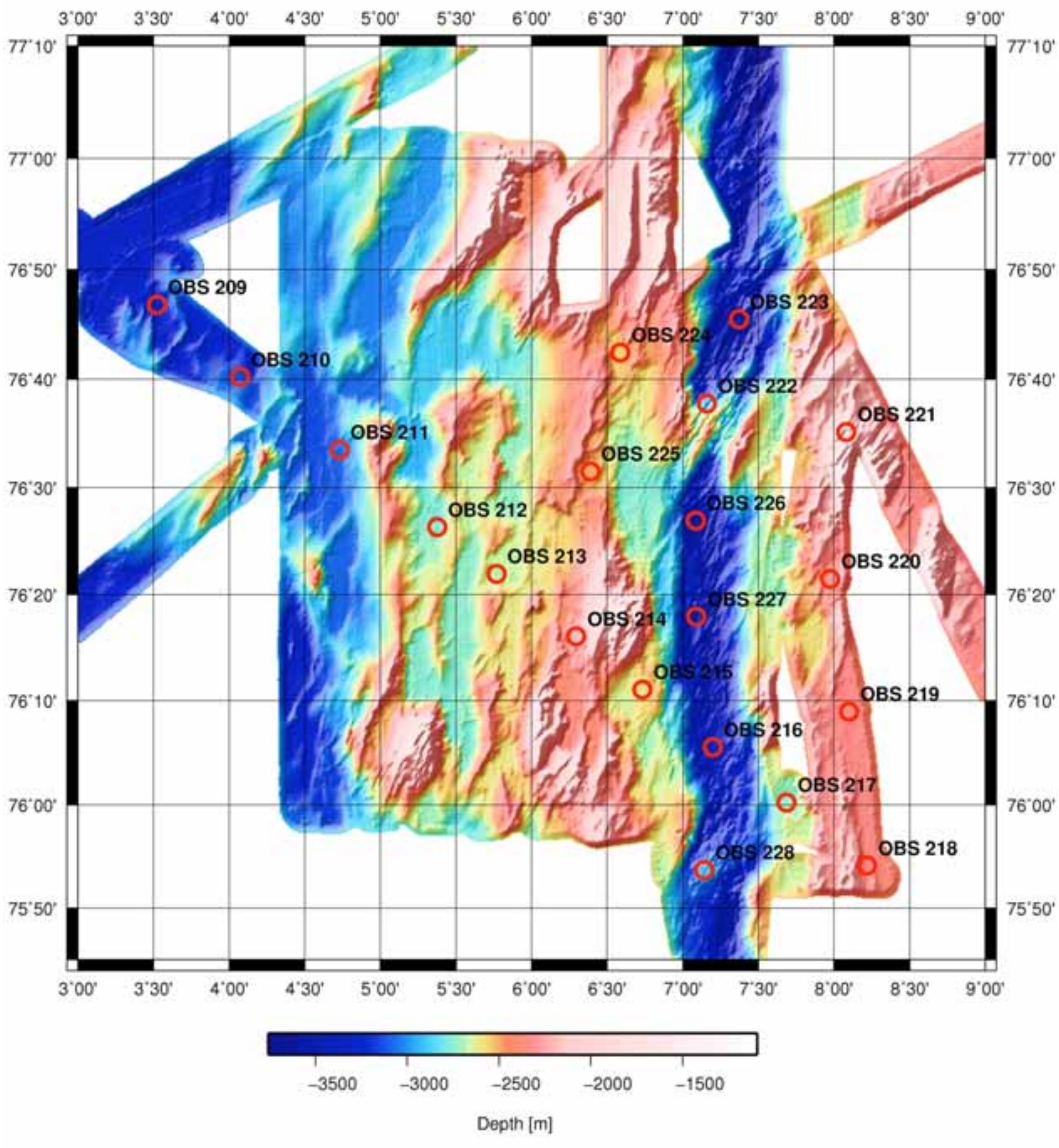

Fig. 3.6.7: Bathymetry of the Knipovich Ridge between 76 and 78° N latitude

4. GPS OBSERVATIONS AND GEODETIC WORK IN NE-GREENLAND

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Objectives

The main goal of the geodetic work was the re-observation of GPS stations at up to 16 ice-free locations in the coastal area of East Greenland between 74° and 81°N, which were installed and firstly observed during *Polarstern* ARK XXIII/1 and ARK XXIII/2 cruises in 2008. In addition, the reconnaissance and set-up of new GPS stations in regions not yet sufficiently covered by observations (i.e., south of 74°N and north of 80°N) were planned.

The network configuration of the stations contains, on the one hand, a west-east component (stations at the ice edge and close to the coast, respectively), and covers, on the other hand, the entire area of investigation between 72° and 81°N. A repetition of the GPS observations at marked stations results in two precise station coordinates, the difference of which yields information on deformations of the Earth's crust. As independent information, it delivers a valuable contribution to the validation and improvement of models of the glacial-isostatic adjustment and of the recent mass balance in North-East Greenland. The significance of horizontal deformations will be checked to contribute to the investigation of the tectonic situation in the area of investigation.

Another aspect of the geodetic work carried out during the cruise was the support of the land activities of the geology group (see Chapter 5) in surveying geologically interesting landmarks and lake levels.

Work at sea and land

Polarstern with its two helicopters provided a basis for the realization of the work. To reach the locations on land, *Polarstern* had to sail to positions close enough to the Greenlandic coast. The geodetic flight programme was fitted to the ship's route such that no additional anchoring had to be done.

The first activities took place during the geophysical operations near to and in Kong Oscar Fjord. In that region, five new GPS stations were installed and successfully observed for the first time (see Table 4.1). Where and when possible to use both helicopters, the four participants of the working group formed two groups of two people each in order to fly with both helicopters and to work at an optimum time schedule.

The transit of *Polarstern* from southern to northern Greenland defined the second part of the working area. Since compact sea ice covered the coastal area between 77°N and 80°'N with a width of up to 80 nm, a careful planning of the flight paths had to be done, and some stations were beyond the helicopter's range. Additionally, weather conditions were not favourable in terms of flight conditions. Finally, four stations installed in 2008 could be reached by the helicopters and were set up for a repeated GPS observation.

A third operation area was found in the Djimphna Sound/Centrumsø region. Together with the flight operations to set out the field camp of the geology group, one helicopter flight to two GPS stations formerly installed during 2008 was possible. An additional station was newly installed near the field camp.

Altogether, 12 GPS stations were set up and successfully observed. Six stations were newly installed this season; at six stations a re-observation of the 2008 campaign took place. A geodetic GPS station was built up by a special marker fixed to the rock, which served to take the GPS antenna and which worked as a forced centering for the antenna. The power supply was realized by means of solar modules and sealed batteries, specially adapted for usage with solar power. GPS receiver, batteries and further devices (charging controller, data logger) were stored in a Zarges aluminium box, which protected the equipment from the influence of the weather. Fig. 4.1 shows an example of the set-up of a GPS station. The receivers collect data for a longer period (depending on receiver model, at least for five days) with a data rate of 30s in order to meet the goal of an accuracy of the determined coordinates of some millimetres. A list of the GPS stations is given in Table 4.1; the locations are also shown in the overview map (Fig. 4.4).

In addition to the TU Dresden GPS stations, two locations of the Danish land survey in Greenland could be reached (see also Table 4.1 and Fig. 4.4), such continuing the work already started during the 2008's cruise. These locations are part of about 100 locations, which were observed by the Danish colleagues of Kort- og Matrikelstyrelsen (KMS, Copenhagen) applying Doppler measurements in North Greenland in the period of 1977 to 1982. The Doppler observations served as a basis to realize a geodetic base network as well as reference points for the airborne photogrammetric surveys and the subsequent edition of topographic maps at the scales 1:500.000 and 1:250.000, respectively. The accuracy of the Doppler positioning was approx. 1.5 m. The presently realized re-observation of the visited locations by means of short-term GPS measurements (for about 15 to 20 minutes each) will help to improve the reliability and accuracy of the network, e.g. by linking the points to the most recent terrestrial reference frame and by solving yet unknown orientation parameters.

Fig. 4.1: Typical set-up of a GPS station.
Left: Complete set-up of station HOPE with antenna (on top of the rock in the middle, directly fixed to the rock by a special bolt), solar panels and Zarges aluminium box.
Right: Sealed batteries (2x56Ah), charge controller and receiver (yellow box atop) with special data logger (down in the middle of the box) are stored in a Zarges aluminium box, which then will be closed to provide some shelter against weather.

One member of the geodetic working group accompanied the geological group during their field camps at the Greenland coast (B. Männel in Mestersvig, R. Rosenau in Skallingen). Their task was the surveying of landmarks, which were of interest for the geologists, especially the leveling of ancient marine shorelines, and to determine the height of the level of the lakes that were sampled by the geology group. Another task was the installation and surveying of one new GPS station in the vicinity of the camp as already described in the above paragraphs.

The determination of lake level heights had to be done with respect to the actual mean sea level at the Greenlandic coast. For that purpose, at three selected locations at the coast tide gauges were installed (see Table 4.1) The tide gauges were co-located with a TU Dresden GPS station, and the observation period coincides with that of the respective GPS station. During the installation of the tide gauge, the ellipsoidal height of the instantaneous sea level was determined by conventional leveling to a GPS antenna (see Fig. 4.2). The tide gauge time series give, on the one hand, valuable information for the validation of ocean tide models. After removing the tides it yields, on the other hand, the mean sea level height (Fig. 4.3).

The re-collection of the equipment from the 7 northern locations took place on two days, when *Polarstern* was close enough to the coast to allow helicopter flights to the land. On September 1st, the four northernmost stations and the Holm Land tide gauge were brought in together with the geological field camp while *Polarstern* cruised in the Djimphna Sound. Another flight operation took place on September 11th, when the remaining three GPS stations were re-collected. The third tide gauge, which was deployed at Shannon Island, could not be retrieved. Heavy ice and a large number of ice floes, which piled up at the shoreline driven there by wind and current, likely took the relatively small measurement device with it and thereby draw it away from the shore. The entire data download was already accomplished on board *Polarstern*. The analysis of the data, however, will be done at the home lab.

Fig. 4.2: Set up of the SHAN tide gauge station. Left: The instantaneous sea level height is determined with respect to a GPS antenna. The tide gauge itself consists of a small pressure sensor that is directly put into the water, and which is connected with a small data recorder stored at the coast. Right: Shannon tide gauge site at time of the re-collection of the equipment

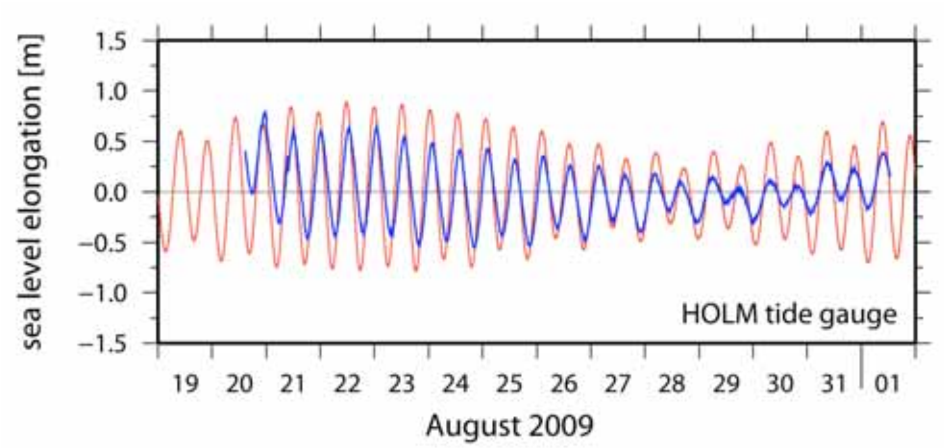

Figure 4.3: Sea level variations observed at the HOLM tide gauge site. The blue line marks the sea level variations that where observed by the tide gauge. Clearly to be seen are the tidal variations with a range of up to ±0.5 m and a distinct semi-diurnal tide. The red curve shows the predicted tides for that site from the TPXO6.2 ocean tide model (Agnew 2005; Egbert et al. 1994). Both curves are centered on their respective mean value.

Table 4.1: List of the GPS Stations with approximate coordinates and time of their observation

Station ID	Longitude West [deg min sec]	Latitude North [deg min sec]	Ellips. Height [m]	Installed (year)	Tide Gauge	Observation period	Gejographical region
BASA	22 32 47	72 42 52	193	2009		10.08.-15.08.2009	Geographical Society Ø, Basaltsø
BUKU	21 16 36	73 08 23	299	2009		10.08.-15.08.2009	Bontekoe Ø
CENU	27 52 32	72 35 16	1543	2009		09.08.-15.08.2009	Cecilia Nunatak
IFJO	26 12 09	73 17 04	1657	2009		09.08.-15.08.2009	Andrée Land, at Isfjord
MEST	23 45 22	72 42 52	77	2009	X	09.08.-14.08.2009	East of Mestersvig station
BART	24 09 38	74 10 28	1046	2008			Ole Rømer Land
HOPE	20 22 26	73 52 12	502	2008		16.08.-11.09.2009	Hold With Hope, Home Forland
SHAN	17 39 07	74 56 01	64	2008	(X)	16.08.-11.09.2009	Shannon, Kap Philip Broke
FRAN	18 37 38	78 34 42	337	2008		18.08.-01.09.2009	Southern island of Franske Øer island group
CRIW	24 18 49	80 05 33	344	2008		20.08.-01.09.2009	Kronsprins Christian Land, south-west at ice edge
HOLM	16 25 54	80 16 23	410	2008	X	20.08.-01.09.2009	Holm Land
MUSK	22 43 23	79 58 46	613	2009		20.08.-31.08.2009	Skallingen
KMS 41005	21 16 39	73 08 22	344	1951		10.08.2009	Bontekoe Ø
KMS 2331	18 12 07	78 49 18	74	1980		18.08.2009	Northern island of Franske Øer island group

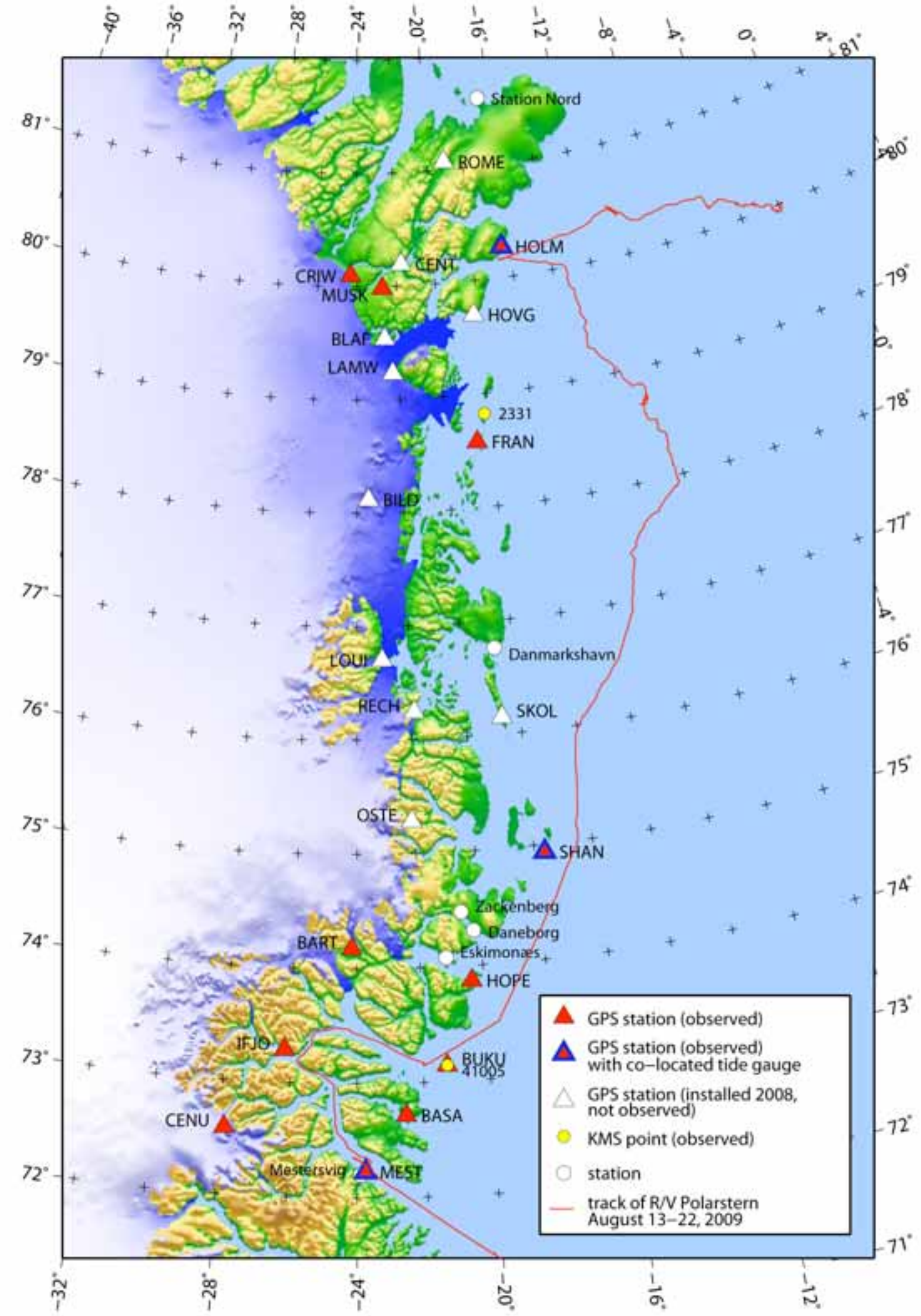

Fig. 4.4: Overview map showing the locations of the GPS stations (DEM by Ekholm 1996)

Acknowledgements

The geodetic programme could be realized that successfully due to the great support by numerous colleagues in the preparation and realization of the expedition as well as by the crew of Polarstern. Especially we like to thank: W. Jokat (chief scientist), J. Büchner and K. Hammrich (helicopter pilots), and S. Schwarze (master of Polarstern).

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Agnew DC (2005). SPOTL: Some Programs for Ocean-Tide Loading. Technical Report, Scripps Institution of Oceanography, University of California, San Diego, La Jolla.

5. PALEOENVIRONMENTAL STUDIES IN NE-GREENLAND

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[2)]GEUS, Copenhagen
[3)]Maquarie University Sydney, Sydney

Introduction

The existing knowledge of past glacial variability in East and North-East Greenland is mainly based on the investigation of ice cores, geomorphologic features, and marine and lacustrine sediment sequences. An important ice-core record originates from the Renland ice cap in central East Greenland (Fig. 5.1). This core provides substantial information on climate changes back to the Pleistocene (Johnsen et al., 1992; Vinther et al., 2008). However, a similar ice-core record covering such a long period does not exist from North-East Greenland. For this region geomorphologic studies and the investigation of marine and lacustrine sediment cores provide information on the minimum ages of deglaciation at the Pleistocene/Holocene transition (e.g. Bennike and Björck, 2002; Cremer et al., 2008) and on postglacial climatic and environmental changes in the coastal ice-free regions (e.g., Hjort, 1979, 1997; Funder and Abrahamsen, 1988; Wagner et al., 2000). Although the knowledge of these paleoclimatic and paleoenvironmental changes between Scoresby Sund (70°N) and Store Koldewey (76°N) has significantly improved during the past years (e.g. Wagner et al. 2000, 2008; Wagner and Melles, 2001, 2002; Klug et al. 2009a, b) the region further north is still poorly investigated.

Some geomorphologic investigations indicate that during the early to mid Holocene thermal maximum glaciers withdrew up to 20 km behind their present positions in interior North and North East Greenland (Weidick et al., 1996; Hjort, 1997, and references herein). However, these geomorphologic findings can hardly be confirmed by lacustrine sediment records, which in general provide reliable paleoenvironmental information. The existing lacustrine sediment records from north of Store Koldewey concentrate on palynological analyses, which were partly complemented with sedimentological, biogeochemical and fossil analyses (Funder and Abrahamsen, 1988; Fredskild, 1995; Bay and Fredskild, 1997; Bennike and Weidick, 2001). In addition to the fact that only few records from this region exist, most of these sediment sequences have poorly constrained chronologies, which complicate robust paleoenvironmental reconstructions including ice-mass changes.

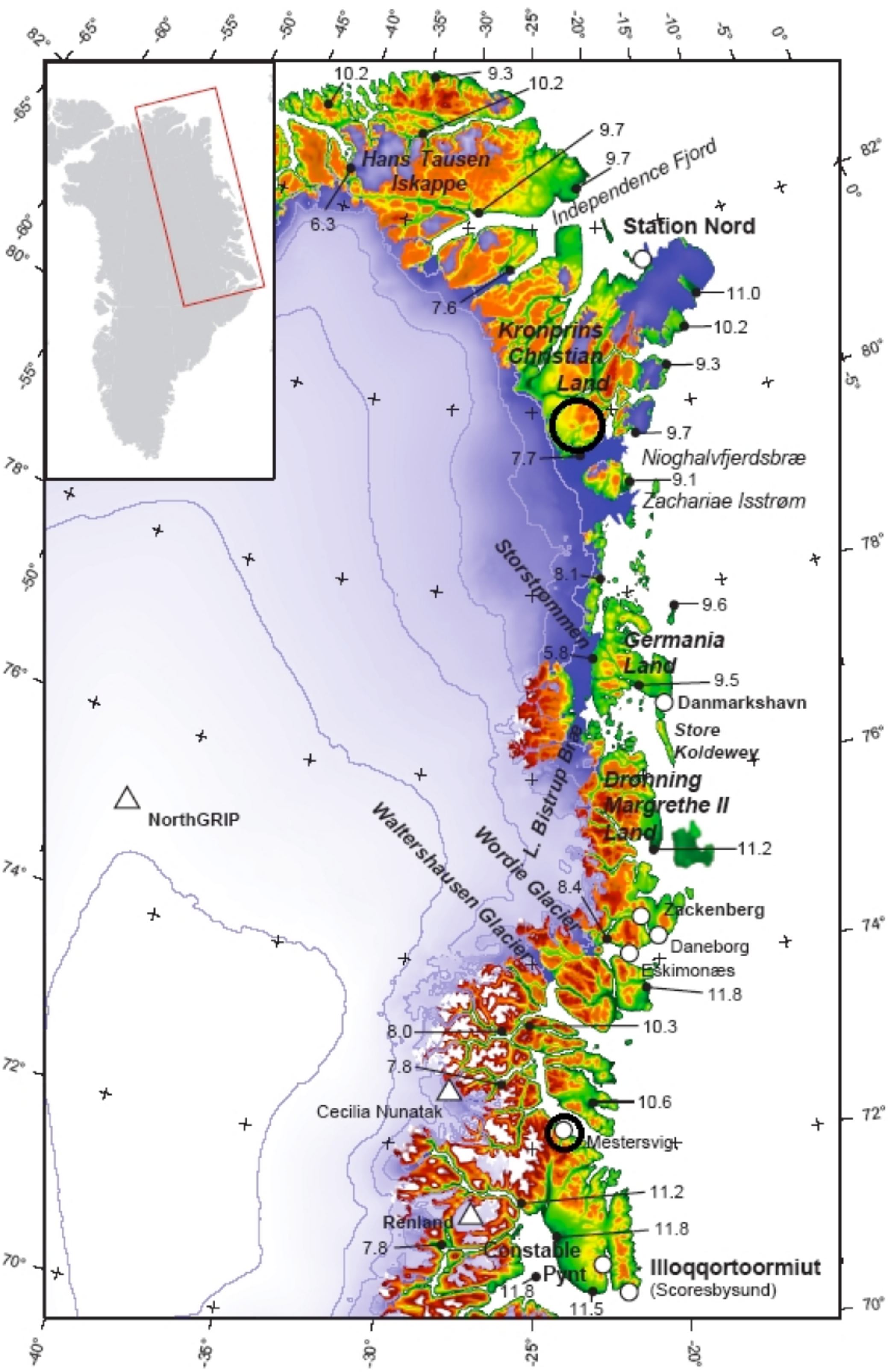

Fig. 5.1: Overview map of North-East Greenland from 70°N to 83°N (© for the DEM: Ekholm, 1996). Black dots indicate the distribution of oldest radiocarbon dates pertaining to the last deglaciation of the ice-free parts of Greenland (dates: calibrated thousand years before present, from Bennike and Björck, 2002). The black encircled regions indicate the study areas close to Mestersvig and in Skallingen, Kronprins Christian Land

Although the region of central East Greenland is much better studied in terms of paleoenvironmental changes, there are still large gaps in knowledge. For example, deposits of the Storegga tsunami, which was created by a submarine slide off Norway about 8150 cal. yr BP (e.g., Haflidason et al., 2005), are found in Norway, Scotland, the Faroe and Shetland Islands, and modeling has shown that a ca. 3 m high wave crossed the North Atlantic within only a few hours (Bondevik et al., 2005). From East Greenland there exists only one record on outer Geographical Society Ø so far (Wagner et al., 2007). More records would be needed to validate this record and to shed more light on the environmental history of East Greenland.

5.1 Fieldwork in the Kong Oscar Fjord region

The fieldwork in the Kong Oscar Fjord region lasted from 9 to 15 August and aimed at two major objectives:

(1) Coring of Noret Basin close to Mestersvig in order to obtain information to deglaciation of the Kong Oscar Fjord, to the environmental history after deglaciation and to check for Storegga tsunami deposits.
(2) Reconstruction of the extent of former ice masses by evaluating the distribution and character of erratics, glacial diamicts and freshly abraded features such as glacial striae and grooves.

Coring

Noret Basin is a marine basin located close to Mestersvig Station in the southern part of Kong Oscar Fjord (Fig. 5.2). It is separated from Kong Oscar Fjord by a shallow subaquatic sill and from the more open sea to the east by a broad ridge, which has a maximum elevation of about 10 m above sea level (a.s.l.). These characteristics make Noret Basin a suitable archive, which potentially contains deposits of the Storegga tsunami, and which can provide information about deglaciation of the Kong Oscar Fjord and the postglacial environmental changes.

Fig. 5.2: Map of the Kong Oscar Fjord region

Prior to coring, the height of the submarine sill, which separates Noret Basin from the Kong Oscar Fjord, and the water depth in the basin were measured with a handheld echosounder. At the time of measurements, the minimum water depth of the sill was determined to ca. 4.5 m, which corresponds to about 5.8 m below the highest astronomical tide. Maximum water depths in Noret Basin were determined along several profiles across the lake to about 48 m. These dates provide only rough estimations of the water depths, since the tide gauge measurements of the sea level in Kong Oscar Fjord indicated a tidal range of about 1.3 m (Fig. 5.3).

Coring was carried out from a floating platform and using a gravity corer of 120 cm length and a piston corer of 300 cm length (UWITEC Co.). More details about the coring equipment used are given, for example, in Bennike et al. (2004). The recovery of cores from different, overlapping depths resulted in a composite sediment sequence of about 13 m length (Table 5.1). The sediments recovered indicated gray to brownish color at the top, and were mainly composed of fine-grained clastic material. With increasing depth, the color of the sediments became grayer and ice-rafted debris (IRD) occurred more often. Single black spots in the sediments are likely due to iron or manganese concretions. Since laminations were not observed, it can be assumed that large parts of the sediments are bioturbated. The very fine grained sediments with sporadic IRD grains and widely absence of organic matter indicate that the lower part of the sediment sequence was likely deposited during deglaciation of Kong Oscar Fjord. Hence, more detailed analyses of the sediment sequence in the laboratory will indicate the timing of deglaciation, if Storegga tsunami deposits occur, and will provide crucial information to the environmental history in the region.

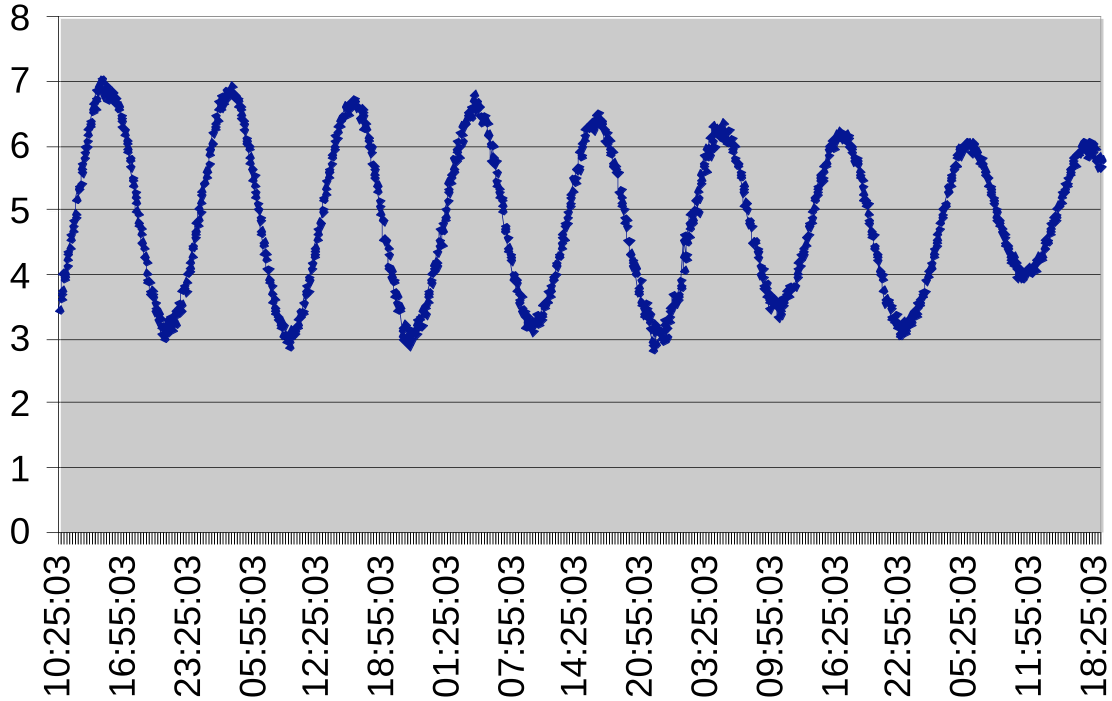

Fig. 5.3: Tidal curve measured from 10 to 14 August in Kong Oscar Fjord close to Noret Basin. Water heights (y-axis) are given in feet, time (x-axis) is in GMT. Details about measurements are given in Chapter 4

Table 5.1: List of sediment cores recovered from Noret Basin

Code No.	Latitude	Longitude	WD (cm)	Penetration (cm)	Date	Gear
Co1205-1	N 72°13.251	W 023°48.532	46.0	0-35	10 August	gravity corer
Co1205-2	N 72°13.251	W 023°48.532	46.0	0-34	10 August	gravity corer
Co1205-3	N 72°13.272	W 023°48.569	45.5	0-33	10 August	gravity corer
Co1205-4	N 72°13.272	W 023°48.569	45.5	0-234	11 August	piston corer
Co1205-5	N 72°13.272	W 023°48.569	46.3	134-431	11 August	piston corer
Co1205-6	N 72°13.272	W 023°48.569	46.6	365-658	11 August	piston corer
Co1205-7	N 72°13.239	W 023°48.498	45.5	550-692	12 August	piston corer
Co1205-8	N 72°13.239	W 023°48.498	46.0	600-899	12 August	piston corer
Co1205-9	N 72°13.256	W 023°48.555	45.5	800-1100	13 August	piston corer
Co1205-10	N 72°13.250	W 023°48.485	45.7	1000-1302	14 August	piston corer

WD – water depth

Geomorphology

The reconstruction of the extent of former ice masses by evaluating the distribution and character of erratics, glacial diamicts and freshly abraded features such as glacial striae and grooves was carried out along a transect, which extended from the mouth of Kong Oscar Fjord to Ceilia Nunataks, a few km from the ice sheet margin (Fig. 5.4). This transect consisted of 5 days of detailed ground based investigations at Dannevirke (near Mestersvig), a short helicopter based visit to Ceilia Nunataks and the summit of Grifhovedet, and ship based reconnaissance from the outer fjord to Antarctic Sund.

The aim of this transect was to reconstruct the thickness of ice draining from the ice sheet since the Last Glacial Maximum, and collect samples to date this retreat. This transect should provide a good comparison to the well documented glacial history of the Scoresby Sund region (Funder et al., 1998; Håkansson et al., 2007, 2008), and determine if there is any spatial variability in the extent and timing of ice retreat in this sector of Greenland.

The primary study site on this transect was Dannevirke near Mestersvig, where the relatively low angled (~15º) fjord walls have allowed the preservation of late Quaternary sediments (Fig. 5.5). In the upper zone, from the summit down to ~ 350 m a.s.l, there were no distinct glacial sediments or erratics observed, and the sandstone and dolerite bedrock was highly weathered. The lack of glacial erratics in this area indicates that it has not been recently overrun by ice flowing from inland regions, and the lack of well-preserved glacial landforms indicates that any locally sourced ice caps have been small and cold based.

In the middle zone, from ~350 to 100 m a.s.l, there is an assemblage of lateral moraines, kame terraces and glacifluvial fans and notches. Glacially transported boulders in these areas are a mixture of locally sourced sandstones (~30%) and shales (~10%), with more erratic lithologies such as a distinct quartz rich dolerite (30%), granite (10%) and gneisses (20%). These features are reasonably well preserved on slopes not affected by strong fluvial reworking or mass wasting. Robust glacial grooves and striae are preserved on dolerite bedrock, and erratics remain commonly perched on local summits. This sequence is interpreted as having been deposited by the lateral and terminal margins of a glacier draining the ice sheet as it retreated back through the fjord. The height of this event is broadly consistent with the reconstructed ice thickness in this area by Funder and Hansen (1996).

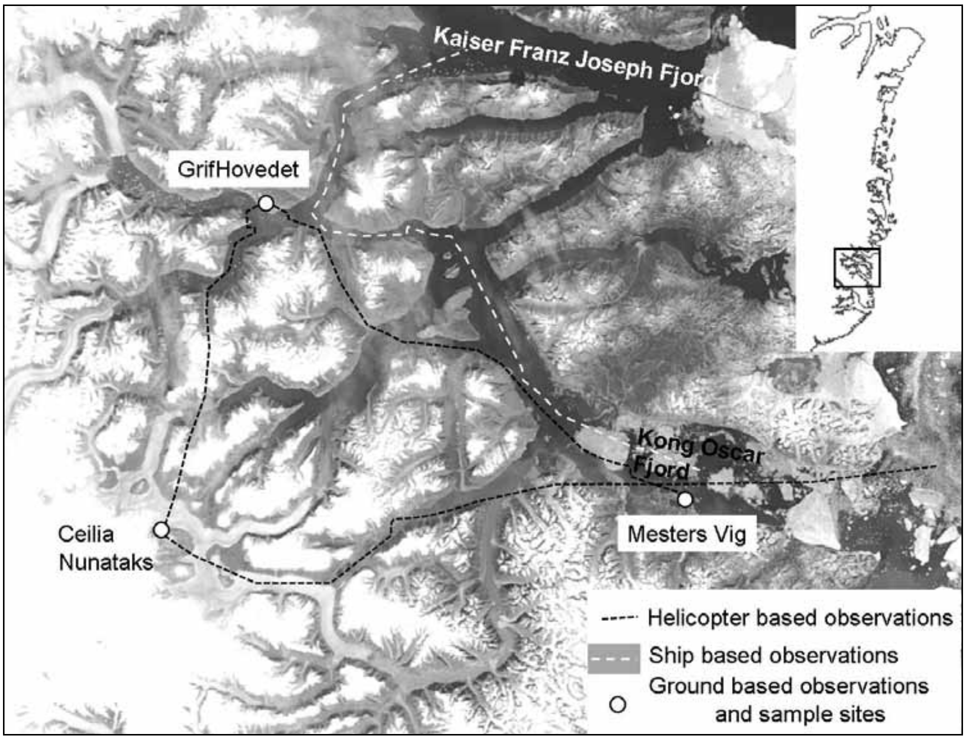

Fig. 5.4: Map of the southern transect

Glacial sediment and striae are also found in the lower zone, from sea level to 100 m elevation. However, glacifluvial sediment is absent and erratics are only very rarely found perched on local summits. As described by Washburn (1965), there is a well-preserved set of beach terraces and deltas to at least 80 m a.s.l. and shelly marine sediments are observed in stream sections at altitudes below 60 m a.s.l. This zone is interpreted as an area that was below sea level during the time the outlet glacier retreated from the outer fjord, and has since been glacio-isostatically uplifted to it's present position.

Observations of the fjord walls from the ship indicate that these three zones extend laterally along both directions in the fjord. Fresh glacial debris are preserved at intermittent locations at least 20 km further inland, although the height increases to at least ~600-800 m a.s.l. Also, well-preserved flights of deltas are preserved tens of metres above modern sea level at least as far inland as Antarctic Sund.

Based on the degree of weathering of the glacial sediments below the kame terrace/lateral moraine at Dannevirke, and comparisons with the glacial history of the Scoresby Sund region, it is tentatively suggested that these sediments were likely deposited in either the Flakkerhuk or Milne Land stadials. A more precise chronology of these deposits should be gained from the 14 cosmogenic exposure samples collected from Mestersvig and Ceilia Nunataks for this purpose (Table 5.2). Also, eight optically stimulated luminescence samples were collected from the flight of beach terraces at Dannevirke, from sea level to 36 m a.s.l. to better reconstruct the late Holocene relative sea level history at this site.

Table 5.2: Details of cosmogenic, optically stimulated luminescence and marine shell samples collected during the voyage

Loc.	Sample #	Lat. (N)	Long (W)	Alt. (m a.s.l.)	Date	Bedr.	Err.	Shells	OSL	Sed.	Estimat. age
CN	Cel-1	72.5878	27.8756	1543	10/08	1	3				degl/holoc
GR	Cel-2	73.2844	26.2025	1657	10/08	1					pre LGM?
MV	hovdet	72.2197	23.7558	3	10/08		1				late holoc.
MV	044	72.1708	23.3989	712	12/08	2					pre LGM?
MV	046	72.1744	23.7750	251	12/08		1				LGM
MV	047	72.1925	23.7810	172	12/08		1				deglacial
MV	048	72.1927	23.7799	182	12/08	1	1				deglacial
MV	049	72.1927	23.7799	169	12/08		1				deglacial
MV	050	72.2171	23.7780	0	14/08		1				recent?
MV	056	72.1909	23.8783	313	14/08		2				LGM
MV	057	72.2247	23.7494	0	15/08				1		modern
MV	058	72.2238	23.7512	2	15/08				1		late holoc.
MV	059	72.2226	23.7516	6	15/08				1		late holoc.
MV	060	72.2209	23.7502	12	15/08		1		1		late holoc.
MV	061	72.2205	23.7512	15	15/08			1			late holoc.
MV	062	72.2204	23.7461	25	15/08		1				late holoc.
MV	063	72.2199	23.7464	22	15/08				1		late holoc.
MV	064	72.2164	23.7411	28	15/08				1		late holoc.
MV	065	72.2163	23.7379	28	15/08				1		late holoc.
MV	066	72.2160	23.7354	32	15/08				1		late holoc.
GS	072	80.0402	22.8951	438	21/08		1				deglacial?
SK	075	79.9586	22.5569	556	23/08	1	1				deglacial?
SK	081	79.9792	22.7241	582	23/08	1	3				deglacial?
GS	083	80.0199	22.9975	540	24/08		1				deglacial?
GS	084	80.0246	22.9920	525	24/08	1	2				deglacial?
GS	085	80.0293	22.9797	374	24/08		2				deglacial?
SK	087	79.9722	22.7240	569	25/08		2				deglacial?
GS	090	79.8877	23.6560	395	26/08		2				v.l. degl?
SK	096	79.9153	23.9917	380	27/08		2				v.l. degl?
SK	097	79.9139	23.9979	370	27/08	1	1				v.l. degl?
SK	107	79.9411	22.6128	593	31/08					14	deglacial
SK	109	79.9411	22.6128	628	31/08		1				deglacial

CN – Ceilia Nunataks; GR – Grifhovedet; MV – Merstersvig; GS – Graeselv; SK – Skallingen; v.l. degl – very late deglacial

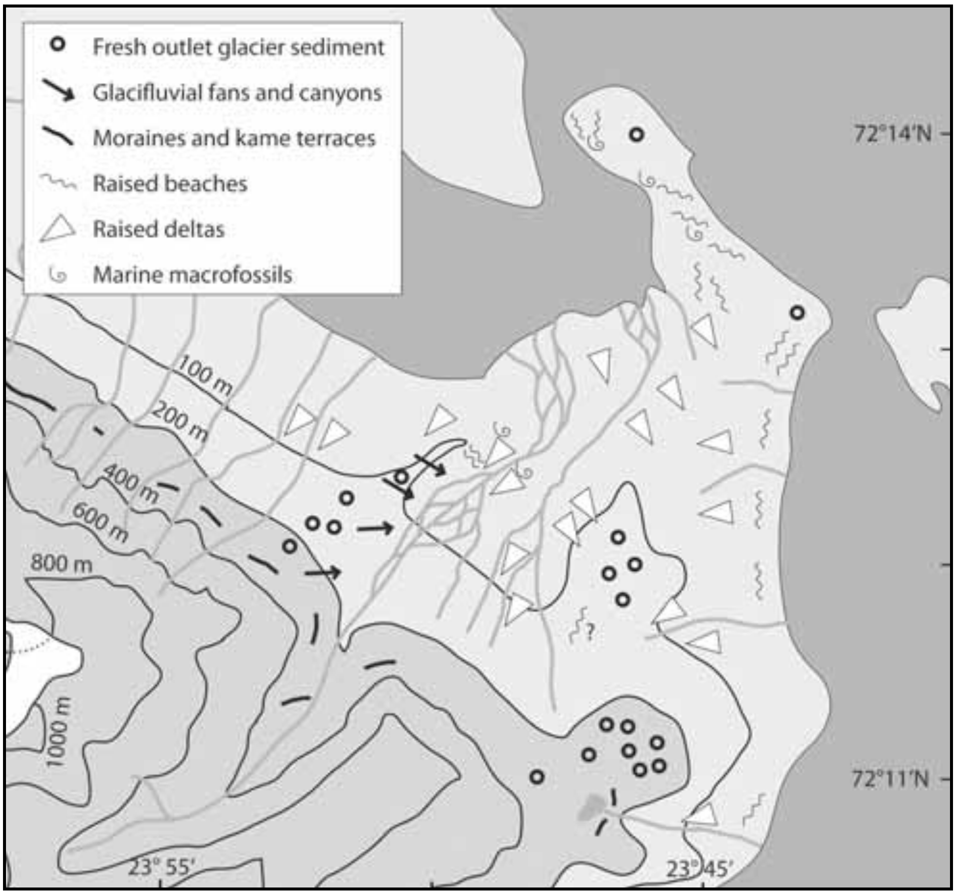

Fig. 5.5: Quaternary sediments at Dannevirke

5.2 Fieldwork in Skallingen

The fieldwork in Skallingen, Kronprins Christian Land, lasted from 20 August to 1 September and aimed at two major objectives:

(1) Coring of several lakes in order to obtain information about the timing of deglaciation and the environmental history after deglaciation of the region.
(2) Reconstruction of the extent of former ice masses by evaluating the distribution and character of erratics, glacial diamicts and freshly abraded features such as glacial striae and grooves.

Coring

The central part of Skallingen contains numerous, so far unnamed lakes of up to 2 kilometers in diameter (Fig. 5.6). Some of these lakes were selected for paleoenvironmental studies, since their location between the Greenland ice sheet and local ice caps suggests that they became deglaciated relatively early at the Pleistocene/Holocene transition. Thus, the lakes may contain sedimentary records covering the entire Holocene. Although the selected lakes are located between ca. 480 and 580 m a.s.l., the fairly rich vegetation in the catchment is assumed to provide sufficient nutrients into the lakes for productivity. Changes in the vegetation density or in the vegetation assemblages or in the productivity in the lakes hence may be recorded in the sediments and may be used to infer climatic changes in the region.

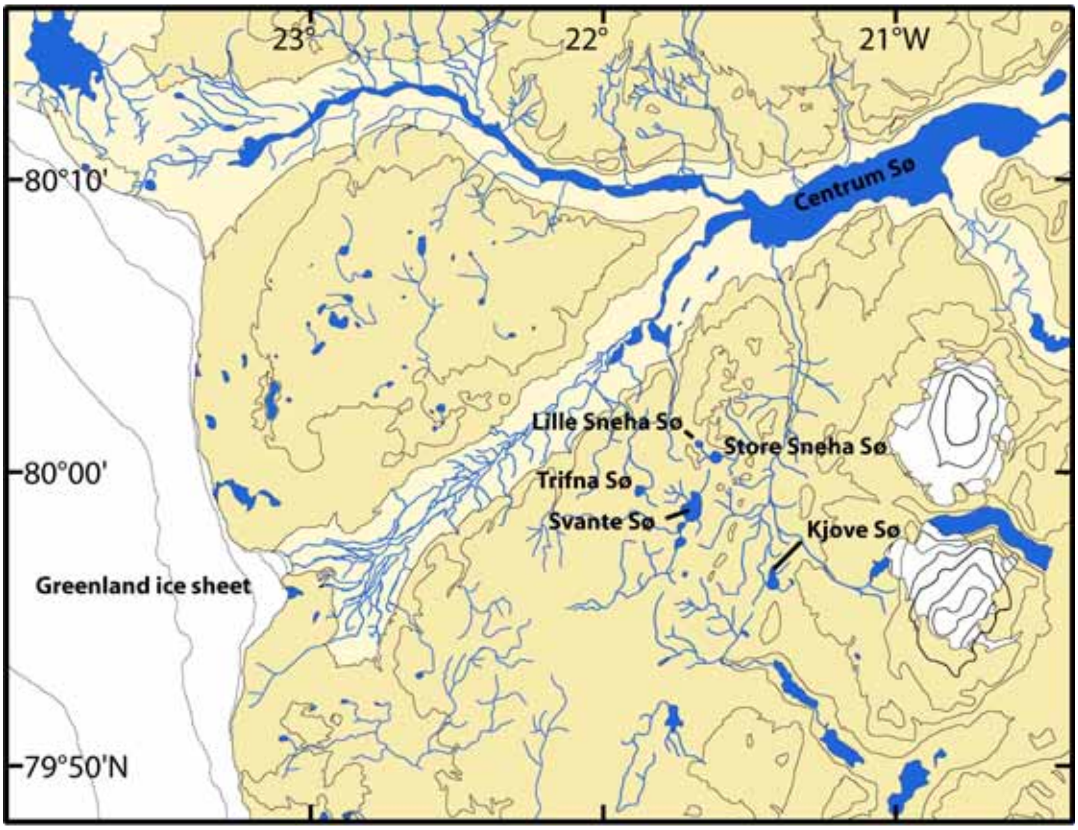

Fig. 5.6: Map of the Skallingen region with lakes mentioned in the text

The present hydrological conditions in the lakes can be estimated from hydrological measurements in the largest lake, here called Svante Sø. At the day of measurements, a multi-probe (WTW 197 Multi) indicated a pH of 8.4 and a low specific conductivity of 86 μS/cm in the surface water. The temperature was 5.7°C, but it is likely that short-term weather changes will significantly affect the water temperatures. Since the lake is relatively shallow, it can be assumed that the lake is completely mixed in summer. Although hydrological measurements were not carried out in the other lakes investigated, it is likely that these lakes have similar characteristics.

Prior to coring, the water depths of the lakes were measured by a handheld echosounder. Wherever possible and supported by the basin internal morphology, the deepest spots in the lakes were chosen as coring locations. Some of the lakes, however, were too deep for the coring equipment used and more lateral, shallower coring locations had to be selected. Coring was carried out from a small floating platform, using a gravity corer for the recovery of undisturbed surface sediments and a Russian peat corer with a 1 m long and 7.5 cm diameter chamber for deeper sediments. An overview of selected lakes and sediment cores recovered is given in Table 5.3.

Table 5.3: List of sediment cores recovered from lakes in Skallingen, Kronprins Christian Land

Code No.	Name	Latitude	Longitude	Alt. (m a.s.l.)	WD (cm)	Pen. (cm)	Date	Gear
Co1206-1	Svante Sø	N 79°59.139	W 022°40.018	556	12.3	0-51	20 August	GC
Co1206-2	Svante Sø	N 79°59.140	W 022°40.022	556	12.3	0-51	21 August	GC
Co1206-3	Svante Sø	N 79°59.140	W 022°40.022	556	12.3	0-56	21 August	GC
Co1206-4	Svante Sø	N 79°59.140	W 022°40.022	556	12.3	65-165	21 August	RC
Co1206-5	Svante Sø	N 79°59.140	W 022°40.022	556	12.3	25-125	21 August	RC
Co1206-6	Svante Sø	N 79°59.140	W 022°40.022	556	12.3	50-150	21 August	RC
Co1207-1	Svante Sø	N 79°58.652	W 022°42.103	556	15.3	0-54	24 August	GC
Co1207-2	Svante Sø	N 79°58.652	W 022°42.103	556	15.3	0-51	24 August	GC
Co1207-3	Svante Sø	N 79°58.652	W 022°42.103	556	15.3	10-110	24 August	RC
Co1208-1	Store Sneha Sø	N 80°00.520	W 022°35.628	573	26.0	0-39	25 August	GC
Co1209-1	Store Sneha Sø	N 80°00.552	W 022°35.751	573	17.6	0-39	25 August	GC
Co1209-2	Store Sneha Sø	N 80°00.552	W 022°35.751	573	17.6	0-100	25 August	RC
Co1209-3	Store Sneha Sø	N 80°00.552	W 022°35.751	573	17.6	0-100	25 August	RC
Co1210-1	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	0-44	26 August	GC
Co1210-2	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	0-50	26 August	GC
Co1210-3	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	20-120	26 August	RC
Co1210-4	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	10-110	26 August	RC
Co1210-5	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	0-70	26 August	RC
Co1210-6	Lille Sneha Sø	N 80°00.958	W 022°39.014	583	10.7	15-115	26 August	RC
Co1211-1	Trifna Sø	N 79°59.368	W 022°51.222	561	6.4	0-69	27 August	GC
Co1211-2	Trifna Sø	N 79°59.318	W 022°51.202	561	5.8	0-63	28 August	GC
Co1211-3	Trifna Sø	N 79°59.318	W 022°51.202	561	5.8	60-160	28 August	RC
Co1211-4	Trifna Sø	N 79°59.318	W 022°51.202	561	5.8	30-130	28 August	RC
Co1211-5	Trifna Sø	N 79°59.318	W 022°51.202	561	5.8	10-110	28 August	RC
Co1212-1	Kjove Sø	N 79°56.632	W 022°24.947	481	15.4	0-52	29 August	GC
Co1212-2	Kjove Sø	N 79°56.632	W 022°24.947	481	15.4	10-110	30 August	RC
Co1212-3	Kjove Sø	N 79°56.632	W 022°24.947	481	15.4	60-160	30 August	RC
Co1212-4	Kjove Sø	N 79°56.632	W 022°24.947	481	15.4	60-160	30 August	RC

Alt – Altitude; WD – water depth; Pen. – Penetration; GC – gravity corer; RC _ Russian corer

Svante Sø is the largest lake investigated. The lake is about 1.7 km long and 800 m wide. A sandy ridge in the northwestern part of the lake extends into the basin as a split and separates the lake into a smaller northern and a larger southern sub-basin. The maximum water depth was 12.3 m in the northern sub-basin and 15.3 m in the southern sub-basin. Cores were recovered from both sub-basins. The core from the northern sub-basin exhibited 30-40 cm of sand and silt at its base, which were likely deposited during deglaciation of the basin. These sediments were overlain by fine laminated gyttja, which likely reflects the lacustrine sedimentation after deglaciation in this sub-basin. In contrast, the core from the southern sub-basin contained a second horizon of silt and sand, which was separated from the lower one by an organic horizon with cryogenic overprinting. Freezing of the sediments could indicate that the lake, or at least the southern basin, has a thermokarstic origin, or that significant relative lake level fluctuations occurred at the beginning of the lacustrine sedimentation.

Store Sneha Sø has a round shape and measures ca. 800 m in diameter. The lake was to about one third ice-covered at the day of coring. The maximum water depth measured in the lake was about 26 m. Since this is too deep for the coring equipment used, the lake was cored from the ice cover, where a water depth of 17.6 m was measured. The core base was formed by sand, which was overlain by silt and weakly laminated organic gyttja.

Lille Sneha Sø has also a roughly round shape, except of the northern part, where the main inlet has formed a relatively large delta. The diameter of the lake is about 400 m. The sediment sequence recovered from the deepest part of the lake at 10.7 m water depth consisted of a silty to sandy base, which was overlain by finely laminated gyttja. It can be assumed that the sequence contains the complete Holocene history of the basin after deglaciation.

Trifna Sø is oval in shape and has a length of ca. 1.2 km and a width of ca. 800 m. The maximum water depth was determined to 6.4 m. As observed from the coring platform, the sediment surface was patchy covered by mosses. The core from close to the deepest part of the basin exhibited cryogenic overprinting of soil or sediment at the base. This horizon was overlain by a silty horizon, followed by laminated gyttja with interspersed moss horizons towards the top of the sequence.

Kjove Sø has maximum length of ca. 1.5 km and a maximum width of ca. 600 m. The northernmost part of the lake was partly ice-covered at the day of coring. Since the maximum water depth in the lake was about 21 m, a shallower coring location was chosen in the northern part of the lake, where the water depth was determined to 15.3 m. The base of the core was formed by silty sand, which was overlain by ca. 1.3 m of fine laminated gyttja likely containing the entire lake history.

Exploration of other, smaller lakes in the vicinity of the camp at Svante Sø revealed that large boulders covered their sediment surface or that these lakes were very shallow. Therefore, these lakes were not suitable to provide promising sediment sequences. Some of the lakes, particularly the shallower ones, started to become ice-covered by the end of the field season. The ice cover on Store Sneha Sø and on

Kjove Sø likely formed in the winter before, and persisted due to the relatively large water depths and volume of these lakes at least partly during summer.

Geomorphology

Ground based investigations were conducted along the uplands south of Græselv, from the ice sheet to ~22.5ºW. These observations were supplemented with four E-W helicopter reconnaissance transects from 23°W to the coast, between 80ºN and Nioghalvfjerdsfjorden, and a ship based circumnavigation of Dijmphna and Hekla Sunds. (Fig. 5.7).

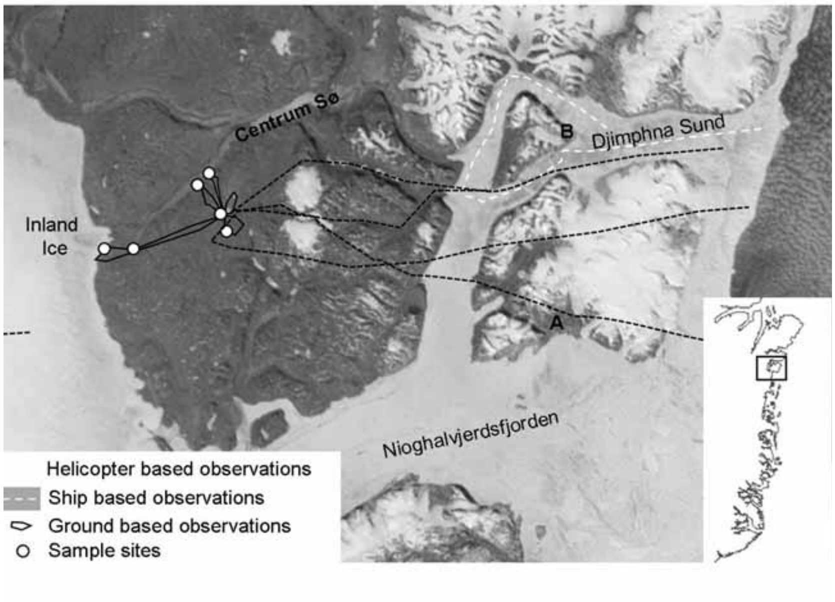

Fig. 5.7: Map of field activities and sample locations on the 80ºN transect

The ground-based observations revealed that the uplands south of Græselv were covered in a silty diamict, at least 1.5 m thick (Fig. 5.8). Based on three lines of evidence, it is interpreted that this diamict was deposited by the ice sheet. Firstly, the diamict was rich in erratic lithologies, with quartzite, sandstone, granite and dolerite clasts making up 60-80% of the clasts observed on the ground. Secondly, fluvioglacial sediments were found on the eastern side of most of the moraines, indicating that ice bordered these ridges to the west. Thirdly, there is a distinct increase in weathering from the ice sheet along the ground survey (Fig. 5.9), suggesting retreat of ice to the west. Samples of bedrock and erratic boulders for cosmogenic isotope dating were collected along this transect to provide a chronology of ice retreat from these areas (Table 5.2). Further samples were also collected in a pit near the main camp to determine the importance of sediment reworking, both pre and post-deposition, on exposure age dating in this sediment mantled area.

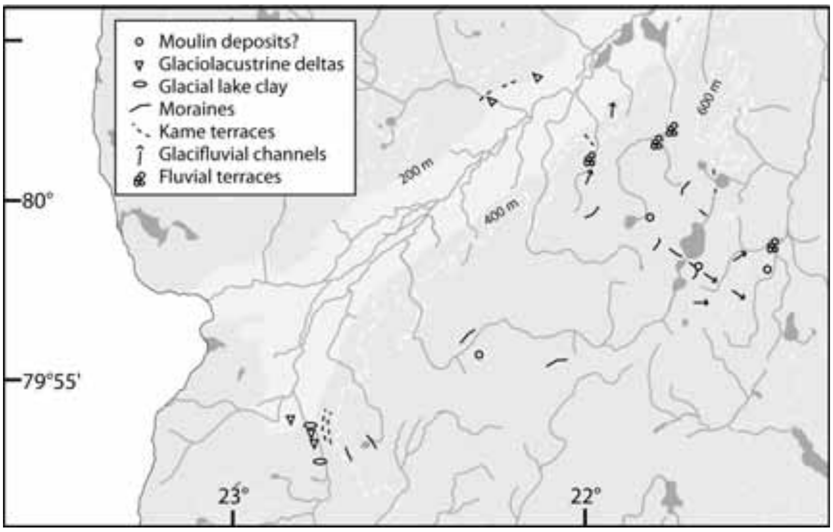

Fig. 5.8: Map of glacial features observed in the Skallingen region

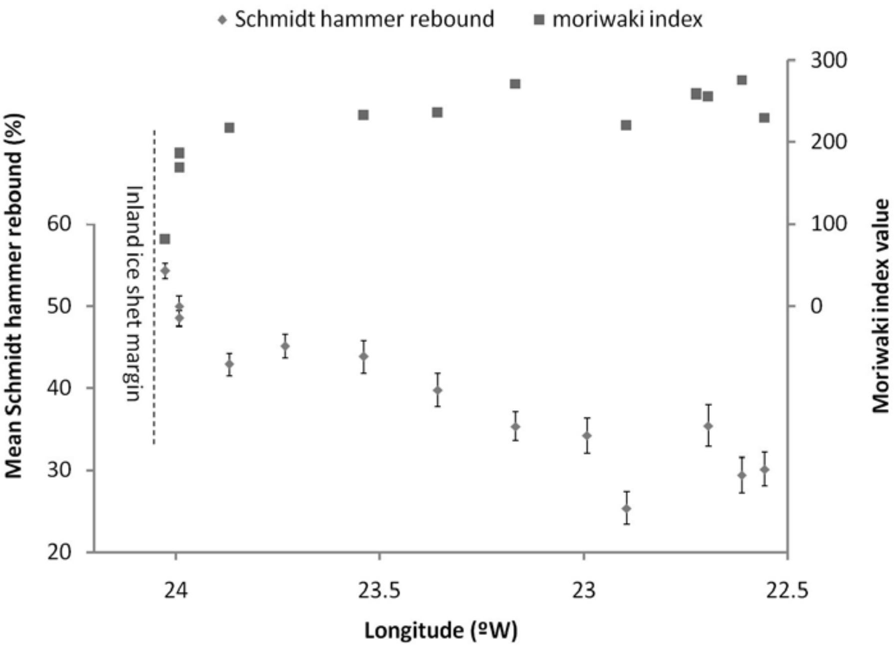

Fig. 5.9: Weathering of dolerite boulders along the southern margin of Græselv. Moriwaki index values refer to the scheme described in White et al., in press, where larger numbers indicate a more weathered deposit

Ship and helicopter based observations of sediments in the coastal regions provide suggestions of a distinct glacial limit halfway up the outer fjords, similar to that at Kong Oscar Fjord. These include a distinct moraine deposited from a small tongue of the Nioghalvfjerdsbræ on the southern margin of Hovgaard Ø at 300-500 m at 79º 48'N, 22º 19'W, and large collection of fresh, hummocky debris that terminate at a similar elevation on the eastern tip of Lynn Ø. However, these reconnaissance observations require ground truthing to confirm these interpretations and also for collection of samples to provide a chronology for this former ice limit.

Annotated list of mammals, birds and vascular plants from Skallingen

MAMMALS

Arctic fox. A single fox came and inspected our camp, and a single animal, presumably the same one, was also observed in the area on several occasions. Droppings and tracks of foxes were also regularly encountered.

Arctic wolf. Tracks of a wolf were noted at a few places. A single wolf was seen on several occasions just north of Nioghalvfjerdsfjorden in the summer 1998, and Sirius people in the region have also seen wolves in the early summer. In contrast, no wolves were observed during the Peary Land Expeditions from 1947-1950, or during the US Air Force work in the Centrum Sø area from *c.* 1958 to 1960. The wolf probably re-immigrated to Greenland from Canada in the 1960s or 1970s. However, the species has a long history in Greenland, and arrived already in the early or mid Holocene.

Ermine. A single animal was observed in the eastern part of Skallingen on the 23rd August. Ermines are widespread in northeastern Greenland, but rarely observed.

Collared lemming. Both winter nests and burrows of lemmings were common, and a single animal was also observed. The so-called lemming gardens were also found here and there, and owl pellets with lemming bones and hair were also frequent. It appeared that the Skallingen area supported a rather dense population of lemming.

Arctic hare. Only a few arctic hares were seen, apparently more or less being restricted to areas with bedrock exposures. On the helicopter flights between the outer coast and our main camp, several small flocks of 3-5 hares were observed. An old looking bone of an arctic hare was found; the bone was apparently weathering out of glaciolacustrine silt. The oldest bones of arctic hare found in Greenland so far come from archaeological sites belonging to the Independence I Culture and are dated to around 4500 years before present. Maybe an age determination of the bone from Skallingen can push back the history of this mammal species in Greenland. So far no bones from geological deposits have been dated.

Muskox. Two groups of muskox were observed, one with 6 animals and another with 8 animals. In addition, a lone bull was met with. The animals were mainly foraging in areas rich in arctic willow. Bones of muskox were surprisingly rare, only a skull was observed. This rarity may indicate that muskox only frequent the Skallingen area in late summer, after the ground has dried out to allow the animals to move around. The species is widespread in northeastern Greenland, but the population density is very low in Kronprins Christian Land (of which Skallingen is part), and we were surprised to see so many animals. One bone fragment of a muskox found near Blåsø south of Skallingen in 1997 was dated to *c.* 4000 years BP and is the oldest record for the species from the area.

BIRDS

Longtailed duck. A group of 6 birds was seen on Svante Sø. It was probably a breeding bird with a flock of young.

Pinkfooted goose. This was by far the most common bird species in the area, with an estimated total of around 2000 birds. However, it was difficult to count the birds because some flocks were roosting in the area and were seen repeatedly. Most birds observed were flocks, usually with 100 to 200 birds, migrating south. The species is a common breeding species in central eastern Greenland, but non-breeders go north to moult. In the past years, several thousand pinkfooted geese have begun to go to Peary Land during the moulting season. This probably reflects that the Greenland population of this goose species has increased markedly during the past decades. Goose droppings were common, especially along the shores of the lakes.

Gyrfalcon. A single white bird was noted on the 30th August. The species is a rare but widespread breeding bird in northeastern Greenland.

Ringed plover. Ringed plovers were regularly seen, but only in low numbers. The maximum number of birds seen on one day was 4 birds. The species is common in the region.

Turnstone. Turnstones were seen in low numbers, with a maximum of 10 birds on the 25th August.
The last birds were noted on the 28th August. The species is widespread and fairly common in the region.

Sanderling. Sanderling was the most common wader in the Skallingen area. Small flocks were observed every day, and the highest number noted on one day was *c.* 50 on the 25th August. The species is common in the region.

Dunlin. A few birds were regularly seen even until the 1st September when we left. The maximum number was 5 birds on 21st August. There are no potential breeding sites for this species at Skallingen, but the species may breed in some of the valleys, such as the Græselv valley, that are found at the borders of Skallingen. Skallingen is close to the northern range limit of this species.

Knot. Only a fews knots were observed, with a maximum of 5 birds on the 21st August. The breeding status of this species in the region is poorly known.

Grey phalarope. A single grey phalarope was observed on the 1st September. It stayed together with a small flock of sanderlings, swimming near the shore of Svante Sø. It was in winter plumage. Grey phalaropes are rare visitors to the region.

Long-tailed skua. A single stationary adult bird was found at Kjove Sø on 29th and 30th August. It was presumably a breeding bird because non-breeders normally leave northeastern Greenland already in mid-summer. The species is widespread in the region.

Snowy owl. A single adult bird was observed on several occasions, between 21st and the 29th August. The species is widespread, but rather rare in the region.

Raven. A single bird was recorded at our camp. Raven is an extremely rare bird this far north, and the observation may be the northernmost in northeastern Greenland. However, a single bird has been recorded in Nansen Land in northwestern Peary Land.

Snow bunting. Two flocks of snow buntings were observed, one with around 45 birds on the 28th August, another with 5 birds on the 29th August and another with 5 birds on the 30th August. These birds must represent birds coming from areas to the north, because Skallingen offers very few potential breeding sites for this species.

VASCULAR PLANTS

Vascular plants were found to be surprisingly common, whereas mosses and lichens were rare, reflecting the unstable soils of the Skallingen area. The flora is typical for an area with long-lasting snow cover, and *Saxifraga oppositifolia* mainly occurred in the snowfield form. The diversity of vascular plants was low, also reflecting the long-lasting snow cover. Below a list of vascular plants noted is provided, with a general impression of their frequency. r = rare, c = common, a = abundant.

Alopecurus alpinus: c at Kjove Sø
Braya purpurascens: c
Carex misandra: r at Kjove Sø
Carex nardina: r at Kjove Sø
Cerastium arcticum: c
Cerastium regellii: c, often in flower
Draba bellii: a
Dryas integrifolia: r, but c at Kjove Sø
Eriophorum angustifolium: r
Eriophorum scheuzeri: r
Juncus biglumis: c
Kobresia sp.: Only noted at Kjove Sø
Minuartia sp.: c
Papaver radicatum: c

Phippsia algida: c
Puccinellia angustata: c
Salix arctica: c
Saxifraga caespitosa: r
Saxifraga cernua: a
Saxifraga oppositifolia: a
Stellaria longipes: a

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6. INVESTIGATON OF PERFLUORINATED ORGANIC COMPOUNDS AND BROMINATED FLAME RETARDANTS IN THE NORTH ATLANTIC

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Introduction

Polyfluoroalkyl-substances (PFAS) have been produced and applied worldwide in high volumes for several decades to fabricate consumer products such as polymerisation aids, stain repellents in carpets, textile, and leather and paper products. PFAS is used to describe a wide range of chemicals containing fully fluorinated carbon atoms of varying chain length ($CF_3[CF_2]_n$-R). Perfluorocarboxylic acids e.g. perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), which are the widely known PFAS due to their presence in the global environment and detectable concentrations in wildlife and humans both in source regions and remote areas. Some toxicological effects have been attributed to these compounds based on recent laboratory studies.

PFASs have been synthezised either via electrochemical fluorination or telomerisation. Commercial production of PFOS has been based on the electrochemical fluorination with perfluorooctanesulfonyl fluoride (PSOF) as the basic unit of the group of perfluoroalkyl sulfonate derivatives, thus PFOS is the ultimate degradation product of PSOF-based polymers. The telomerisation process is used to produce perfluoroalkyl carboxylates (PFCs) and fluorotelomer alcohols (FTOHs). FTOHs can be transformed to PFCA during photo- and biological degradation processes. The annual global production of PFCs was estimated to be 4400-8000 tons/yr between 1975-2004.

PFOA and PFOS may directly enter the environment during their production, processing and dispersion of fluoropolymers, production and use of fire fighting foams, and emission from commercial products. Indirect sources of PFOA and PFOS are photo- and microbial degradation of volatile and semivolatile precursors such as perfluorosulfonamides (xFOSA), perfluorosulfonamidoethanols (xFOSE) and FTOHs. FTOHs and FOSE/A have been shown to be present ubiquitously in the atmosphere, including the Arctic and Antarctic. Atmospheric degradation of these precursors has been recognized to be a significant source for the presence of PFOA and PFOS in remote regions.

The brominated flame retardants (BFRs), particularly polybrominated diphenyls (PBDEs), tetrabromobisphenol A (TBBPA) and hexabromocyclododecane (HBCD) have been used in a variety of commercial applications to prevent fire. BFRs have been produced world wide more than 200,000 metric tons each year. Europe consumed 15% of the market volume. They are more likely to leach out of the products during the lifetime. The impacts of BFRs on the environment and their potential risk from animals and humans have been of increasing concern to the scientific community. Environmental studies conducted primarily in Europe, North America and Japan indicated that these chemicals are ubiquitous in sediment and biota. Recently, studies indicated that BFRs are accumulated in living organisms. Research and health concerns have led to the banning of two types of PBDEs—penta- and octa- mixtures—by the European Union and reductions of their use in the United States and Canada since 2004. More recently, use of deca-PBDE has also been banned in parts of the US as well as the EU. Two PBDE congeners, BDE-47 and BDE 99 have become part of the POP list of Stockholm Convention, since 2009. However, Deca-BDE was exempted from the EU's Directive on the Restriction of Hazardous Substances (RoHS), and thus increasing market volume can be expected. BFRs may be a new "PCB problem".

The Arctic is an important indicator region for the sustainable relevance of persistent, bio-accumulative and toxic chemical substances. Most parts of the Arctic are very remote with few activities that constitute local sources of POPs. Recent studies have demonstrated that PFCs and PBDEs are ubiquitous in Arctic biotic and abiotic samples. TBBPA and HBCD have also been determined in Arctic samples for some cases. Nevertheless, more comprehensive studies are necessary to investigate the concentration levels of PFCS and BFRs and their degradation products in the Arctic environment and to evaluate the transport processes from source region to the Arctic.

Objectives

For the 2009 cruise ARK-XXIV-3, the project is focused on the determination of PFCs amd BFRs in surface waters and air in eastern Greenland Sea. The aim of the project is to characterize the distribution of novel PFCs in the atmosphere and sea water of the Arctic Ocean and evaluate the air–sea gas exchange process intervening in the transport of PFCs and BFRs into coastal regions. Data will be used to estimate the transport path of PFCs and BFRs from high concentrated region to relatively low contaminated region, and discover the flow of persistent organic pollutants via air-water or air-snow interaction in the Arctic summer. Additionally, some other emerging persistent organic pollutants such as non-polybrominated flame retardants, currently used pesticides (hexachlorobenzene (HCB), trifluralin and endosufan isomers) and dechlorane plus will be investigated for their presence in the Arctic.

Work at sea

Air samples were collected using a high-volume air sampler operating at a constant flow rate of 500 L min^{-1}. The ship-borne air samples are collected on the upper deck of Polarstern (Figure 6.1). Typical air sample volume is 1500-3000 m^3. The high volume air sampler consists of a high volume pump (ISAP 2000, Schulze Automation & Engineering, Asendorf, Germany), a digital flow meter, a metal filter holder and a PUF/XAD-2 or PUF/PAD-2 column. GF/F 8 filter was used to collect atmospheric particles. Table 6.1 and 6.2 represent samples collected using PUF/XAD-2 or PUF/PAD-2 columns. Samples collected with PUF/PAD-2 columns are used to determine neutral PFCs, BFRs and dechlorane plus, and samples collected with PUF/XAD-2 will be used to investigate the concentrations of currently used pesticides such as HCB; trifluralin, and endosufan isomers, respectively. Field blanks are prepared by shortly espousing the columns to the sampling site. Air samples are stored at -20 °C in a cooling room.

Water samples are collected using both Keel In-Situ Pump (KISP) and 2-liter seawater solid-phase extraction. In-situ pump was connected to the seawater intake system (stainless steel pipe/Klauss pump) of RV Polarstern (11 m depth). A glass cartridge packed with PAD-2 or PAD-3 is used to enrich the analytes in the dissolved phase, and a glass fibre filter (GF/F 52) is used to collect suspended particular matters (SPMs). Each sample continually ran for 20 hours to achieve a sample volume of ~1000 L (Table 6.3). Moreover, 37 2-L water samples are extracted with Oasis Wax catrdiges to determine the distribution of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) across the North Atlantic and the Arctic (Figure 6.2). PAD-2 and PAD-3 columns are stored at 0°C, and the Oasis Wax cartridges, and filter samples are stored at -20 °C in a cooling room, respectively.

Four snow samples have been collected on the Arctic ice with a helicopter. Two litre of melting snow water from each snow sample were extracted with solid-phase extraction for the determination of perfluorinated acids. Two litre of melting snow water from each sample were extracted with PAD-2 column for the determination of neutral PFCs, BFRs and currently used pesticides in snow.

Preliminary (expected) results

The samples are further handled in a clean-lab at GKSS Research Centre. PUF/XAD-2, PUF/PAD-2, PAD-2 and PAD-3 columns and GF filters are extracted with organic solvents (hexane, dichloromethane, acetone, and methanol) or a mixture for ~16 h.

The SPE cartridge is dried for 30 minutes, and then eluted in two steps using 14 mL acetonitrile for the sulfonamides and using 5 mL 0.1 % ammonium hydroxide in methanol for the acids. The acetonitrile extract is evaporated with a rotary evaporator (Büchi) to approximately 1 mL. Both eluates are combined and further reduced to 200 μL under a nitrogen stream. 20 ng of the Injection standards (i.e. d_5-EtFOSAA and [$^{13}C_6$]-3,4-dichlorophenol, 10μL of a 2 μg mL^{-1} solution) were spiked to the final extract.

Neutral PFCs are quantified by an Agilent 6890 gas chromatography (GC) coupled to a 5973 mass spectrometer (MS) using positive chemical ionization mode. BFR and currently used pesticides are determined by GC-MS using negative chemical ionization mode, respectively. PFOS and PFOA and other ionic PFCs are detected using liquid chromatography coupled with tandem mass spectrometers (LC-MS-MS).
Data obtained from this cruise will set up a background of PFCs and BFRs in the North Atlantic. Furthermore, the air-sea gas exchanges of PFCs and BFRs will be investigated to discover the impotence of atmospheric transport for the occurrence of these emerging persistent organic pollutants in high Arctic.

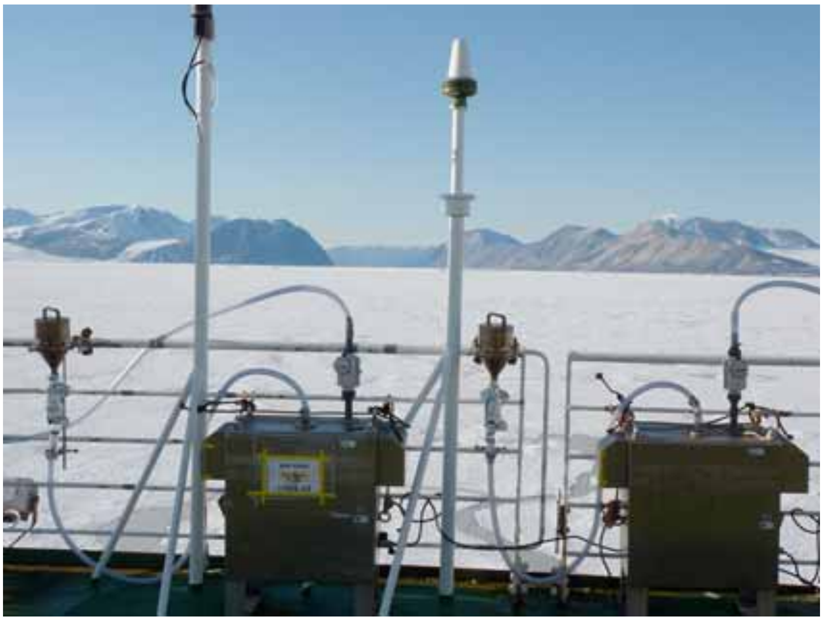

Fig. 6.1 High volume air sampling operated aboard Polarstern during ARK-XXIV-3

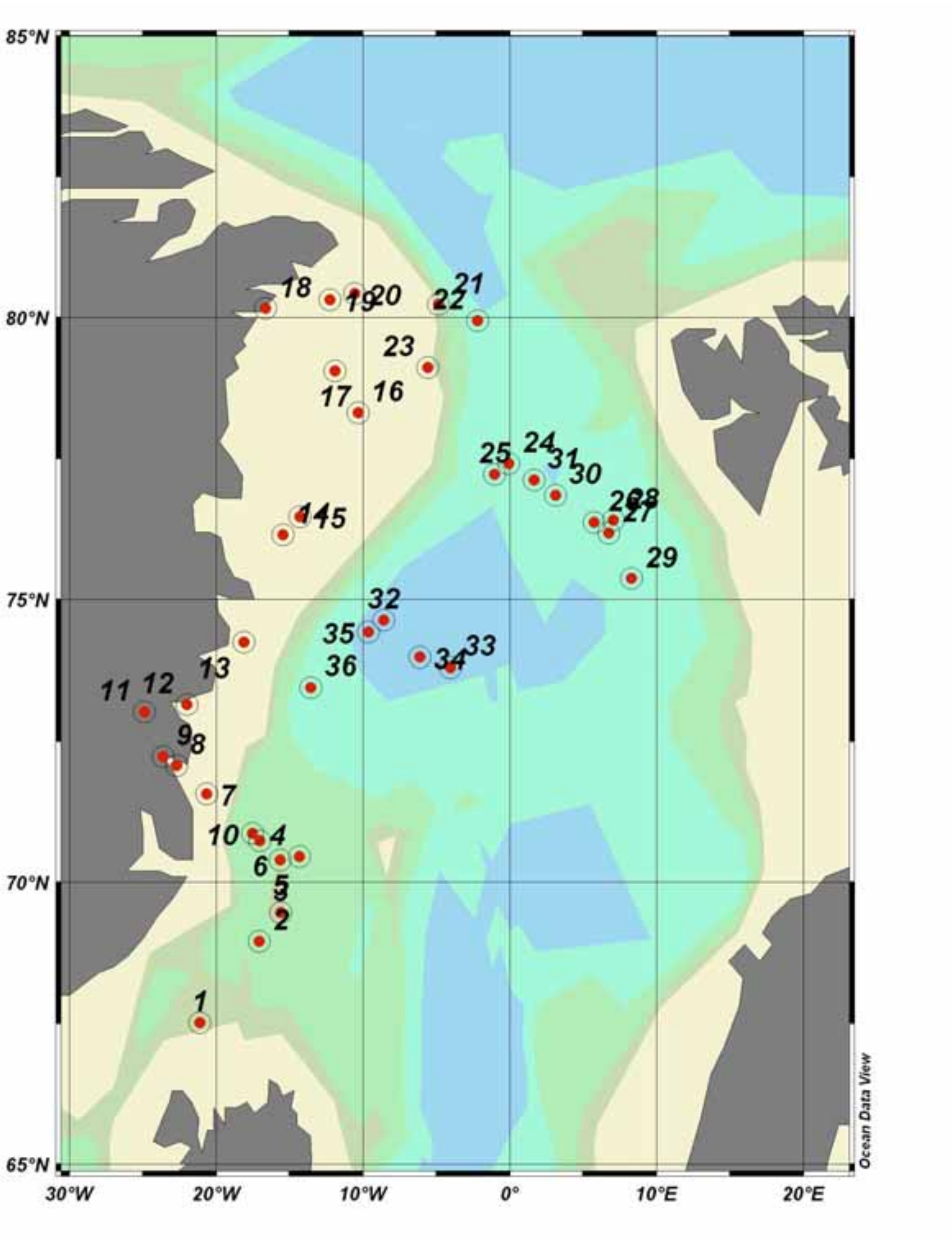

Fig. 6.2 sampling positions of Solid-phase extraction for the determination of fluorinated acids aboard Polarstern during ARK-XXIV-3

Table 6.1: High volume air samples for determination of semi-volatile PFCs and BFRs ("-" means west and south for longitude and latitude)

Sample I.D.	Date	Latitude (°)	Longitude (°)	Volume (m^3)	Ta	Humidity (%)
ARK-XXIV-3 AP1	07.08.09	69.073	-16.741	760	5.4	100
ARK-XXIV-3 AP2	09.08.09	72.030	-22.461	1927	4.6	98
ARK-XXIV-3 AP3	13.08.09	70.461	-15.902	1437	2.8	98
ARK-XXIV-3 AP4	16.08.09	73.893	-18.838	1592	1.5	98
ARK-XXIV-3 AP5	21.08.09	80.237	-4.805	1738	2.3	98
ARK-XXIV-3 AP6	25.08.09	78.000	-3.537	2717	3	98
ARK-XXIV-3 AP7	31.08.09	80.302	-9.000	2570	-3.8	100
ARK-XXIV-3 AP8	06.09.09	75.575	8.246	1177	6.5	88
ARK-XXIV-3 AP9	09.09.09	74.469	-7.685	2338	5.1	92
ARK-XXIV-3 AP10	14.09.09	72.765	-19.960	1500	0.5	100

Table 6.2: High volume air samples for determination of currently used pesticides ("-" means west and south for longitude and latitude)

Sample I.D.	Date	Latitude (°)	Longitude (°)	Volume (m^3)	Ta	Humidity (%)
ARK-XXIV-3 AX1	07.08.09	69.073	-16.741	743	5.4	100
ARK-XXIV-3 AX2	09.08.09	72.030	-22.461	1935	4.6	98
ARK-XXIV-3 AX3	13.08.09	70.461	-15.902	1331	2.8	98
ARK-XXIV-3 AX4	16.08.09	73.893	-18.838	966	1.5	98
ARK-XXIV-3 AX5	21.08.09	80.237	-4.805	1649	2.3	98
ARK-XXIV-3 AX6	25.08.09	78.000	-3.537	2678	3	98
ARK-XXIV-3 AX7	31.08.09	80.302	-9.000	2625	-3.8	100
ARK-XXIV-3 AX8	06.09.09	75.575	8.246	1060	6.5	88
ARK-XXIV-3 AX9	09.09.09	74.469	-7.685	2101	5.1	92
ARK-XXIV-3 AX10	14.09.09	72.765	-19.960	1500	0.5	100

Table 6.3: High volume water samples for determination of semi-volatile PFCs, BFRs and currently used pesticides ("-" means west and south for longitude and latitude)

Sample I.D.	Date	Latitude (°)	Longitude (°)	Volume (L)	Tw (°C)	Salinity (psc)
ARK-XXIV-3 W1 (PAD-2)	07.08.09	68.950	-17.097	1000	5.92	34.62
ARK-XXIV-3 W2 (PAD-3)	08.08.09	70.431	-15.771	891	4.64	32.56
ARK-XXIV-3 W3 (PAD-2)	09.08.09	71.523	-20.444	733	1.16	20.81
ARK-XXIV-3 W4 (PAD-3)	10.08.09	72.071	-22.460	836	3.76	21.91
ARK-XXIV-3 W5 (PAD-3)	11.08.09	71.822	-21.748	770	3.76	21.91
ARK-XXIV-3 W6 (PAD-2)*	14.08.09	70.930	-17.862	1000	5.3	33.3
ARK-XXIV-3 W7 (PAD-3)*	15.08.09	72.272	-23.681	1000	7.32	21.23
ARK-XXIV-3 W8 (PAD-2)	16.08.09	73.192	-21.666	1000	-2.62	28.13
ARK-XXIV-3 W9 (PAD-2)	17.08.09	76.122	-15.481	692	-0.5	28.12
ARK-XXIV-3 W10 (PAD-3)	18.08.09	78.302	-10.338	1443	-0.95	30.01
ARK-XXIV-3 W11 (PAD-2)	19.08.09	78.678	-11.061	832	-1.05	29.79
ARK-XXIV-3 W12 (PAD-3)	20.08.09	80.157	-16.627	1236	-0.8	29.1
ARK-XXIV-3 W13 (PAD-2)	21.08.09	80.200	-5.443	1280	-1.47	30.84
ARK-XXIV-3 W14 (PAD-3)	22.08.09	79.942	-2.146	1000	-1.63	32.68
ARK-XXIV-3 W15 (PAD-2)	23.08.09	79.973	1.401	1000	-1.64	30.81
ARK-XXIV-3 W16 (PAD-3)	24.08.09	79.439	2.755	1000	4.62	34.14
ARK-XXIV-3 W17 (PAD-2)	25.08.09	78.334	-5.379	987	-1.46	29.95
ARK-XXIV-3 W18 (PAD-3)	26.08.09	77.234	0.973	1000	5.5	34.76
ARK-XXIV-3 W19 (PAD-2)	27.08.09	76.366	5.768	1000	6.62	34.96
ARK-XXIV-3 W20 (PAD-3)	28.08.09	76.327	7.053	1000	5.97	34.88
ARK-XXIV-3 W21 (PAD-2)	29.08.09	76.803	3.400	1000	1.07	31.67
ARK-XXIV-3 W22 (PAD-3)	30.08.09	78.063	-3.912	1000	-1.26	29.7
ARK-XXIV-3 W23 (PAD-2)	31.08.09	79.933	-7.938	1000	-1.09	28.24
ARK-XXIV-3 W24 (PAD-3)	01.09.09	80.165	-16.683	525	-1.04	27.96
ARK-XXIV-3 W25 (PAD-2)	09.09.09	74.838	-8.319	1000	4.59	34.21
ARK-XXIV-3 W26 (PAD-3)	10.09.09	73.828	-4.916	1000	3	34.29
ARK-XXIV-3 W27 (PAD-2)	11.09.09	74.805	-12.804	1000	0.31	31.61
ARK-XXIV-3 W28 (PAD-3)	12.09.09	73.371	-13.629	1000	2.7	33.25
ARK-XXIV-3 W29 (PAD-2)	13.09.09	71.987	-15.982	1000	3.03	29.23
ARK-XXIV-3 W30 (PAD-3)	14.09.09	72.660	-19.508	1000	1.75	28.87

*Two columns are used for this sample to check breakthrough.

7. COMPOSITION OF THE ATMOSPHERE AND RADIATION BUDGET AT THE ATMOSPHERE /OCEAN INTERSECTION

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Objectives

Our main task was to determine the net radiation budget at the surface. The net radiation budget is the sum of net shortwave incoming radiation and longwave outgoing radiation and is hence the amount of radiative energy available for heating the sea or land surface or melting sea-ice. By this way it is the driving force for many physical processes in the climate system.

Every square meter at the top of the atmosphere, directed towards the sun obtains solar radiation with a power of 1362 W/m². In global view, 30 % of the solar radiation is directly reflected to space. The rest of the incoming solar radiation is transformed in longwave radiation, latent and sensitive thermal fluxes and evapotranspiration. A part of the longwave radiation is absorbed by the land and water masses and also by the atmosphere.

We want to model the radiation transport with clouds and sea-ice by using a Monte-Carlo radiative transfer model and also want to run a coupled ocean-atmosphere-sea-ice model (BSIOM from A. Lehmann) with our measurement data. With the help of these results we will try to study the influence of clouds in arctic regions.

Clouds play an important role in regulating the surface energy budget. Especially they have a strong influence on Arctic sea-ice and the sea-ice albedo feedback.

Coupled global circulation models do not resolve clouds, though, because they have a too small spatial scale. For that problem we use parameterizations of clouds and their impact on the shortwave and longwave radiation. As unique conditions occur in the Arctic with frequent low-level inversions, very low temperatures and water vapour mixing rations, highly relective sea-ice and snow surfaces and high solar zenith angles, parametrizations have to be adapted to fit to Arctic conditions.

Work at sea

For continuous measurements of radiation we used a pyranometer (shortwave solar radiation) and a pyrgeometer (longwave radiation). Both had an orientation to sky and were installed on the container at the wheelhouse deck. We made a measurement every two seconds and saved the values to an ACSII-file.

Also on this container, we installed the sky-imager, which made a 360°-picture every 15 seconds. The camera is a Canon PowerShot A640 with a fisheye-objectiv. The whole camera was fixed in a self-made waterproof box. With the help of a Perl-script we controlled the camera software PSRemote to take a photo in regular time steps.

The same camera type was used after August 18th to take photos of the ice conditions. This camera was at the wheelhouse and took a photo of the sea surface every minute to give us a possibility for a detailed reanalysis of the sea-ice conditions on the expedition.

Under sea-ice conditions, we also made manual measurements of the albedo in time steps of a few hours, to characterize the backscattering of different ice types. For these measurements we installed two downward directed pyranometers on both sides of the vessel. These were covered to the shipside, so that reflections of *Polarstern* could not falsify the measurements. For every measurement we generally registered nine values on every side with a time step of 15 seconds.

When we had clear-sky conditions, we could additionally measure the aerosol concentration in the atmosphere. For that, we employed a sun-photometer Microtops II from Solar Light Co., which determines the optical thickness of atmosphere at different wavelengths (340 nm, 440 nm, 675 nm, 870 nm and 936 nm).

More parameters, as temperature and humidity, were taken from the vessel system (DShip). The instruments of the vessel determined higher values of the humidity than expected. Therefore we made measurements with an Assmann-psychrometer to compare the values. By this way we can make a correction of the mean error.

The measuring instruments were installed and working from August 6th until September 24th. Radiation measurements with the pyranometer and pyrgeometer started August 6th at 7 pm. During the first days, software problems caused several minor gaps in the data recording. Thereafter, the data sets from pyranometer and pyrgeometer are complete until the end of the cruise. Occasionally, the instruments were shaded by the mast of the *Polarstern*, what caused incorrect data for a time interval of a few minutes to a few hours. If a shading of the instruments has taken place can be determined by analyzing the shortwave radiation records and the pictures of the sky-imager.

The first picture with the sky-imager was shot on August 6th at 20:39. At daylight, the camera took a picture every 15 seconds. The controlling program computed the times of sunrise and sunset from date and coordinates and switched of the camera during night. Over the whole cruise, the camera broke down on four days, each time causing record gaps between two and four hours.

Before installing the ice-camera on the bridge, we had already spent two days in the ice, taking photos of the sea-ice conditions about every hour and doing albedo measurements every two to three hours.

From August 19th the ice-camera produced pictures every minute. Seven days with almost complete sea-ice covering are documented that way. Furthermore, the photos exist from several days with few or changing sea-ice cover.

Preliminary results

Ice camera

It is possible to determine albedo values from camera pictures with help of a computer program (Weissling, 2009). We will use a linear relationship between the ice coverage and the albedo if the ice type and the coverage of melt ponds are similar, taking the solar angle into consideration.

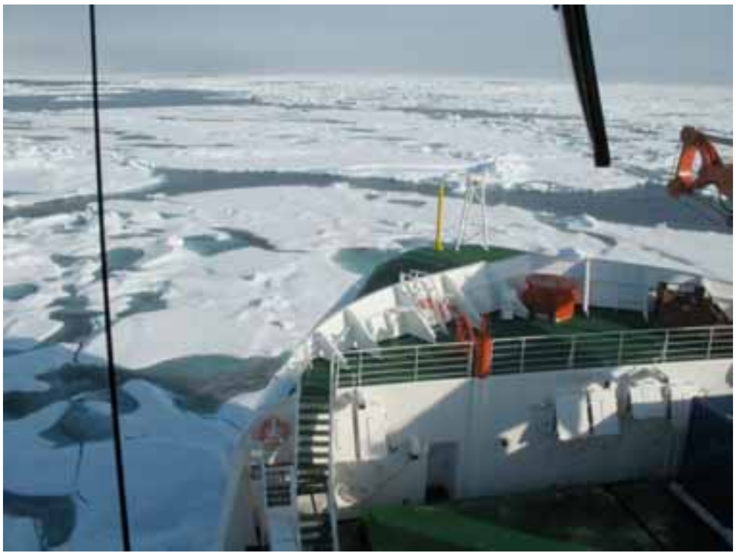

Fig. 7.1: Example for a photo from the ice camera at the wheelhouse (03.09.2009, 14:44).

Humidity

To verify the humidity measurements of the vessel, we made a total of 110 measurements with an Assmann-Psychrometer. We did these on the wheelhouse deck while the instruments for temperature and humidity of the vessel measured seven meters higher on a platform. Mainly because of the difference in height of the measurement places, we got temperature differences between the ship and our hand-measurements, which we could exclude by using the water vapour pressure.

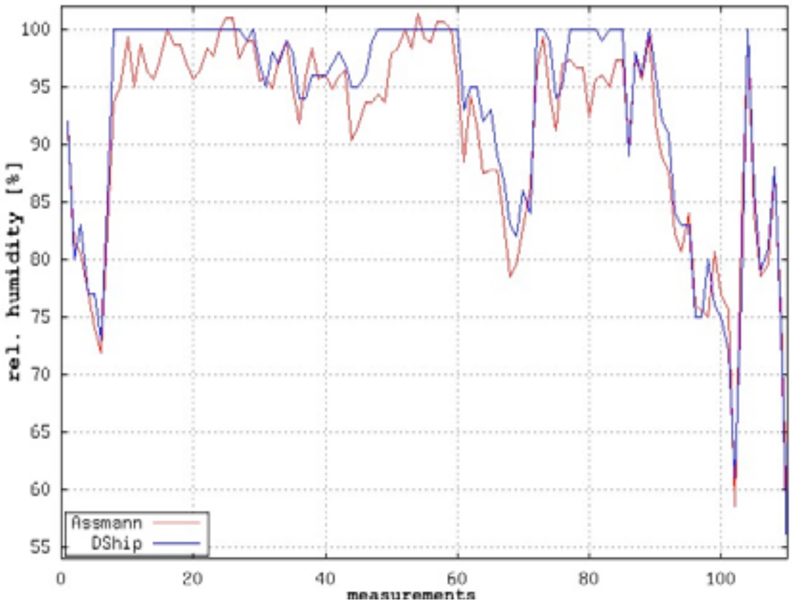

Fig. 7.2: Relative humidity from the vessel in blue and from the Assmann-Psychrometer in red.

Fig. 7.2 represents the measurement values of the relative humidity in % from the vessel in blue and from our hand-measurements in red. The hand-measurements were corrected in temperature with the help of the vapour pressure. So we also got values above 100 % relative humidity. In Fig. 7.2 we can see that especially under higher moisture conditions (e. g. measurements 11 to 25 and 78 to 83) the vessel system is lazy. Without a temperature correction the moisture measurements of the ship were in mean 3.5 %-points higher (standard deviation: 3.2 %-points, correlation: 0.95) than our hand measurements. If we take the temperature differences into consideration, the vessel instruments were in mean 1.7 %-points (standard deviation: 2.4 %, correlation: 0.97) higher than the Assmann-psychrometer. The mean temperature during our measurements was 4.2 °C at the vessel instruments system and 4.5 °C at our hand-measurements.

Radiation

From August 06th to 16th conditions were almost ice-free. From 06th to 13th of August the sky was mainly covered with clouds or haze. On August 06th, a maximum in the longwave downwelling radiation occurred with 358W/m². During this day, we observed an optically thick layer of fog. Only in the afternoon parts of the sky could be seen for a short time.

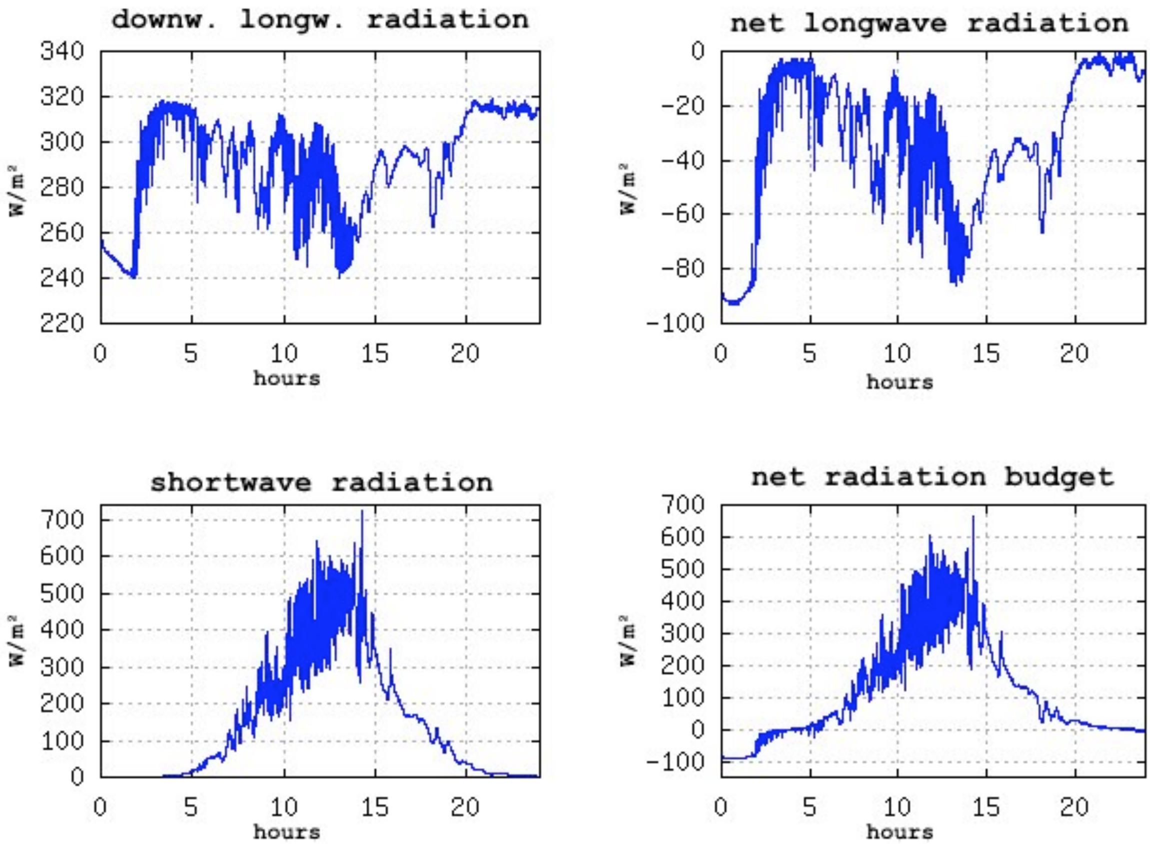

Fig 7.3: Measured downwelling longwave and shortwave radiation (left-hand side) and computed net longwave radiation and radiation budget (right-hand side) for the 16th August.

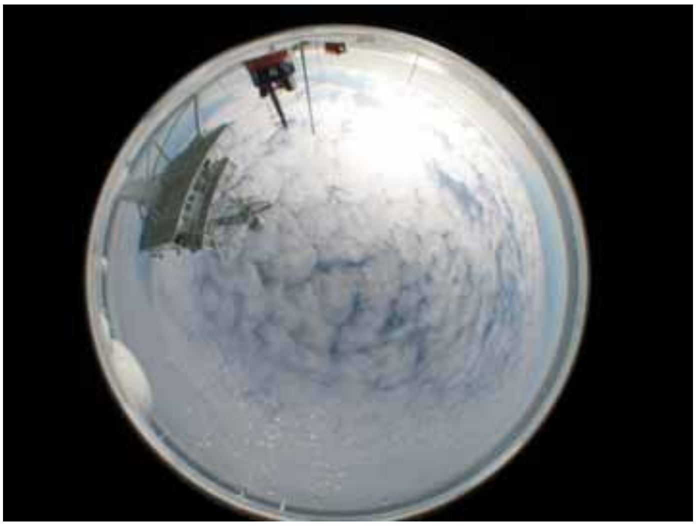

Fig 7.4: Photo of sky imager from August 16th, 14:14: time of the highest increase of shortwave downwelling radiation, due to the broken-cloud-effect.

On August 9th the sky was only partly cloud covered for a short time and an increase of radiation occurred, due to the broken-cloud-effect, with incoming shortwave radiation of over 700W/m². On 14th and 16th August we had changing cloud conditions and increases of shortwave radiation likewise occurred. On August 16th, we measured the maximal incoming shortwave radiation at 14:14 with 726W/m². Figure 7.4 shows the photo of the sky-imager taken at this time. The integrated net radiation budget, which equals the sum of shortwave incoming radiation and longwave outgoing radiation and is hence the amount of radiative energy available for heating the sea surface, had its maximum value at August 14th and its next highest value at August 16th. On 14th of August, the net radiative budget achieved likewise its highest intermediate value with 689W/m² and on 16th of in the morning, the lowest value occurred with -93W/m².

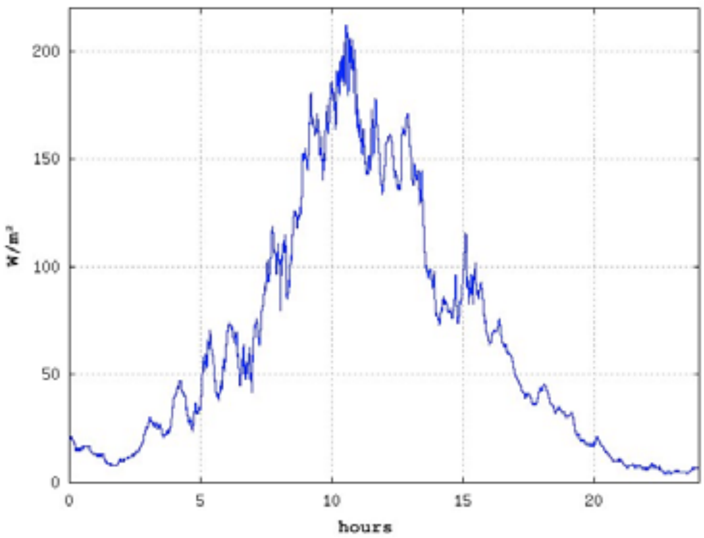

Fig 7.5: Shortwave radiation from 21st August represents a typical day with fog and low-level clouds under sea-ice conditions.

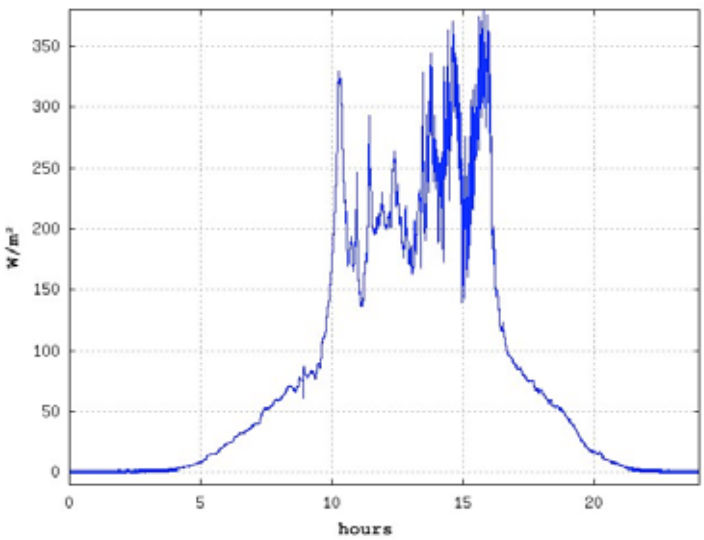

Fig 7.6: Shortwave radiation from 03rd September represents a day in sea-ice with increased radiation during haze conditions.

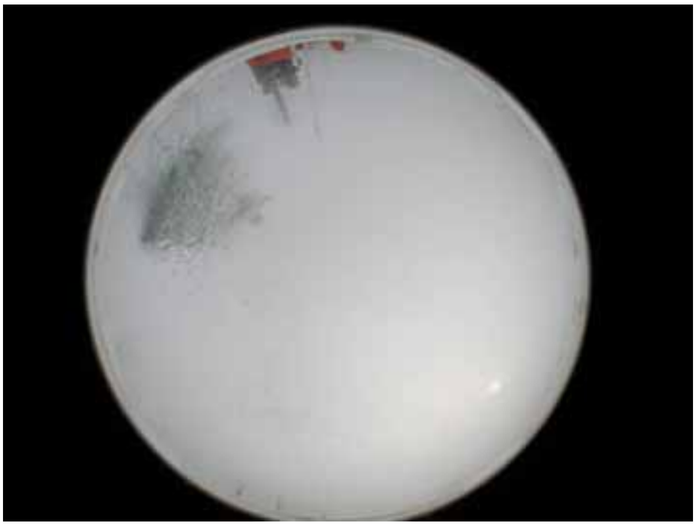

Fig 7.7: Photo of sky imager from September 03rd, 10:10: time of increase of shortwave radiation with the sun visible through the fog.

From August 17th to 26th and August 30th to September 03rd, the ship was mostly in the sea-ice. During this time, the sky was covered the most days and often, also fog or haze occurred. The shortwave insolation at 21th of August shows a typical shape (see Figure 7.5). Over the whole day, the sky was completely cloud covered and only for short moments the sun could only be recognized behind the clouds. The maximal shortwave insolation only obtained values of about 200W/m². Figure 7.6 shows the incoming shortwave radiation for the 3rd of September. During the morning, the conditions were very foggy. From 10am however, the sun is visible through the fog what causes an increase of the shortwave radiation by more than three times from about 90W/m² to over 300W/m². Figure 7.7 shows the photo of the sky-imager at 10:10. From 14:00 to 15:30 the blue sky is visible, after that the sky gets cloud-covered again.

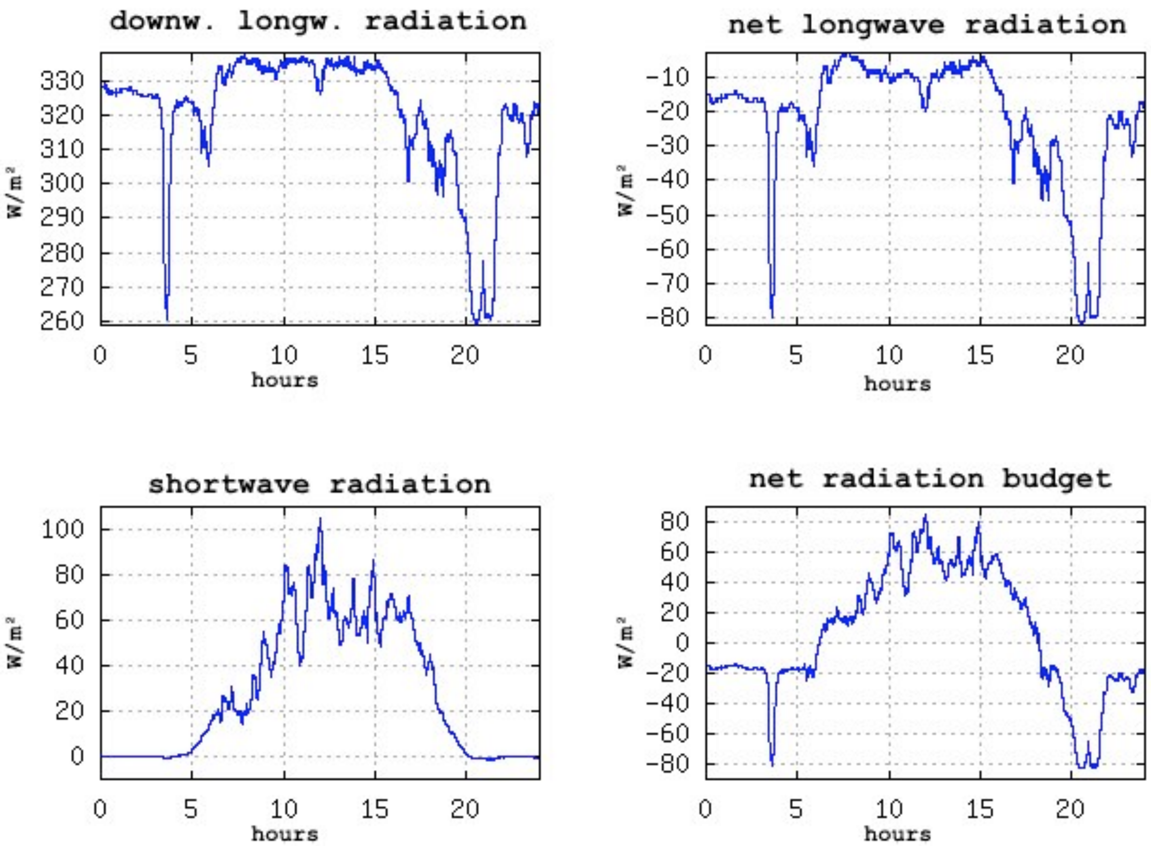

Fig 7.8: Measured downwelling longwave and shortwave radiation (left-hand side) and computed net longwave radiation and radiation budget (right-hand side) for the 9th September.

From 04th to 10th of September we had no more sea-ice conditions and the sky was almost over the whole time covered by thick low-level clouds. This produced several days in a series of very low shortwave incoming radiation and the lowest integrated net radiation budget occurred on September 9th (see figure 7.8). This minimum originated on one hand from the low shortwave insolation with a maximum of the day of about 100W/m². On the other hand, two times of reduced cloudiness occurred during the day, one at 5 in the morning and a longer time in the evening after 8pm. At these times of the day, the reduced cloudiness brought almost no additional shortwave radiation but a distinct increase of the longwave outgoing radiation.

Although the integrated net radiation budget of this day represented the minimum of our cruise records, it was still positive, hence still providing net radiative energy for heating the sea surface.

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8. AT-SEA DISTRIBUTION OF SEABIRDS AND MARINE MAMMALS

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Objectives

Our aim was to complete our study on the mechanisms explaining the at-sea distribution of seabirds and marine mammals (pinnipeds = seals = Robben, cetaceans = whales): influence of water masses and pack ice, as well as fronts and ice edge, reflecting differences in food abundance and availability. Moreover, in comparison with data already gathered during a long term study by the same team - i.e. same methodology and same platform: moving Polarstern, plus confirmations from helicopter flights - we try to detect and understand possible changes in status of the main species, such as on the one hand increasing numbers of large whales (bowhead, blue, humpback ...) as a probable result of import from the richer Pacific population ("stock") into the very poor NE Atlantic one, to be interpreted as a consequence of the opening of the Passages – mainly the NE one – due to poor ice coverage in the 2005-2007 period. On the other hand, some species such as little auk (Krabbentaucher) breeding in the southern colonies on Jan Mayen, might be separated from their feeding grounds at the ice edge by much too long distances when the pack ice is strongly receding, so that return journeys from colony to ice edge in order to bring food to their chicks become impossible, eventually leading to breeding failure (e.g. in 2005: Joiris 2007, Joiris & Falck submitted).

Work at sea

Continuous transect counts (half-an-hour each, without width limitation) from the bridge when Polarstern is moving, visibility conditions allowing. More than 900 counts were registered (as on September 13th), and many more counts were lost because of abundant heavy fog, as well as long nights in the southern part of the study area.

Preliminary data

The most obvious remark is, as usual, that the Fram Strait ecosystem is very poor, with a majority of counts just showing a few fulmars (Eissturmvogel) and even less kittiwakes (Dreizehenmöwe). Not to mention "empty" counts, without any animal, e.g. on the drift ice of the NE sector of the study area.

Main seabird species:

- Little auks were by far the most abundant species, representing half of the total of all birds encountered (15000, i.e. 10300 local and 4640 moving ones, out of a total of 27350 seabirds). Far from homogenous, their distribution showed very high numbers at some localities. Firstly, they were massively flying NNE off Kong Oscar fjord (72°N) on August 9th, apparently leaving the huge Scoresby Sound colony (70°N). More than 2900 were counted at 9 successive counts, i.e. in a “road” roughly 80 nmiles broad, and very few only were flying in the reverse direction “back to the colony”. They were still in adult summer plumage (black throat and head: Fig. 8.1).

Fig. 8.1: Part of a flock of little auks flying NNE off Kong Oscar fjord, summer plumage (see text).

Other concentrations concerned pairs of little auks: one adult – probably the father – accompanying a recently fledged juvenile, swimming together off the breeding colony. On August 11th and 12th, on the SE transect starting at 72°N, a total of 563 were noted sitting on the water in 28 counts (of which 335 could not be included in the overall counts, due to fog limiting visibility for the larger species). A maximum of 185 were registered at 3 successive counts, which corresponds to a density of 25 km-2.

Later, after the end of the breeding season, some very high concentrations were noted, such as more than 7300 local little auks in 2 days, including a peak of 3000 in 3 counts (Table 8.1), i.e. approximatively 15 nmiles, which corresponds to the huge density of 800 km-2. Actual numbers might even be much higher, since counting had to be interrupted during night. These were already in winter plumage, and far from any colony: a typical post-breeding situation. These concentrations apparently did not correspond to a front of mixed polar/ Arctic water as expected, but might reflect the presence of a deeper eddy with such a type of water (Joiris & Falck, subm.). Concentrations of hundreds were already encountered from Polarstern in the same region in September 2005.

Table 8.1: Concentration of local little auks at selected stations. Numbers per half-an-hour transect count (see text).

Date	time	transect	count nber	position °N	°E	water temp.	salinity	little auks
08-Sep	11h30	WSW	803	76.00	2.37	6.13	34.88	0
			804	75.58	2.05	5.74	34.84	0
			805	75.48	1.49	5.42	34.84	240
			806	75.47	-1.26	5.38	34.62	205
			807	75.45	-1.51	5.41	34.59	168
			808	75.44	-2.14	5.40	34.53	122
			809	75.42	-2.38	5.34	34.55	70
			810	75.41	-2.59	5.42	34.84	135
			811	75.40	-3.24	5.39	34.53	33
			812	75.40	-3.47	5.41	34.53	31
09-Sep	5h	SSW	813	75.18	-7.20	4.87	34.21	107
		seismic	814	75.16	-7.25	4.76	34.18	1000+
			815	75.14	-7.29	4.81	34.23	1000+
			816	75.12	-7.39	4.82	34.28	1000+
			817	75.10	-7.39	4.80	34.26	550
			818	75.08	-7.43	4.80	34.26	350
			819	75.05	-7.48	4.78	34.23	125
			820	75.03	-7.50	4.78	34.23	91
			821	75.01	-7.55	4.73	34.18	110
			822	74.59	-8.02	4.35	34.22	33
			823	74.56	-8.07	4.41	34.23	30
			824	74.54	-8.12	4.63	34.28	32
			825	74.52	-8.16	4.57	34.22	18
			826	74.50	-8.21	4.58	34.21	353
			827	74.47	-8.25	4.54	34.24	73
			828	74.45	-8.30	4.57	34.22	78
			829	74.43	-8.35	4.57	34.20	48
			830	74.40	-8.42	4.50	34.22	83
09-Sep	14h	SE	831	74.38	-8.37	4.59	34.17	65
			832	74.35	-8.21	4.59	34.22	29
			833	74.32	-8.02	4.75	34.26	8
			834	74.28	-7.39	4.58	34.14	0
			835	74.25	-7.23	4.61	34.17	15
			836	74.22	-7.06	4.87	34.21	46

Date	time	transect	count nber	position °N	°E	water temp.	salinity	little auks
			837	74.18	-6.48	4.97	34.24	173
			838	74.16	-6.32	5.17	34.22	423
			839	74.12	-6.14	5.14	34.26	209
			840	74.09	-5.56	5.28	34.21	160
			841	74.06	-5.39	5.26	34.21	101
			842	74.02	-5.21	5.21	34.22	8
10-Sep	5h	WNW	843	73.37	-3.26	5.46	34.38	1
			844	73.40	-3.45	5.40	34.36	2
			845	73.43	-4.05	5.26	34.37	3

Fig. 8.2: Local little auks at selected stations, winter plumage and moulting (see text and Table 8.1).

- The fulmar was apparently among the most numerous species (8700 in 900 counts), but this figure is a strong over-estimation due to the fact that they tend to follow or circle around the ship, sometimes at long distances – this was confirmed by helicopter flights at different occasions - and the data can certainly not be expressed as density. Actual figures might probably be at least two orders of magnitude lower. Most were of the light morph, while the proportion of dark morph (D) strongly increased in the north-western part of the study area, including a few very dark (DD) individuals; a few very light individuals were met.

Fig. 8.3a & b: Light and dark morphs of the fulmar.

- The kittiwake was present in significant numbers (1500 in 900 counts) in the whole region, but clearly in lower numbers than in the Norwegian and Greenland seas, where it represents one of the three most abundant species. We could follow in time the appearance of juveniles, indicating the end of the breeding season, as well as the evolution of moult in the different age classes.

- The Brünnich's guillemot (Dickschnabellumme) deserves a similar comment: it was present in much lower numbers (210) than in the Greenland and Norwegian seas, which represent the bulk of the species' distribution.

Indicator seabird species:

- Ivory gulls (Elfenbeinmöwe) were encountered as expected, in the ice covered zones, as well as a few in Kong Oscar fjord, probably returning to their breeding colony. In recent years their numbers seem to decrease steadily and we counted 294 exemplars in total (most of the counts out of the pack ice of course), while in the years 1991-93, more than two per count were in average registered in the "Polynya box" (Joiris et al 1997). If confirmed, this might reflect a decline of the population, even if no clear explanation for it could be proposed now.

Fig. 8.4: Adult ivory gull.

- Very few Sabine's gulls (Schwalbenmöwe) were encountered, a normal figure for this rare high Arctic gull breeding on NE Greenland: 12 in total, of which 11 during counts.

Fig. 8.5: Adult Sabine's gull.

Other seabird species were: 35 Manx shearwaters* in 900 counts, 61 common guillemots*, 52 black guilemots, 32 puffins, 30 gannets* + 1 in open sea, 14 great skuas, 29 pomarine skuas, 40 Arctic skuas, 9 long-tailed skuas, 175 glaucous gulls, 1 Iceland gulls, 187 great black-backed gulls*, 77 lesser black-backed gulls*, 600 Arctic terns, 16 common eiders, 1 juvenile male king eider (*: close to Iceland).

Cetaceans: whales were encountered in normal numbers as well, for the post 2005 situation (see introduction): 7 bowheads, 2 blue whales, 8 fin + 1 at station, 3 minke, 5 humpback, 3 sperm, 8 orcas and a group of 25 white-beaked dolphins. Narwhal deserves a special comment: 15 were seen from Polarstern, an exceptional observation for a species known to avoid ships. All together, around 50 were noted from various helicopter flights, both at the ice edge and at the mouth of some ice-free fjords. We did not detect any important cetacean concentration, such as in 2008, with 350 humpbacks in a few counts: a reflection of their very patchy distribution.

Fig. 8.6: Fin whale starting to dive.

Fig. 8.7: Part of a flock of narwals: at least 2 adult and 2 immature males; close to the land fast ice, 80°N, from helicopter.

Fig. 8.8: Killer whales (orcas): 3 probable females – or immature males? – with a juvenile.

- Pinnipeds were also encountered in "normal" numbers, mainly at the ice edge and the OMIZ: 1 walrus (plus 4 from helicopter), 34 bearded seals, 33 harp – mainly immatures plus 2 groups of 20 and 30 "silver" juveniles from helicopter, 80°N -, 12 ringed and 49 hooded. Up to 75, however, were swimming at some distance from Polarstern and could not be identified.

Fig. 8.9: Immature harp seal.

Fig. 8.10: Immature hooded seal.

Fig. 8.11: Bearded seal.

Fig. 8.12: Walrus, probably immature male, with dark fulmar.

- Polar bears were present in what seems to be normal numbers, with a total of 15 contacts concerning 18 animals (of which 14 during counts), and the presence of mothers with one or two cubs (Fig. 8. 13) does not seem to reflect any decline in the population, nor difficulties in raising cubs. They were basically observed in the Outer Marginal Ice Zone (OMIZ) and not midden in the closed pack ice: an usual situation. Four seal carcasses and 2 skeletons reflect the existence of successful hunts.

Fig. 8.13: Mother with two large cubs, probably in their 3d year; from helicopter.

The main conclusion concerns the patchiness of the distribution, in this case of little auks, especially in a post-breeding situation, when their distribution enterily depends on food availability, without the distance limitation for flying back to the colony while breeding. It is easy to evaluate numbers without the local high concentrations, and to calculate the huge difference in density with or without the zones with high numbers. A similar observation was made last year NW off Iceland: 250 humpbacks, ten thousands feeding fulmars, thousands feeding alcids (little auks, Brünnich's guillemots, plus some puffins and common guillemots) were seen in a few hours ... but in the begining of this expedition we sailed more NE than N from Iceland, and could not visit the same zone again.

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9.	Kotnik, Herbert	2. Eng.
10.	Schnürch, Helmut	2. Eng.
11.	Westphal, Henning	2. Eng.
12.	Holtz, Hartmut	Elec. Eng.
13.	Dimmler, Werner	ELO
14.	Feiertag, Thomas	ELO
15.	Fröb, Martin	ELO
16.	Nasis, Ilias	ELO
17.	Clasen, Burkhard	Boatsw.
18.	Neisner, Winfried	Carpenter
19.	Brickmann, Peter	A.B.
20.	Burzan, Gerd-Ekkeh.	A.B.
21.	Hartwig-Lab. Andreas	A.B.
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31.	Krösche, Eckard	Mot-man
32.	Watzel, Bernhard	Mot-man
33.	Fischer, Matthias	Cook
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35.	Völske, Thomas	Cooksmate
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42.	Wartenberg, Irina	2. Stwdess
43.	Ruan, Hi Guang	Laundrym.
44.	Junge, Johannes	Apprent.
45.	Schliffke, Benjamin	Apprent.

A.4 STATION LIST

(see next pages)

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/206-1	07.08.09	09:07	68° 57,31' N	17° 4,84' W	2162	ESE 9	53,4	11,3	Magnetic Turn Circle	MTC	profile start	
PS74/206-1	07.08.09	09:13	68° 57,05' N	17° 2,76' W	2341	ESE 10	173,7	8,1	Magnetic Turn Circle	MTC	action	
PS74/206-1	07.08.09	09:29	68° 56,88' N	17° 5,83' W	2246	ESE 8	337	8,3	Magnetic Turn Circle	MTC	action	linksdrehung
PS74/206-1	07.08.09	09:53	68° 56,84' N	17° 6,16' W	2216	ESE 9	18,9	9,2	Magnetic Turn Circle	MTC	on ground/max depth	
PS74/206-1	07.08.09	09:54	68° 56,99' N	17° 6,04' W	2162	ESE 9	17,5	9,2	Magnetic Turn Circle	MTC	profile end	
PS74/206-1	07.08.09	09:58	68° 57,56' N	17° 5,40' W	2013	ESE 9	35,4	9,5	Magnetic Turn Circle	MTC	on deck	schwachsinn
PS74/207-1	07.08.09	14:12	69° 27,79' N	15° 35,64' W	1165	ESE 7	170,9	0,4	Heat Flow	HF	in the water	
PS74/207-1	07.08.09	14:13	69° 27,78' N	15° 35,64' W	1164	ESE 8	217,1	0,4	Heat Flow	HF	lowering	
PS74/207-1	07.08.09	14:30	69° 27,73' N	15° 35,66' W	1163	ESE 8	351,6	0,1	Heat Flow	HF	on ground/max depth	1000 m, GE72.1
PS74/207-1	07.08.09	14:39	69° 27,74' N	15° 35,67' W	1161	ESE 8	57,9	0,1	Heat Flow	HF	hoisting	
PS74/207-1	07.08.09	14:55	69° 27,74' N	15° 35,62' W	1163	ESE 8	128,1	0,2	Heat Flow	HF	information	aus dem Wasser
PS74/207-1	07.08.09	14:59	69° 27,73' N	15° 35,56' W	1163	ESE 7	141,9	0,2	Heat Flow	HF	on deck	
PS74/207-2	07.08.09	15:01	69° 27,72' N	15° 35,54' W	1163	ESE 7	122	0,2	Releaser Test	REL	in the water	
PS74/207-2	07.08.09	15:02	69° 27,72' N	15° 35,54' W	1164	ESE 7	170,2	0,2	Releaser Test	REL	lowering	
PS74/207-2	07.08.09	15:27	69° 27,69' N	15° 35,48' W	1160	ESE 8	34,4	0,2	Releaser Test	REL	on ground/max depth	1000 m, EL31
PS74/207-2	07.08.09	15:29	69° 27,69' N	15° 35,46' W	1163	ESE 9	39,8	0,3	Releaser Test	REL	information	Hydophon zu Wasser
PS74/207-2	07.08.09	15:53	69° 27,66' N	15° 35,39' W	1160	ESE 9	90,7	0,3	Releaser Test	REL	information	Hydrophon an Bod
PS74/207-2	07.08.09	15:55	69° 27,66' N	15° 35,38' W	1161	ESE 9	100,8	0,2	Releaser Test	REL	hoisting	
PS74/207-2	07.08.09	16:15	69° 27,62' N	15° 35,44' W	1157	ESE 9	267,4	0,5	Releaser Test	REL	on deck	
PS74/208-1	07.08.09	20:33	70° 0,51' N	14° 0,92' W	1632	ESE 6	33,1	1,4	Heat Flow	HF	in the water	
PS74/208-1	07.08.09	20:43	70° 0,64' N	14° 0,62' W	1626	SE 6	66,6	0,6	Heat Flow	HF	on ground/max depth	kein Signal, GE 72.1 360m, war nicht auf Grund
PS74/208-1	07.08.09	20:44	70° 0,64' N	14° 0,59' W	1628	SE 6	68,2	0,9	Heat Flow	HF	hoisting	
PS74/208-1	07.08.09	20:56	70° 0,79' N	14° 0,35' W	1618	ESE 6	11,9	0,8	Heat Flow	HF	on deck	
PS74/208-2	07.08.09	21:09	70° 0,72' N	13° 59,71' W	1563	ESE 6	13,9	0,6	Releaser Test	REL	in the water	
PS74/208-2	07.08.09	21:38	70° 0,91' N	13° 59,14' W	1543	ESE 5	81,9	0,5	Releaser Test	REL	on ground/max depth	EL 31 1000m
PS74/208-2	07.08.09	22:09	70° 0,90' N	13° 58,91' W	1558	ESE 5	356,5	0,2	Releaser Test	REL	hoisting	
PS74/208-2	07.08.09	22:32	70° 0,90' N	13° 58,64' W	1566	ESE 6	160,1	0,1	Releaser Test	REL	on deck	
PS74/208-3	07.08.09	23:02	70° 0,09' N	14° 0,63' W	1616	ESE 6	193,2	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/208-3	07.08.09	23:03	70° 0,08' N	14° 0,63' W	1614	ESE 6	190,2	0,9	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/208-3	07.08.09	23:03	70° 0,08' N	14° 0,63' W	1614	ESE 6	190,2	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/209-1	08.08.09	00:05	70° 4,72' N	14° 18,99' W	1366	SE 5	42,9	0,1	Ocean bottom seismometer	OBS	in the water	
PS74/209-1	08.08.09	00:05	70° 4,72' N	14° 18,99' W	1366	SE 5	42,9	0,1	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/209-1	08.08.09	00:06	70° 4,71' N	14° 18,98' W	1365	SE 5	151	0,4	Ocean bottom seismometer	OBS	on deck	
PS74/210-1	08.08.09	02:04	70° 9,46' N	14° 38,66' W	1298	ESE 5	227,6	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/210-1	08.08.09	02:04	70° 9,46' N	14° 38,66' W	1298	ESE 5	227,6	0,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/210-1	08.08.09	02:05	70° 9,46' N	14° 38,64' W	1302	ESE 6	116,7	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/211-1	08.08.09	03:55	70° 13,88' N	14° 56,76' W	945,4	ESE 5	155,2	0,5	Ocean bottom seismometer	OBS	in the water	
PS74/211-1	08.08.09	03:55	70° 13,88' N	14° 56,76' W	945,4	ESE 5	155,2	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/211-1	08.08.09	03:56	70° 13,87' N	14° 56,73' W	956,7	ESE 5	124,8	1,1	Ocean bottom seismometer	OBS	on deck	
PS74/212-1	08.08.09	06:07	70° 18,26' N	15° 14,60' W	1061	E 4	344,8	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/212-1	08.08.09	06:09	70° 18,25' N	15° 14,57' W	1057	E 4	135,1	0,4	Ocean bottom seismometer	OBS	on ground/max depth	abgetaucht
PS74/212-1	08.08.09	06:10	70° 18,25' N	15° 14,55' W	1058	E 4	130,8	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/213-1	08.08.09	08:11	70° 23,60' N	15° 36,85' W	1061	ESE 5	206,5	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/213-1	08.08.09	08:12	70° 23,60' N	15° 36,86' W	1061	ESE 5	209,3	0,2	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/213-1	08.08.09	08:12	70° 23,60' N	15° 36,86' W	1061	ESE 5	209,3	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/214-1	08.08.09	10:02	70° 27,82' N	15° 54,67' W	1186	SE 7	148	0,9	Ocean bottom seismometer	OBS	in the water	
PS74/214-1	08.08.09	10:02	70° 27,82' N	15° 54,67' W	1186	SE 7	148	0,9	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/214-1	08.08.09	10:03	70° 27,81' N	15° 54,64' W	1185	SE 7	151,4	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/215-1	08.08.09	12:00	70° 32,60' N	16° 14,45' W	1191	SE 5	221,5	0,5	Ocean bottom seismometer	OBS	in the water	
PS74/215-1	08.08.09	12:00	70° 32,60' N	16° 14,45' W	1191	SE 5	221,5	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/215-1	08.08.09	12:01	70° 32,59' N	16° 14,44' W	1192	SE 5	145,4	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/216-1	08.08.09	14:00	70° 37,30' N	16° 34,12' W	1564	E 4	93,2	0,1	Releaser Test	REL	in the water	
PS74/216-1	08.08.09	14:21	70° 37,24' N	16° 34,07' W	1565	E 6	281,6	0,1	Releaser Test	REL	on ground/max depth	1000 m, EL 31
PS74/216-1	08.08.09	14:23	70° 37,23' N	16° 34,08' W	1566	E 5	216	0,1	Releaser Test	REL	information	Hydrophon zu Wasser
PS74/216-1	08.08.09	14:48	70° 37,18' N	16° 34,11' W	1568	E 5	234,3	0,2	Releaser Test	REL	information	Hydrophon aus dem Wasser
PS74/216-1	08.08.09	14:48	70° 37,18' N	16° 34,11' W	1568	E 5	234,3	0,2	Releaser Test	REL	hoisting	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/216-1	08.08.09	15:11	70° 37,11' N	16° 34,38' W	1569	E 6	253,5	0,6	Releaser Test	REL	on deck	
PS74/216-2	08.08.09	15:25	70° 37,58' N	16° 35,31' W	1553	E 6	203,3	0,5	Ocean bottom seismometer	OBS	in the water	
PS74/216-2	08.08.09	15:25	70° 37,58' N	16° 35,31' W	1553	E 6	203,3	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/216-2	08.08.09	15:26	70° 37,57' N	16° 35,32' W	1555	E 6	168	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/217-1	08.08.09	16:59	70° 41,81' N	16° 53,07' W	1482	E 6	282,4	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/217-1	08.08.09	16:59	70° 41,81' N	16° 53,07' W	1482	E 6	282,4	0,4	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/217-1	08.08.09	17:00	70° 41,81' N	16° 53,07' W	1481	E 6	148,6	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/218-1	08.08.09	18:57	70° 46,79' N	17° 13,94' W	1703	E 5	103	0,2	Ocean bottom seismometer	OBS	in the water	
PS74/218-1	08.08.09	18:58	70° 46,79' N	17° 13,93' W	1703	E 4	296,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/218-1	08.08.09	18:59	70° 46,79' N	17° 13,92' W	1701	E 4	108,2	0,1	Ocean bottom seismometer	OBS	on deck	
PS74/219-1	08.08.09	20:44	70° 51,27' N	17° 32,98' W	1727	E 5	127,5	0,2	Ocean bottom seismometer	OBS	in the water	
PS74/219-1	08.08.09	20:45	70° 51,27' N	17° 32,97' W	1727	E 5	141,5	0,3	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/219-1	08.08.09	20:46	70° 51,27' N	17° 32,97' W	1728	E 5	143,6	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/220-1	08.08.09	22:36	70° 55,94' N	17° 52,79' W	1735	E 5	215,3	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/220-1	08.08.09	22:36	70° 55,94' N	17° 52,79' W	1735	E 5	215,3	0,3	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/220-1	08.08.09	22:37	70° 55,94' N	17° 52,80' W	1713	E 4	187,2	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/221-1	08.08.09	23:45	71° 0,57' N	18° 12,87' W	1725	ENE 4	210,9	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/221-1	08.08.09	23:45	71° 0,57' N	18° 12,87' W	1725	ENE 4	210,9	0,4	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/221-1	08.08.09	23:46	71° 0,56' N	18° 12,86' W	1727	ENE 4	150	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/222-1	09.08.09	00:53	71° 5,32' N	18° 33,05' W	1606	ENE 3	307,1	0,2	Ocean bottom seismometer	OBS	in the water	
PS74/222-1	09.08.09	00:53	71° 5,32' N	18° 33,05' W	1606	ENE 3	307,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/222-1	09.08.09	00:54	71° 5,32' N	18° 33,02' W	1605	ENE 3	143,6	1,1	Ocean bottom seismometer	OBS	on deck	
PS74/223-1	09.08.09	01:59	71° 10,02' N	18° 53,01' W	1155	ENE 3	295,6	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/223-1	09.08.09	01:59	71° 10,02' N	18° 53,01' W	1155	ENE 3	295,6	0,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/223-1	09.08.09	02:00	71° 10,02' N	18° 53,01' W	1154	ENE 3	135,1	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/224-1	09.08.09	03:30	71° 14,59' N	19° 13,21' W	476,2	NE 4	214,5	0,2	Ocean bottom seismometer	OBS	in the water	
PS74/224-1	09.08.09	03:30	71° 14,59' N	19° 13,21' W	476,2	NE 4	214,5	0,2	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/224-1	09.08.09	03:31	71° 14,58' N	19° 13,23' W	475,9	NE 4	175,1	1,3	Ocean bottom seismometer	OBS	on deck	
PS74/225-1	09.08.09	05:22	71° 19,17' N	19° 33,12' W	382,3	NE 5	216,1	1,2	Ocean bottom seismometer	OBS	in the water	
PS74/225-1	09.08.09	05:22	71° 19,17' N	19° 33,12' W	382,3	NE 5	216,1	1,2	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/225-1	09.08.09	05:22	71° 19,17' N	19° 33,12' W	382,3	NE 5	216,1	1,2	Ocean bottom seismometer	OBS	on deck	
PS74/226-1	09.08.09	07:10	71° 23,87' N	19° 53,37' W	252,7	NNE 7	182,3	0,8	Ocean bottom seismometer	OBS	in the water	
PS74/226-1	09.08.09	07:11	71° 23,86' N	19° 53,36' W	252,6	NNE 7	151,2	0,8	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/226-1	09.08.09	07:11	71° 23,86' N	19° 53,36' W	252,6	NNE 7	151,2	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/227-1	09.08.09	08:17	71° 28,67' N	20° 14,05' W	275	NNE 6	160,4	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/227-1	09.08.09	08:17	71° 28,67' N	20° 14,05' W	275	NNE 6	160,4	0,3	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/227-1	09.08.09	08:17	71° 28,67' N	20° 14,05' W	275	NNE 6	160,4	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/228-1	09.08.09	09:25	71° 33,26' N	20° 34,61' W	261,5	NNE 6	304	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/228-1	09.08.09	09:26	71° 33,26' N	20° 34,60' W	260,9	NNE 6	120,3	0,3	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/228-1	09.08.09	09:26	71° 33,26' N	20° 34,60' W	260,9	NNE 6	120,3	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/229-1	09.08.09	10:47	71° 39,00' N	21° 0,01' W	289,1	N 5	119,5	1,4	Ocean bottom seismometer	OBS	in the water	
PS74/229-1	09.08.09	10:47	71° 39,00' N	21° 0,01' W	289,1	N 5	119,5	1,4	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/229-1	09.08.09	10:47	71° 39,00' N	21° 0,01' W	289,1	N 5	119,5	1,4	Ocean bottom seismometer	OBS	on deck	
PS74/230-1	10.08.09	15:15	72° 3,40' N	22° 46,66' W	356,4	ESE 3	137,9	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/230-1	10.08.09	15:15	72° 3,40' N	22° 46,66' W	356,4	ESE 3	137,9	0,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/230-1	10.08.09	15:16	72° 3,40' N	22° 46,63' W	356,1	SE 4	133,5	1,1	Ocean bottom seismometer	OBS	on deck	
PS74/231-1	10.08.09	20:27	72° 25,98' N	24° 26,11' W	514,2	ESE 4	137,2	2	Seismic refraction profile	SEISREFR	in the water	
PS74/231-1	10.08.09	20:37	72° 25,52' N	24° 24,69' W	511,1	ESE 4	138,4	4,1	Seismic refraction profile	SEISREFR	profile start	1. Messschuss
PS74/231-1	11.08.09	04:03	72° 3,70' N	22° 48,01' W	377,4	ESE 4	130	5,1	Seismic refraction profile	SEISREFR	action	Wegpunkt
PS74/231-1	11.08.09	04:09	72° 3,39' N	22° 46,75' W	358,9	ESE 4	129	5,1	Seismic refraction profile	SEISREFR	action	pass 230-1
PS74/231-1	11.08.09	12:20	71° 39,02' N	21° 0,13' W	287,4	SE 3	126,9	5	Seismic refraction profile	SEISREFR	action	passieren 229-1
PS74/231-1	11.08.09	14:20	71° 33,27' N	20° 34,80' W	259,4	ESE 3	124,9	4,9	Seismic refraction profile	SEISREFR	action	passieren 228-1
PS74/231-1	11.08.09	15:58	71° 28,65' N	20° 14,11' W	276,4	SE 2	125,4	4,8	Seismic refraction profile	SEISREFR	action	passieren 227-1
PS74/231-1	11.08.09	17:35	71° 23,86' N	19° 53,45' W	252,8	SE 2	123,6	4,9	Seismic refraction profile	SEISREFR	action	pass 226-1
PS74/231-1	11.08.09	19:09	71° 19,20' N	19° 33,29' W	380,5	E 1	122,7	4,4	Seismic refraction profile	SEISREFR	action	pass 225-1
PS74/231-1	11.08.09	20:42	71° 14,62' N	19° 13,41' W	474,6	S 0	127,3	4,7	Seismic refraction profile	SEISREFR	action	pass PS74/ 224-1 OBS

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/231-1	11.08.09	22:20	71° 10,04' N	18° 53,11' W	1147	NNE 1	125,9	5,1	Seismic refraction profile	SEISREFR	action	pass PS74/ 223-1 OBS
PS74/231-1	11.08.09	23:54	71° 5,37' N	18° 33,22' W	1600	NNE 2	128,7	5,1	Seismic refraction profile	SEISREFR	action	pass PS74/222-1 OBS
PS74/231-1	12.08.09	01:32	71° 0,56' N	18° 12,99' W	1722	NNE 4	126,9	4,9	Seismic refraction profile	SEISREFR	action	pass PS74 221-1
PS74/231-1	12.08.09	03:09	70° 55,93' N	17° 52,79' W	1736	NNW 3	131,7	4,9	Seismic refraction profile	SEISREFR	action	pass PS 74 220-1
PS74/231-1	12.08.09	04:46	70° 51,24' N	17° 32,95' W	1728	NNW 4	125,3	4,8	Seismic refraction profile	SEISREFR	action	pass 219-1
PS74/231-1	12.08.09	06:16	70° 46,83' N	17° 14,21' W	1710	NNW 4	126,4	5,2	Seismic refraction profile	SEISREFR	action	pass 218-1
PS74/231-1	12.08.09	07:58	70° 41,80' N	16° 53,06' W	1483	NNW 5	127,1	4,6	Seismic refraction profile	SEISREFR	action	pass 217-1
PS74/231-1	12.08.09	09:26	70° 37,61' N	16° 35,48' W	1550	NNW 5	126,5	4,7	Seismic refraction profile	SEISREFR	action	pass PS74/216-2 OBS
PS74/231-1	12.08.09	11:06	70° 32,59' N	16° 14,50' W	1190	NNW 6	121	5,4	Seismic refraction profile	SEISREFR	action	pass PS74/215-1 OBS
PS74/231-1	12.08.09	12:41	70° 27,84' N	15° 54,86' W	1185	NNW 7	130,8	5	Seismic refraction profile	SEISREFR	action	pass PS74 214-1
PS74/231-1	12.08.09	14:10	70° 23,61' N	15° 36,92' W	1062	NNW 7	128	5	Seismic refraction profile	SEISREFR	action	pass PS74 213-1
PS74/231-1	12.08.09	16:02	70° 18,28' N	15° 14,79' W	1093	NNW 8	126	5,2	Seismic refraction profile	SEISREFR	action	pass PS74 212-1
PS74/231-1	12.08.09	17:31	70° 13,87' N	14° 56,87' W	977,2	NNW 7	123,4	5,1	Seismic refraction profile	SEISREFR	action	pass 211-1
PS74/231-1	12.08.09	19:00	70° 9,44' N	14° 38,61' W	1300	NNW 8	122	5,2	Seismic refraction profile	SEISREFR	action	pass 210-1
PS74/231-1	12.08.09	20:38	70° 4,71' N	14° 19,13' W	1364	NNW 9	126,8	4,7	Seismic refraction profile	SEISREFR	action	pass PS74/209-1 OBS
PS74/231-1	12.08.09	22:14	70° 0,12' N	14° 0,80' W	1620	NNW 7	120,8	5,1	Seismic refraction profile	SEISREFR	action	pass PS74/208-1 OBS
PS74/231-1	13.08.09	02:19	69° 48,18' N	13° 13,91' W	1592	NNW 6	131,3	4,9	Seismic refraction profile	SEISREFR	profile end	
PS74/231-1	13.08.09	02:22	69° 48,02' N	13° 13,39' W	1595	NNW 7	131,3	3,4	Seismic refraction profile	SEISREFR	hoisting	
PS74/231-1	13.08.09	02:41	69° 47,53' N	13° 11,14' W	1609	NNW 8	109,4	1,1	Seismic refraction profile	SEISREFR	on deck	
PS74/232-1	13.08.09	04:52	69° 59,92' N	13° 59,51' W	1558	NNW 6	190,4	1,2	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/232-1	13.08.09	04:58	69° 59,84' N	13° 59,44' W	1559	NNW 7	133,1	0,5	Ocean bottom seismometer	OBS	action	Ausgeloest
PS74/232-1	13.08.09	05:07	69° 59,81' N	13° 59,35' W	1565	NNW 6	205,4	0,7	Ocean bottom seismometer	OBS	action	Hydrophon aus Wasser
PS74/232-1	13.08.09	05:13	69° 59,76' N	13° 59,42' W	1573	NNW 7	206,5	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/232-1	13.08.09	05:18	69° 59,73' N	13° 59,47' W	1574	NNW 6	185,3	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus Wasser
PS74/232-1	13.08.09	05:23	69° 59,71' N	13° 59,42' W	1576	N 6	160,6	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/232-1	13.08.09	05:40	69° 59,96' N	14° 0,57' W	1609	NNW 6	96,5	2,2	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/232-1	13.08.09	05:50	69° 59,86' N	14° 0,61' W	1591	N 7	242,2	0,6	Ocean bottom seismometer	OBS	on ground/max depth	nur fues System
PS74/232-1	13.08.09	05:50	69° 59,86' N	14° 0,61' W	1591	N 7	242,2	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/232-2	13.08.09	06:35	70° 0,39' N	14° 2,37' W	1641	NNW 7	235,2	0,9	Heat Flow	HF	in the water	
PS74/232-2	13.08.09	06:56	70° 0,26' N	14° 2,82' W	1641	NNW 6	236,4	0,6	Heat Flow	HF	action	gestopt zum auspendeln bei 1500m
PS74/232-2	13.08.09	07:12	70° 0,22' N	14° 2,79' W	1640	NNW 6	18,2	0,2	Heat Flow	HF	on ground/max depth	GE 72.1 1613m
PS74/232-2	13.08.09	07:24	70° 0,23' N	14° 2,77' W	1639	NNW 6	69,6	0,5	Heat Flow	HF	hoisting	
PS74/232-2	13.08.09	07:26	70° 0,23' N	14° 2,75' W	1640	NNW 6	30,7	0,2	Heat Flow	HF	action	aus dem Boden
PS74/232-2	13.08.09	07:58	70° 0,21' N	14° 2,90' W	1638	NNW 6	225,2	0,1	Heat Flow	HF	on deck	
PS74/233-1	13.08.09	08:47	70° 4,58' N	14° 18,50' W	1372	N 6	314,3	0,5	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/233-1	13.08.09	08:49	70° 4,59' N	14° 18,50' W	1370	NNW 6	7,1	0,5	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/233-1	13.08.09	08:55	70° 4,64' N	14° 18,46' W	1369	NNW 6	11	0,3	Ocean bottom seismometer	OBS	action	Hydophon aus dem Wasser
PS74/233-1	13.08.09	09:09	70° 4,67' N	14° 18,52' W	1368	N 7	329,9	0,4	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/233-1	13.08.09	09:17	70° 4,66' N	14° 18,75' W	1367	N 5	263,9	1,7	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot vebunden
PS74/233-1	13.08.09	09:22	70° 4,60' N	14° 18,90' W	1367	NNW 7	201,9	1,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/233-1	13.08.09	09:23	70° 4,58' N	14° 18,92' W	1367	NNW 7	206,8	1,5	Ocean bottom seismometer	OBS	on deck	
PS74/234-1	13.08.09	10:22	70° 9,25' N	14° 37,48' W	1180	N 6	227,8	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/234-1	13.08.09	10:24	70° 9,24' N	14° 37,52' W	1181	NNW 6	224,9	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/234-1	13.08.09	10:29	70° 9,24' N	14° 37,54' W	1176	NNW 6	340,4	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/234-1	13.08.09	10:43	70° 9,26' N	14° 37,63' W	1164	N 6	223,8	0,3	Ocean bottom seismometer	OBS	action	OBS taucht auf
PS74/234-1	13.08.09	10:49	70° 9,26' N	14° 38,00' W	1214	N 6	277,5	3,3	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/234-1	13.08.09	10:58	70° 9,30' N	14° 38,56' W	1304	NNW 6	212,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/234-1	13.08.09	10:59	70° 9,30' N	14° 38,57' W	1303	NNW 6	223,4	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/235-1	13.08.09	11:58	70° 13,85' N	14° 56,84' W	968,8	NNW 4	269	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/235-1	13.08.09	12:01	70° 13,85' N	14° 56,87' W	970,9	NW 4	327,5	0	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/235-1	13.08.09	12:07	70° 13,90' N	14° 56,93' W	983,8	NNW 5	347,8	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/235-1	13.08.09	12:16	70° 13,98' N	14° 57,00' W	998,5	NW 4	348,6	0,1	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/235-1	13.08.09	12:19	70° 13,98' N	14° 57,01' W	997,9	NNW 5	99,4	0,6	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/235-1	13.08.09	12:25	70° 13,94' N	14° 56,87' W	976,8	NNW 5	176,7	0,3	Ocean bottom seismometer	OBS	on ground/max depth	an Deck
PS74/235-1	13.08.09	12:27	70° 13,93' N	14° 56,89' W	980,5	N 5	202,4	0,5	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/236-1	13.08.09	13:22	70° 18,65' N	15° 16,02' W	1393	NNW 5	256,2	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/236-1	13.08.09	13:24	70° 18,64' N	15° 16,05' W	1394	N 4	243,3	0,2	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/236-1	13.08.09	13:30	70° 18,60' N	15° 16,15' W	1401	N 5	248,9	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/236-1	13.08.09	13:41	70° 18,60' N	15° 16,15' W	1405	NNW 5	48,1	0,2	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/236-1	13.08.09	13:45	70° 18,60' N	15° 16,05' W	1403	N 5	68	0,3	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/236-1	13.08.09	13:56	70° 18,40' N	15° 14,45' W	1090	N 5	126,7	0,3	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Bord
PS74/236-1	13.08.09	13:58	70° 18,39' N	15° 14,41' W	1089	N 5	123,6	0,6	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/237-1	13.08.09	14:54	70° 23,29' N	15° 35,25' W	1027	N 4	330,2	0,3	Ocean bottom hydrophone	OBH	action	Hydrophon zu Wasser
PS74/237-1	13.08.09	14:58	70° 23,30' N	15° 35,29' W	1028	N 4	55,3	0,1	Ocean bottom hydrophone	OBH	action	ausgelöst
PS74/237-1	13.08.09	15:06	70° 23,28' N	15° 35,32' W	1028	N 5	199,8	0,1	Ocean bottom hydrophone	OBH	action	Hydrophon an Deck
PS74/237-1	13.08.09	15:16	70° 23,24' N	15° 35,38' W	1032	N 5	200,2	0,1	Ocean bottom hydrophone	OBH	action	OBS aufgetaucht
PS74/237-1	13.08.09	15:52	70° 23,34' N	15° 37,12' W	1068	NNE 5	201,4	0,4	Ocean bottom hydrophone	OBH	action	OBS mit Schlauchboot verbunden
PS74/237-1	13.08.09	16:02	70° 23,27' N	15° 37,26' W	1069	N 4	240,9	0,4	Ocean bottom hydrophone	OBH	on ground/max depth	nur für's system
PS74/237-1	13.08.09	16:02	70° 23,27' N	15° 37,26' W	1069	N 4	240,9	0,4	Ocean bottom hydrophone	OBH	on deck	
PS74/238-1	13.08.09	16:52	70° 27,68' N	15° 53,95' W	1170	NNE 3	294,6	1,1	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/238-1	13.08.09	16:57	70° 27,69' N	15° 54,10' W	1173	NNE 3	230,1	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/238-1	13.08.09	17:01	70° 27,66' N	15° 54,15' W	1175	NNE 3	207,4	0,6	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/238-1	13.08.09	17:13	70° 27,70' N	15° 54,24' W	1175	N 3	344,7	0,5	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/238-1	13.08.09	17:23	70° 27,78' N	15° 54,37' W	1181	N 3	202,2	0,6	Ocean bottom seismometer	OBS	action	am Schlauchboot angeschlagen
PS74/238-1	13.08.09	17:27	70° 27,75' N	15° 54,40' W	1182	N 3	217,1	0,4	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/238-1	13.08.09	17:28	70° 27,74' N	15° 54,42' W	1182	N 2	216,8	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/239-1	13.08.09	18:25	70° 32,67' N	16° 14,80' W	1160	N 1	295,4	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/239-1	13.08.09	18:30	70° 32,67' N	16° 14,96' W	1174	NNE 2	271	1	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/239-1	13.08.09	18:37	70° 32,70' N	16° 15,15' W	1192	NNE 2	331	0,7	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/239-1	13.08.09	18:46	70° 32,74' N	16° 15,33' W	1222	ENE 2	259	0,6	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/239-1	13.08.09	18:55	70° 32,63' N	16° 14,71' W	1175	NNE 2	132,3	0,2	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/239-1	13.08.09	19:03	70° 32,56' N	16° 14,64' W	1182	NE 1	318	0,2	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/239-1	13.08.09	19:03	70° 32,56' N	16° 14,64' W	1182	NE 1	318	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/240-1	13.08.09	19:55	70° 37,45' N	16° 34,71' W	1562	NNE 1	303	5,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/240-1	13.08.09	20:01	70° 37,46' N	16° 35,04' W	1558	NNE 1	296	0,5	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/240-1	13.08.09	20:12	70° 37,52' N	16° 35,19' W	1559	NNE 0	339,2	0,4	Ocean bottom seismometer	OBS	action	Hydophon aus dem Wasser
PS74/240-1	13.08.09	20:25	70° 37,54' N	16° 35,34' W	1554	WNW 1	339,4	0,9	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/240-1	13.08.09	20:30	70° 37,58' N	16° 35,39' W	1552	W 1	181,8	0,1	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/240-1	13.08.09	20:31	70° 37,58' N	16° 35,40' W	1551	NW 1	283	0,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/240-1	13.08.09	20:37	70° 37,62' N	16° 35,43' W	1550	W 1	349	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/240-2	13.08.09	20:52	70° 37,62' N	16° 35,45' W	1552	WSW 1	83	0,1	Heat Flow	HF	in the water	
PS74/240-2	13.08.09	21:13	70° 37,61' N	16° 35,44' W	1552	WSW 2	234	0,1	Heat Flow	HF	action	1300 m, auspendeln
PS74/240-2	13.08.09	21:22	70° 37,61' N	16° 35,41' W	1552	WSW 1	258,9	0,3	Heat Flow	HF	on ground/max depth	Lanze im Boden / GE 72.1 1518 m
PS74/240-2	13.08.09	21:31	70° 37,61' N	16° 35,42' W	1552	WSW 2	335,1	0,1	Heat Flow	HF	hoisting	aus dem Boden
PS74/240-2	13.08.09	22:01	70° 37,62' N	16° 35,37' W	1550	SW 2	233,6	0,1	Heat Flow	HF	on deck	
PS74/241-1	13.08.09	22:53	70° 41,67' N	16° 52,43' W	1470	S 3	228,9	0,2	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/241-1	13.08.09	22:55	70° 41,67' N	16° 52,44' W	1469	S 3	193,2	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/241-1	13.08.09	23:08	70° 41,60' N	16° 52,51' W	1471	S 3	357,6	0,3	Ocean bottom seismometer	OBS	action	Hydophon aus dem Wasser
PS74/241-1	13.08.09	23:18	70° 41,65' N	16° 52,42' W	1468	SW 1	64	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/241-1	13.08.09	23:20	70° 41,65' N	16° 52,39' W	1466	SW 1	76,6	0,1	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/241-1	13.08.09	23:27	70° 41,71' N	16° 52,74' W	1476	SSW 2	190,6	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/241-1	13.08.09	23:29	70° 41,69' N	16° 52,74' W	1475	SSW 2	216,5	0,7	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/242-1	14.08.09	00:30	70° 46,74' N	17° 14,04' W	1704	S 4	276,6	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/242-1	14.08.09	00:36	70° 46,72' N	17° 14,05' W	1704	S 3	50,6	0,2	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/242-1	14.08.09	00:45	70° 46,73' N	17° 13,87' W	1703	SSW 4	50,6	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/242-1	14.08.09	01:13	70° 46,72' N	17° 13,95' W	1704	SSW 4	296,9	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/242-1	14.08.09	01:21	70° 46,73' N	17° 13,88' W	1704	SSW 5	61,7	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/242-1	14.08.09	02:35	70° 46,78' N	17° 13,82' W	1704	S 6	155,4	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/242-1	14.08.09	02:39	70° 46,76' N	17° 13,85' W	1704	S 6	220,9	0,1	Ocean bottom seismometer	OBS	action	OBS ausgelöst
PS74/242-1	14.08.09	02:54	70° 46,76' N	17° 13,89' W	1703	SSW 5	267,4	0,1	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/242-1	14.08.09	05:04	70° 47,47' N	17° 14,99' W	1698	S 6	308,3	10,8	Ocean bottom seismometer	OBS	on ground/max depth	nu fuers System
PS74/242-1	14.08.09	05:07	70° 47,80' N	17° 16,29' W	1666	SSW 6	308,1	11,1	Ocean bottom seismometer	OBS	on deck	Abbuch / Suche eingestellt

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/243-1	14.08.09	05:46	70° 51,17' N	17° 32,90' W	1726	SSW 6	295,8	0,5	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/243-1	14.08.09	05:52	70° 51,20' N	17° 32,96' W	1727	SSW 6	313,6	0,6	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/243-1	14.08.09	06:12	70° 51,15' N	17° 32,88' W	1729	SSW 5	128,9	0,5	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/243-1	14.08.09	06:17	70° 51,12' N	17° 32,81' W	1728	SSW 5	146,4	1,1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/243-1	14.08.09	06:24	70° 51,36' N	17° 32,56' W	1728	S 6	15,5	0,9	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/243-1	14.08.09	06:31	70° 51,43' N	17° 32,61' W	1727	SSW 6	328,7	0,6	Ocean bottom seismometer	OBS	on ground/max depth	nur fues System
PS74/243-1	14.08.09	06:34	70° 51,44' N	17° 32,66' W	1728	S 5	254	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/243-2	14.08.09	06:50	70° 51,42' N	17° 32,82' W	1728	S 5	53,4	0,4	Heat Flow	HF	in the water	
PS74/243-2	14.08.09	07:21	70° 51,54' N	17° 32,60' W	1727	SSW 6	96,8	0,4	Heat Flow	HF	on ground/max depth	
PS74/243-2	14.08.09	07:25	70° 51,55' N	17° 32,62' W	1726	S 6	247,6	0,4	Heat Flow	HF	action	GE 72.1 1698m
PS74/243-2	14.08.09	07:28	70° 51,54' N	17° 32,63' W	1728	S 5	197,3	0,6	Heat Flow	HF	hoisting	
PS74/243-2	14.08.09	08:03	70° 51,75' N	17° 32,39' W	1728	S 7	41,5	0,6	Heat Flow	HF	on deck	
PS74/244-1	14.08.09	09:02	70° 55,89' N	17° 52,86' W	1735	S 7	27,9	0,1	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/244-1	14.08.09	09:04	70° 55,90' N	17° 52,84' W	1735	S 8	54,7	0,2	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/244-1	14.08.09	09:19	70° 55,92' N	17° 52,80' W	1736	S 8	96,6	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/244-1	14.08.09	09:28	70° 55,92' N	17° 52,85' W	1736	S 8	27,4	0,4	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/244-1	14.08.09	09:34	70° 55,92' N	17° 52,75' W	1735	S 8	52,8	0,8	Ocean bottom seismometer	OBS	action	Schhlauchboot mit OBS verbunden
PS74/244-1	14.08.09	09:41	70° 55,97' N	17° 52,71' W	1736	S 8	7	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/244-1	14.08.09	09:41	70° 55,97' N	17° 52,71' W	1736	S 8	7	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/245-1	14.08.09	10:35	71° 0,45' N	18° 12,68' W	1722	SSE 9	99,2	0,8	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/245-1	14.08.09	10:39	71° 0,46' N	18° 12,69' W	1724	S 10	326	0,2	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/245-1	14.08.09	10:55	71° 0,49' N	18° 12,77' W	1722	S 10	13,5	0,4	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/245-1	14.08.09	11:03	71° 0,55' N	18° 12,80' W	1722	S 9	315,2	0,7	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/245-1	14.08.09	11:07	71° 0,56' N	18° 12,78' W	1721	S 9	134,6	0,5	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/245-1	14.08.09	11:12	71° 0,58' N	18° 12,79' W	1725	S 10	313,8	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/245-1	14.08.09	11:12	71° 0,58' N	18° 12,79' W	1725	S 9	313,8	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/246-1	14.08.09	12:06	71° 5,30' N	18° 33,18' W	1600	S 11	314,7	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/246-1	14.08.09	12:13	71° 5,34' N	18° 33,29' W	1600	S 11	124,1	0,3	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/246-1	14.08.09	12:27	71° 5,36' N	18° 33,30' W	1601	S 12	223	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/246-1	14.08.09	12:42	71° 5,35' N	18° 33,32' W	1600	S 11	117,5	0,3	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/246-1	14.08.09	12:54	71° 5,28' N	18° 32,88' W	1606	S 10	350	0,3	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/246-1	14.08.09	13:05	71° 5,45' N	18° 32,91' W	1604	S 11	334,8	1,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Bord
PS74/246-1	14.08.09	13:08	71° 5,50' N	18° 33,01' W	1602	S 9	322,4	1,2	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/246-2	14.08.09	13:56	71° 5,37' N	18° 33,00' W	1605	S 10	184,1	0,1	Heat Flow	HF	in the water	
PS74/246-2	14.08.09	14:28	71° 5,33' N	18° 33,06' W	1604	S 11	204,5	0,1	Heat Flow	HF	on ground/max depth	1575 m, GE 72.1
PS74/246-2	14.08.09	14:36	71° 5,34' N	18° 33,05' W	1603	S 11	252,6	0,1	Heat Flow	HF	hoisting	
PS74/246-2	14.08.09	15:08	71° 5,33' N	18° 33,09' W	1602	SSW 10	204	0,2	Heat Flow	HF	at surface	
PS74/246-2	14.08.09	15:13	71° 5,33' N	18° 33,07' W	1603	SSW 12	113,7	0,1	Heat Flow	HF	on deck	
PS74/247-1	14.08.09	16:03	71° 9,92' N	18° 52,79' W	1164	SSW 10	354,1	0,7	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/247-1	14.08.09	16:07	71° 9,94' N	18° 52,76' W	1165	SSW 9	244,2	0,1	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/247-1	14.08.09	16:18	71° 9,95' N	18° 52,80' W	1163	S 10	225,3	0,4	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/247-1	14.08.09	16:27	71° 9,95' N	18° 52,98' W	1158	S 9	265,1	1,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/247-1	14.08.09	16:35	71° 9,90' N	18° 53,24' W	1151	S 10	108,6	0,5	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/247-1	14.08.09	16:38	71° 9,89' N	18° 53,14' W	1155	S 9	112,2	0,8	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/247-1	14.08.09	16:39	71° 9,88' N	18° 53,12' W	1156	S 10	76,6	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/248-1	14.08.09	17:33	71° 14,42' N	19° 13,99' W	475,5	SSW 10	0,7	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/248-1	14.08.09	17:40	71° 14,46' N	19° 13,88' W	474,9	SSW 9	40	0,6	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/248-1	14.08.09	17:43	71° 14,47' N	19° 13,87' W	475,1	SSW 10	247,6	0,4	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/248-1	14.08.09	17:44	71° 14,47' N	19° 13,90' W	475	SSW 10	264,1	0,5	Ocean bottom seismometer	OBS	action	Aufgetaucht
PS74/248-1	14.08.09	17:59	71° 14,41' N	19° 13,45' W	474,3	S 9	319,9	0,9	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/248-1	14.08.09	18:23	71° 14,55' N	19° 13,26' W	476,6	SSW 10	341,7	0,9	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/248-1	14.08.09	18:24	71° 14,57' N	19° 13,26' W	476,9	SSW 10	353,6	1,1	Ocean bottom seismometer	OBS	on deck	
PS74/249-1	14.08.09	19:20	71° 19,03' N	19° 33,33' W	386,5	S 9	206,5	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/249-1	14.08.09	19:23	71° 19,03' N	19° 33,35' W	386,6	S 9	308,4	0,1	Ocean bottom seismometer	OBS	action	Ausgeloest
PS74/249-1	14.08.09	19:26	71° 19,04' N	19° 33,39' W	387,2	SSW 9	17,8	0,6	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/249-1	14.08.09	19:28	71° 19,04' N	19° 33,40' W	386,2	SSW 9	302,3	0,3	Ocean bottom seismometer	OBS	action	Aufgetaucht

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/249-1	14.08.09	19:39	71° 19,06' N	19° 33,20' W	388,2	S 9	294,5	0,5	Ocean bottom seismometer	OBS	action	an Schlauchboot abgeschlagen
PS74/249-1	14.08.09	19:42	71° 19,06' N	19° 33,29' W	387	S 9	9	0,3	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/249-1	14.08.09	19:45	71° 19,07' N	19° 33,29' W	387,1	S 9	51,7	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/250-1	14.08.09	20:44	71° 23,80' N	19° 53,44' W	253	SSW 8	20,1	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/250-1	14.08.09	20:48	71° 23,79' N	19° 53,49' W	253,7	SSW 9	200,4	0,7	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/250-1	14.08.09	20:51	71° 23,78' N	19° 53,48' W	255,1	SSW 8	25,5	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/250-1	14.08.09	20:52	71° 23,78' N	19° 53,47' W	252,4	SSW 8	318,2	0,4	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/250-1	14.08.09	20:55	71° 23,79' N	19° 53,48' W	253,3	SSW 8	334,9	0,2	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/250-1	14.08.09	20:57	71° 23,79' N	19° 53,49' W	253,7	SSW 8	270,5	0,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/250-1	14.08.09	20:58	71° 23,79' N	19° 53,50' W	252,9	SSW 8	279	0	Ocean bottom seismometer	OBS	on deck	
PS74/251-1	14.08.09	22:34	71° 28,56' N	20° 13,49' W	275,1	S 7	266,1	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/251-1	14.08.09	22:35	71° 28,57' N	20° 13,49' W	275,8	S 7	48,2	0,1	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/251-1	14.08.09	22:42	71° 28,59' N	20° 13,43' W	275	S 7	82,5	1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/251-1	14.08.09	22:46	71° 28,60' N	20° 13,47' W	276,3	S 7	281	0,6	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/251-1	14.08.09	22:47	71° 28,61' N	20° 13,49' W	275,9	S 7	360	0,6	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/251-1	14.08.09	22:54	71° 28,64' N	20° 13,48' W	275	S 7	23,9	0,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/251-1	14.08.09	22:54	71° 28,64' N	20° 13,48' W	275	S 7	23,9	0,4	Ocean bottom seismometer	OBS	on deck	
PS74/252-1	15.08.09	00:08	71° 33,42' N	20° 34,03' W	260,5	S 7	81,3	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/252-1	15.08.09	00:12	71° 33,44' N	20° 33,95' W	262,4	S 7	51,9	0,4	Ocean bottom seismometer	OBS	action	aufgelöst
PS74/252-1	15.08.09	00:14	71° 33,45' N	20° 33,93' W	262,5	S 7	70,2	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/252-1	15.08.09	00:16	71° 33,45' N	20° 33,90' W	263,9	S 7	19,3	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/252-1	15.08.09	00:23	71° 33,44' N	20° 33,99' W	261,7	S 7	270,6	0,2	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/252-1	15.08.09	00:29	71° 33,44' N	20° 34,04' W	260,7	S 7	108,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Bord
PS74/252-1	15.08.09	00:32	71° 33,43' N	20° 34,03' W	261,2	S 7	176,9	0,1	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/253-1	15.08.09	01:40	71° 39,01' N	21° 0,30' W	287,4	S 5	1	0,1	Ocean bottom seismometer	OBS	action	Hydrophon im Wasser
PS74/253-1	15.08.09	01:43	71° 39,04' N	21° 0,25' W	289,2	S 5	51,2	0,2	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/253-1	15.08.09	01:45	71° 39,05' N	21° 0,20' W	286	S 5	50,7	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/253-1	15.08.09	01:47	71° 39,05' N	21° 0,16' W	285,6	S 5	3,6	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/253-1	15.08.09	01:52	71° 39,08' N	21° 0,08' W	288,1	S 5	53,8	0,3	Ocean bottom seismometer	OBS	action	OBS mit Boot verbunden
PS74/253-1	15.08.09	01:59	71° 39,11' N	21° 0,06' W	284,8	S 5	277,9	0,1	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/253-1	15.08.09	02:01	71° 39,12' N	21° 0,10' W	287,6	S 5	275,8	0,4	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/254-1	15.08.09	06:04	72° 3,23' N	22° 46,38' W	347,8	ESE 5	268,6	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/254-1	15.08.09	06:06	72° 3,23' N	22° 46,39' W	348	ESE 4	325,1	0,5	Ocean bottom seismometer	OBS	action	Ausgeloest
PS74/254-1	15.08.09	06:10	72° 3,25' N	22° 46,42' W	346,3	ESE 4	4,6	0,3	Ocean bottom seismometer	OBS	action	Hydorphon an Deck
PS74/254-1	15.08.09	06:12	72° 3,26' N	22° 46,42' W	348,8	ESE 4	35,9	0,3	Ocean bottom seismometer	OBS	action	Aufgeschwommen
PS74/254-1	15.08.09	06:15	72° 3,28' N	22° 46,39' W	349	ESE 4	29	0,3	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/254-1	15.08.09	06:15	72° 3,28' N	22° 46,39' W	349	ESE 4	29	0,3	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/254-1	15.08.09	06:20	72° 3,29' N	22° 46,31' W	347	ESE 4	67,3	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/255-1	21.08.09	06:55	80° 17,74' N	5° 35,11' W	821,7	SSE 4	186,9	0,8	Heat Flow	HF	in the water	
PS74/255-1	21.08.09	07:29	80° 17,42' N	5° 35,20' W	821,1	SSE 3	190,1	0,3	Heat Flow	HF	on ground/max depth	umgekippt, neuer Versuch
PS74/255-1	21.08.09	07:33	80° 17,41' N	5° 35,13' W	822,7	SSE 3	101,6	0,3	Heat Flow	HF	action	im BVoden bei 812 m
PS74/255-1	21.08.09	07:39	80° 17,40' N	5° 34,94' W	828,8	SSE 2	152,3	0,5	Heat Flow	HF	hoisting	
PS74/255-1	21.08.09	07:41	80° 17,39' N	5° 34,87' W	831	SSE 2	126,4	0,5	Heat Flow	HF	off ground	
PS74/255-1	21.08.09	07:54	80° 17,18' N	5° 35,12' W	827	SSE 3	178,3	1	Heat Flow	HF	at surface	
PS74/255-1	21.08.09	07:58	80° 17,11' N	5° 35,18' W	815,2	SSE 3	190,3	1,2	Heat Flow	HF	on deck	
PS74/256-1	21.08.09	11:22	80° 13,94' N	4° 50,29' W	1641	ESE 3	270,4	0,4	Heat Flow	HF	in the water	
PS74/256-1	21.08.09	11:46	80° 13,95' N	4° 50,82' W	1632	ENE 2	72,7	0,1	Heat Flow	HF	action	auf 1530 gestoppt um auszupendeln
PS74/256-1	21.08.09	12:15	80° 14,05' N	4° 50,00' W	1653	NE 3	67,1	0,4	Heat Flow	HF	on ground/max depth	Abbruch wg. schlechtem Sediment
PS74/256-1	21.08.09	12:43	80° 14,11' N	4° 49,84' W	1662	NE 4	66,2	0,7	Heat Flow	HF	on deck	
PS74/257-1	21.08.09	15:00	80° 8,72' N	4° 0,70' W	2213	ENE 8	288,5	0,1	Heat Flow	HF	in the water	
PS74/257-1	21.08.09	15:34	80° 8,76' N	4° 0,67' W	2215	ENE 7	75,8	0,1	Heat Flow	HF	action	Winde gestoppt, Auswertung
PS74/257-1	21.08.09	15:37	80° 8,76' N	4° 0,68' W	2214	ENE 7	296,7	0,1	Heat Flow	HF	on ground/max depth	2175 m, GE 72.1
PS74/257-1	21.08.09	15:41	80° 8,76' N	4° 0,72' W	2213	ENE 7	75,9	0,1	Heat Flow	HF	on ground/max depth	
PS74/257-1	21.08.09	15:42	80° 8,76' N	4° 0,72' W	2215	ENE 7	318,5	0,2	Heat Flow	HF	hoisting	
PS74/257-1	21.08.09	16:22	80° 8,82' N	4° 0,21' W	2221	ENE 8	69,6	0,2	Heat Flow	HF	on deck	
PS74/258-1	21.08.09	23:54	80° 4,27' N	3° 7,60' W	2601	E 12	1,7	1	Heat Flow	HF	in the water	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/258-1	22.08.09	00:30	80° 4,51' N	3° 8,22' W	2598	ESE 12	284,6	0,1	Heat Flow	HF	on ground/max depth	2550 m, GE72.1 umgefallen
PS74/258-1	22.08.09	00:42	80° 4,65' N	3° 8,17' W	2599	ESE 12	344,2	0,1	Heat Flow	HF	on ground/max depth	umgefallen
PS74/258-1	22.08.09	00:43	80° 4,65' N	3° 8,18' W	2600	ESE 12	350,3	0,2	Heat Flow	HF	hoisting	
PS74/258-1	22.08.09	01:22	80° 5,06' N	3° 8,60' W	2603	ESE 12	347,7	0,2	Heat Flow	HF	at surface	
PS74/258-1	22.08.09	01:29	80° 5,16' N	3° 8,90' W	2604	ESE 12	343,4	0,2	Heat Flow	HF	on deck	
PS74/259-1	22.08.09	08:30	79° 56,63' N	2° 8,05' W	2788	SE 9	255,3	0,3	Heat Flow	HF	in the water	
PS74/259-1	22.08.09	09:11	79° 56,53' N	2° 8,81' W	2792	SE 9	235,8	0,3	Heat Flow	HF	action	auf 2650 m auspendeln
PS74/259-1	22.08.09	09:25	79° 56,49' N	2° 9,10' W	2788	SE 9	239,1	0,3	Heat Flow	HF	on ground/max depth	GE 72.1 2733 m im Boden
PS74/259-1	22.08.09	09:34	79° 56,47' N	2° 9,31' W	2785	SE 9	230,4	0,4	Heat Flow	HF	hoisting	
PS74/259-1	22.08.09	09:39	79° 56,46' N	2° 9,43' W	2789	SE 9	243,8	0,2	Heat Flow	HF	action	geht nochmal zum Grund
PS74/259-1	22.08.09	09:41	79° 56,46' N	2° 9,47' W	2786	SE 8	246	0,2	Heat Flow	HF	on ground/max depth	GE 72.1 2748 m, im Boden
PS74/259-1	22.08.09	09:50	79° 56,45' N	2° 9,68' W	2787	SE 9	262,8	0,3	Heat Flow	HF	hoisting	
PS74/259-1	22.08.09	10:35	79° 56,45' N	2° 10,78' W	2784	SE 9	288,3	0,2	Heat Flow	HF	at surface	
PS74/259-1	22.08.09	10:38	79° 56,45' N	2° 10,86' W	2784	SE 9	290,2	0,3	Heat Flow	HF	on deck	
PS74/260-1	23.08.09	12:37	79° 52,87' N	1° 18,96' W	2838	SSW 10	50,3	0,3	Heat Flow	HF	in the water	
PS74/260-1	23.08.09	12:38	79° 52,88' N	1° 18,94' W	2839	SSW 9	61,3	0,3	Heat Flow	HF	lowering	
PS74/260-1	23.08.09	13:20	79° 52,95' N	1° 17,75' W	2843	SSW 9	69,8	0,3	Heat Flow	HF	action	Winde gestoppt, Auswertung
PS74/260-1	23.08.09	13:24	79° 52,96' N	1° 17,63' W	2842	SSW 9	69,1	0,3	Heat Flow	HF	on ground/max depth	2790 m, GE 72.1
PS74/260-1	23.08.09	13:33	79° 52,97' N	1° 17,33' W	2843	SSW 9	66,4	0,3	Heat Flow	HF	hoisting	
PS74/260-1	23.08.09	13:36	79° 52,98' N	1° 17,23' W	2844	SSW 9	66,8	0,3	Heat Flow	HF	action	Auswertung, 2700 m
PS74/260-1	23.08.09	13:42	79° 52,99' N	1° 17,03' W	2846	SSW 9	72,7	0,4	Heat Flow	HF	on ground/max depth	2793 m, GE 72.1
PS74/260-1	23.08.09	13:50	79° 53,01' N	1° 16,75' W	2844	SSW 8	73,4	0,4	Heat Flow	HF	on ground/max depth	2792 m, GE 72.1
PS74/260-1	23.08.09	13:56	79° 53,02' N	1° 16,53' W	2847	SSW 7	72,4	0,4	Heat Flow	HF	hoisting	
PS74/260-1	23.08.09	14:43	79° 53,08' N	1° 14,64' W	2856	SSW 8	75,9	0,4	Heat Flow	HF	on deck	
PS74/261-1	23.08.09	16:24	79° 50,37' N	0° 56,27' W	5612	SW 7	107,5	0,5	Heat Flow	HF	in the water	
PS74/261-1	23.08.09	17:04	79° 50,25' N	0° 54,50' W	2810	SW 5	117	0,5	Heat Flow	HF	on ground/max depth	GE 72.1 2761m
PS74/261-1	23.08.09	17:26	79° 50,15' N	0° 53,64' W	2809	SW 6	134,1	0,5	Heat Flow	HF	action	im Boden 2772m
PS74/261-1	23.08.09	17:34	79° 50,11' N	0° 53,35' W	2810	SW 6	126,4	0,4	Heat Flow	HF	hoisting	
PS74/261-1	23.08.09	18:16	79° 49,87' N	0° 52,13' W	2809	SW 4	146,2	0,5	Heat Flow	HF	on deck	
PS74/262-1	23.08.09	19:22	79° 48,51' N	0° 39,99' W	2813	SW 3	171,9	0,4	Heat Flow	HF	in the water	
PS74/262-1	23.08.09	20:08	79° 48,19' N	0° 40,06' W	2812	SSW 3	195,5	0,4	Heat Flow	HF	on ground/max depth	Ge 72.1 2770 m, im Boden
PS74/262-1	23.08.09	20:15	79° 48,14' N	0° 40,12' W	2813	SSW 2	193,4	0,4	Heat Flow	HF	hoisting	
PS74/262-1	23.08.09	21:05	79° 47,82' N	0° 40,88' W	2814	SSW 3	213,3	0,4	Heat Flow	HF	on deck	
PS74/263-1	23.08.09	23:30	79° 43,05' N	0° 13,13' E	2842	S 3	310,2	0,2	Heat Flow	HF	in the water	
PS74/263-1	24.08.09	00:11	79° 43,15' N	0° 12,68' E	2841	SSW 3	331,9	0,2	Heat Flow	HF	action	Winde gestoppt, Auswertung
PS74/263-1	24.08.09	00:11	79° 43,15' N	0° 12,68' E	2841	SSW 3	331,9	0,2	Heat Flow	HF	lowering	zum Grund
PS74/263-1	24.08.09	00:15	79° 43,17' N	0° 12,65' E	2840	SSW 3	339	0,2	Heat Flow	HF	on ground/max depth	2787 m, GE 72.1
PS74/263-1	24.08.09	00:22	79° 43,19' N	0° 12,60' E	2842	SSW 3	341,9	0,2	Heat Flow	HF	hoisting	
PS74/263-1	24.08.09	00:26	79° 43,20' N	0° 12,57' E	2842	SSW 3	342,5	0,2	Heat Flow	HF	lowering	
PS74/263-1	24.08.09	00:27	79° 43,21' N	0° 12,57' E	2843	SSW 3	339,4	0,2	Heat Flow	HF	on ground/max depth	2758 m, GE 72.1
PS74/263-1	24.08.09	00:35	79° 43,24' N	0° 12,53' E	2840	SSW 3	347,3	0,2	Heat Flow	HF	hoisting	
PS74/263-1	24.08.09	01:18	79° 43,41' N	0° 12,52' E	2841	S 3	6,2	0,3	Heat Flow	HF	at surface	
PS74/263-1	24.08.09	01:22	79° 43,42' N	0° 12,54' E	2840	SSW 3	350,1	0,3	Heat Flow	HF	on deck	
PS74/264-1	24.08.09	03:18	79° 39,15' N	0° 46,12' E	2682	S 2	102,8	0,2	Heat Flow	HF	in the water	
PS74/264-1	24.08.09	03:55	79° 39,11' N	0° 46,95' E	2677	SSE 2	69,9	0,2	Heat Flow	HF	action	2500 m, Winde gestoppt, Auswertung
PS74/264-1	24.08.09	04:00	79° 39,11' N	0° 47,07' E	2674	SSE 2	94	0,5	Heat Flow	HF	on ground/max depth	im Grund 2626m
PS74/264-1	24.08.09	04:11	79° 39,12' N	0° 47,32' E	2671	SE 2	51,5	0,3	Heat Flow	HF	off ground	
PS74/264-1	24.08.09	04:11	79° 39,12' N	0° 47,32' E	2671	SE 2	51,5	0,3	Heat Flow	HF	hoisting	im Grund
PS74/264-1	24.08.09	04:25	79° 39,14' N	0° 47,63' E	2669	SE 1	149,6	0,2	Heat Flow	HF	off ground	
PS74/264-1	24.08.09	05:04	79° 39,12' N	0° 48,66' E	2663	S 3	104,4	0,5	Heat Flow	HF	at surface	
PS74/264-1	24.08.09	05:09	79° 39,13' N	0° 48,79' E	2664	SSE 4	14,9	0,4	Heat Flow	HF	on deck	
PS74/265-1	24.08.09	06:37	79° 31,89' N	1° 56,66' E	2800	SSE 2	305,9	0,3	Heat Flow	HF	in the water	
PS74/265-1	24.08.09	07:25	79° 31,88' N	1° 56,95' E	2799	S 3	115,7	0,1	Heat Flow	HF	on ground/max depth	GE 72.1 2764m
PS74/265-1	24.08.09	07:28	79° 31,88' N	1° 56,97' E	2801	S 3	115,4	0,2	Heat Flow	HF	action	im Boden
PS74/265-1	24.08.09	07:31	79° 31,89' N	1° 56,99' E	2800	S 3	156,5	0,2	Heat Flow	HF	hoisting	
PS74/265-1	24.08.09	07:32	79° 31,89' N	1° 57,00' E	2801	SSE 3	39	0,3	Heat Flow	HF	off ground	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/265-1	24.08.09	07:36	79° 31,88' N	1° 57,02' E	2798	SSE 3	115,9	0	Heat Flow	HF	action	im Boden
PS74/265-1	24.08.09	07:43	79° 31,88' N	1° 57,06' E	2802	S 3	24,5	0,2	Heat Flow	HF	hoisting	
PS74/265-1	24.08.09	07:45	79° 31,88' N	1° 57,06' E	2801	S 3	41,4	0,5	Heat Flow	HF	off ground	
PS74/265-1	24.08.09	08:34	79° 31,83' N	1° 57,28' E	2799	S 2	116	0,1	Heat Flow	HF	on deck	
PS74/266-1	24.08.09	10:50	79° 25,98' N	2° 47,75' E	2717	SSW 3	284,2	0,6	Heat Flow	HF	in the water	
PS74/266-1	24.08.09	11:32	79° 26,03' N	2° 47,16' E	2725	S 2	291,8	0,4	Heat Flow	HF	action	aufgestoppt zum auspendeln
PS74/266-1	24.08.09	11:37	79° 26,05' N	2° 47,04' E	2730	SSW 2	284,9	0,4	Heat Flow	HF	on ground/max depth	im Boden, GE72.1 2680 m
PS74/266-1	24.08.09	11:43	79° 26,05' N	2° 46,91' E	2730	SSW 3	316,5	0,2	Heat Flow	HF	hoisting	
PS74/266-1	24.08.09	11:45	79° 26,05' N	2° 46,88' E	2732	SSW 2	316,5	0,2	Heat Flow	HF	action	Lanze aus dem Boden
PS74/266-1	24.08.09	11:48	79° 26,07' N	2° 46,81' E	2734	S 2	332,5	0,6	Heat Flow	HF	on ground/max depth	
PS74/266-1	24.08.09	11:55	79° 26,09' N	2° 46,73' E	2736	SSW 2	231,6	0,4	Heat Flow	HF	hoisting	
PS74/266-1	24.08.09	12:36	79° 25,92' N	2° 45,67' E	2724	S 2	265,4	0,2	Heat Flow	HF	at surface	
PS74/266-1	24.08.09	12:40	79° 25,93' N	2° 45,57' E	2724	S 2	320,3	0,2	Heat Flow	HF	on deck	
PS74/267-1	24.08.09	14:34	79° 17,83' N	4° 6,87' E	2586	SSW 2	79,9	0,2	Heat Flow	HF	in the water	
PS74/267-1	24.08.09	15:11	79° 17,83' N	4° 7,19' E	2591	SW 2	73	0,3	Heat Flow	HF	action	2450 m, Winde gestoppt, Auswertung
PS74/267-1	24.08.09	15:12	79° 17,82' N	4° 7,20' E	2586	SW 2	134,3	0,2	Heat Flow	HF	lowering	zum Grund
PS74/267-1	24.08.09	15:14	79° 17,82' N	4° 7,22' E	2587	SW 3	143,5	0,1	Heat Flow	HF	on ground/max depth	2540 m, GE 72.1
PS74/267-1	24.08.09	15:21	79° 17,83' N	4° 7,27' E	2588	SW 3	26,8	0,1	Heat Flow	HF	hoisting	
PS74/267-1	24.08.09	15:25	79° 17,84' N	4° 7,29' E	2589	SSW 2	161	0,1	Heat Flow	HF	action	2490 m, Winde gestoppt, Auswertung
PS74/267-1	24.08.09	15:25	79° 17,84' N	4° 7,29' E	2589	SSW 2	161	0,1	Heat Flow	HF	lowering	
PS74/267-1	24.08.09	15:27	79° 17,85' N	4° 7,30' E	2588	SSW 2	21,5	0,1	Heat Flow	HF	on ground/max depth	2540 m, GE 72.1
PS74/267-1	24.08.09	15:35	79° 17,87' N	4° 7,33' E	2586	SW 2	160,9	0,1	Heat Flow	HF	hoisting	
PS74/267-1	24.08.09	16:14	79° 17,89' N	4° 7,82' E	2592	SW 2	76,1	0,4	Heat Flow	HF	at surface	
PS74/267-1	24.08.09	16:17	79° 17,90' N	4° 7,93' E	2594	SSW 2	66,3	0,5	Heat Flow	HF	on deck	
PS74/268-1	24.08.09	17:24	79° 12,50' N	4° 55,06' E	1604	SSW 2	23,1	0,4	Heat Flow	HF	in the water	
PS74/268-1	24.08.09	17:49	79° 12,51' N	4° 55,35' E	1601	S 2	339,7	0,3	Heat Flow	HF	on ground/max depth	GE 72.1 1575m
PS74/268-1	24.08.09	17:55	79° 12,54' N	4° 55,29' E	1608	SSW 2	358	0,1	Heat Flow	HF	hoisting	
PS74/268-1	24.08.09	17:57	79° 12,54' N	4° 55,30' E	1607	SSW 2	162,3	0,2	Heat Flow	HF	off ground	
PS74/268-1	24.08.09	18:00	79° 12,53' N	4° 55,35' E	1603	SW 2	149,9	0,5	Heat Flow	HF	action	im Boden
PS74/268-1	24.08.09	18:07	79° 12,50' N	4° 55,44' E	1599	S 2	6,8	0,5	Heat Flow	HF	hoisting	
PS74/268-1	24.08.09	18:37	79° 12,59' N	4° 55,29' E	1611	S 3	150,9	0,4	Heat Flow	HF	at surface	
PS74/268-1	24.08.09	18:40	79° 12,57' N	4° 55,36' E	1608	S 3	151	0,4	Heat Flow	HF	on deck	
PS74/269-1	24.08.09	19:49	79° 7,50' N	5° 42,84' E	1323	SW 3	275,9	0,6	Heat Flow	HF	in the water	
PS74/269-1	24.08.09	20:12	79° 7,43' N	5° 42,18' E	1323	SW 3	253,3	0,3	Heat Flow	HF	on ground/max depth	Lanze im Grund, GE72.1 1296 m
PS74/269-1	24.08.09	20:18	79° 7,42' N	5° 41,95' E	1323	WSW 4	253,4	0,6	Heat Flow	HF	hoisting	
PS74/269-1	24.08.09	20:19	79° 7,41' N	5° 41,91' E	1325	SW 3	256,1	0,5	Heat Flow	HF	action	Lanze aus dem Gund raus
PS74/269-1	24.08.09	20:22	79° 7,40' N	5° 41,80' E	1324	SW 3	270,7	0,3	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 1302 m
PS74/269-1	24.08.09	20:29	79° 7,39' N	5° 41,55' E	1324	SW 3	271,7	0,2	Heat Flow	HF	hoisting	
PS74/269-1	24.08.09	20:30	79° 7,38' N	5° 41,52' E	1324	SW 3	261,6	0,3	Heat Flow	HF	action	frei vom Gund
PS74/269-1	24.08.09	20:58	79° 7,35' N	5° 40,74' E	1326	SSW 3	253,1	0,6	Heat Flow	HF	on deck	
PS74/270-1	25.08.09	12:10	78° 13,10' N	4° 52,55' W	988,1	S 4	163,9	0,1	Heat Flow	HF	in the water	
PS74/270-1	25.08.09	12:23	78° 12,99' N	4° 52,35' W	998,9	S 4	166,1	0,2	Heat Flow	HF	action	Winde gestoppt 850 m, Auswertung
PS74/270-1	25.08.09	12:26	78° 12,98' N	4° 52,35' W	1001	SSE 4	182,6	0,2	Heat Flow	HF	lowering	
PS74/270-1	25.08.09	12:30	78° 12,95' N	4° 52,36' W	1002	S 3	182,9	0,3	Heat Flow	HF	on ground/max depth	989 m, GE 72.1
PS74/270-1	25.08.09	12:37	78° 12,92' N	4° 52,37' W	1010	S 4	196,8	0,2	Heat Flow	HF	hoisting	
PS74/270-1	25.08.09	12:38	78° 12,92' N	4° 52,37' W	1007	S 4	194,5	0,2	Heat Flow	HF	action	Winde gestoppt 950 m, Auswertung
PS74/270-1	25.08.09	12:40	78° 12,91' N	4° 52,38' W	1007	S 3	206,5	0,2	Heat Flow	HF	lowering	
PS74/270-1	25.08.09	12:42	78° 12,90' N	4° 52,40' W	1009	S 3	220,6	0,2	Heat Flow	HF	on ground/max depth	996 m, GE 72.1
PS74/270-1	25.08.09	12:49	78° 12,89' N	4° 52,47' W	1009	S 4	83,7	0,2	Heat Flow	HF	hoisting	
PS74/270-1	25.08.09	13:08	78° 12,79' N	4° 52,21' W	1038	SSE 4	150,3	0,2	Heat Flow	HF	at surface	
PS74/270-1	25.08.09	13:12	78° 12,77' N	4° 52,20' W	1040	SSE 4	227,9	0,2	Heat Flow	HF	on deck	
PS74/271-1	25.08.09	15:16	78° 6,38' N	4° 14,04' W	2278	SSE 2	179,8	0,2	Heat Flow	HF	in the water	
PS74/271-1	25.08.09	15:53	78° 5,87' N	4° 13,80' W	2305	SE 3	154,8	0,3	Heat Flow	HF	action	Winde gestoppt 2250 m, Auswertung
PS74/271-1	25.08.09	15:58	78° 5,80' N	4° 13,71' W	2306	SSE 3	163,2	1	Heat Flow	HF	on ground/max depth	
PS74/271-1	25.08.09	15:58	78° 5,80' N	4° 13,71' W	2306	SSE 3	163,2	1	Heat Flow	HF	hoisting	Abruch
PS74/271-1	25.08.09	16:32	78° 5,26' N	4° 12,73' W	2339	SE 3	159,1	1,1	Heat Flow	HF	at surface	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/271-1	25.08.09	16:36	78° 5,19' N	4° 12,62' W	2344	SE 3	160,6	1,1	Heat Flow	HF	on deck	
PS74/272-1	25.08.09	18:06	78° 0,03' N	3° 32,23' W	2752	SE 2	7,7	0,1	Heat Flow	HF	in the water	
PS74/272-1	25.08.09	18:49	77° 59,88' N	3° 32,62' W	2753	SSE 2	298,1	0,2	Heat Flow	HF	on ground/max depth	GE 72.1 2650m
PS74/272-1	25.08.09	18:52	77° 59,88' N	3° 32,66' W	2754	SSE 2	48,3	0,2	Heat Flow	HF	action	im Boden 2705m
PS74/272-1	25.08.09	18:59	77° 59,89' N	3° 32,73' W	2752	SSE 2	315,8	0,2	Heat Flow	HF	hoisting	
PS74/272-1	25.08.09	19:01	77° 59,88' N	3° 32,78' W	2752	SE 2	230,2	0,4	Heat Flow	HF	off ground	gestoppt
PS74/272-1	25.08.09	19:04	77° 59,89' N	3° 32,79' W	2752	SE 2	14,3	0,1	Heat Flow	HF	action	im Boden 2700m
PS74/272-1	25.08.09	19:11	77° 59,88' N	3° 32,86' W	2752	SE 2	272,4	0,4	Heat Flow	HF	hoisting	
PS74/272-1	25.08.09	19:13	77° 59,89' N	3° 32,88' W	2751	SE 2	8,9	0,4	Heat Flow	HF	off ground	
PS74/272-1	25.08.09	19:52	77° 59,88' N	3° 33,50' W	2749	SE 2	22,7	0,1	Heat Flow	HF	at surface	
PS74/272-1	25.08.09	19:56	77° 59,87' N	3° 33,54' W	2749	SE 2	198	1	Heat Flow	HF	on deck	
PS74/273-1	25.08.09	21:41	77° 53,37' N	2° 52,07' W	2902	E 1	124,7	0,2	Heat Flow	HF	in the water	
PS74/273-1	25.08.09	22:23	77° 53,08' N	2° 51,61' W	2907	SW 1	63,1	0,2	Heat Flow	HF	action	auf 2750 m gestoppt zum auspendeln
PS74/273-1	25.08.09	22:27	77° 53,09' N	2° 51,53' W	2906	SSE 2	81,5	0,3	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 2855 m
PS74/273-1	25.08.09	22:34	77° 53,07' N	2° 51,48' W	2906	SE 3	185,2	0,2	Heat Flow	HF	hoisting	
PS74/273-1	25.08.09	22:38	77° 53,05' N	2° 51,50' W	2906	SE 2	196,6	0,5	Heat Flow	HF	action	auf 2800m gestoppt für 2. Versuch
PS74/273-1	25.08.09	22:39	77° 53,05' N	2° 51,52' W	2906	SE 2	208,1	0,4	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 2855 m
PS74/273-1	25.08.09	22:46	77° 53,04' N	2° 51,49' W	2907	SE 1	99,7	0,4	Heat Flow	HF	hoisting	
PS74/273-1	25.08.09	22:48	77° 53,05' N	2° 51,44' W	2905	SE 1	61	0,4	Heat Flow	HF	action	frei vom Grund
PS74/273-1	25.08.09	23:32	77° 52,70' N	2° 50,82' W	2913	SE 2	208	0,8	Heat Flow	HF	on deck	
PS74/274-1	26.08.09	02:04	77° 39,95' N	1° 31,86' W	3082	ENE 2	0,7	0,1	Heat Flow	HF	in the water	
PS74/274-1	26.08.09	02:52	77° 39,97' N	1° 32,27' W	3083	E 2	348,9	0,1	Heat Flow	HF	action	Winde gestoppt 2950 m, Auswertung
PS74/274-1	26.08.09	02:55	77° 39,97' N	1° 32,27' W	3081	ENE 2	1,1	0,1	Heat Flow	HF	lowering	
PS74/274-1	26.08.09	02:57	77° 39,98' N	1° 32,26' W	3080	E 2	82,2	0,1	Heat Flow	HF	on ground/max depth	3032 m, GE 72.1
PS74/274-1	26.08.09	03:05	77° 39,98' N	1° 32,27' W	3082	E 2	0,5	0,1	Heat Flow	HF	hoisting	
PS74/274-1	26.08.09	03:07	77° 39,98' N	1° 32,27' W	3082	ENE 2	171,8	0,1	Heat Flow	HF	action	Winde gestoppt 2990 m, Auswertung
PS74/274-1	26.08.09	03:10	77° 39,98' N	1° 32,27' W	3081	E 2	0,8	0,1	Heat Flow	HF	on ground/max depth	3035 m, GE 72.1
PS74/274-1	26.08.09	03:16	77° 39,97' N	1° 32,28' W	3082	ENE 2	0,8	0,1	Heat Flow	HF	hoisting	
PS74/274-1	26.08.09	04:09	77° 40,01' N	1° 32,29' W	3082	ENE 2	31,6	0,1	Heat Flow	HF	at surface	
PS74/274-1	26.08.09	04:13	77° 40,01' N	1° 32,31' W	3081	E 2	0,4	0,1	Heat Flow	HF	on deck	
PS74/274-2	26.08.09	04:17	77° 40,01' N	1° 32,34' W	3080	ENE 2	0,7	0	Ocean bottom seismometer	OBS	in the water	
PS74/274-2	26.08.09	04:17	77° 40,01' N	1° 32,34' W	3080	ENE 2	0,7	0	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/274-2	26.08.09	04:17	77° 40,01' N	1° 32,34' W	3080	ENE 2	0,7	0	Ocean bottom seismometer	OBS	on deck	
PS74/275-1	26.08.09	05:37	77° 33,31' N	0° 53,01' W	3138	ENE 4	131,8	0,5	Ocean bottom seismometer	OBS	in the water	
PS74/275-1	26.08.09	05:37	77° 33,31' N	0° 53,01' W	3138	ENE 4	131,8	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/275-1	26.08.09	05:38	77° 33,30' N	0° 52,99' W	3138	NE 4	162,6	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/276-1	26.08.09	07:00	77° 26,73' N	0° 14,31' W	3191	NE 3	181,7	0,2	Heat Flow	HF	action	
PS74/276-1	26.08.09	07:49	77° 26,76' N	0° 14,91' W	3187	NE 3	339,3	0,4	Heat Flow	HF	on ground/max depth	im Boden GE 72.1 3150 m
PS74/276-1	26.08.09	07:58	77° 26,77' N	0° 15,05' W	3187	NE 3	245,6	0,6	Heat Flow	HF	hoisting	
PS74/276-1	26.08.09	08:02	77° 26,77' N	0° 15,14' W	3188	ENE 3	228,4	0,2	Heat Flow	HF	action	auf 3090 m gestoppt
PS74/276-1	26.08.09	08:04	77° 26,76' N	0° 15,19' W	3187	ENE 3	250	0,4	Heat Flow	HF	on ground/max depth	Lanze im Boden auf 3140 m, GE72.1
PS74/276-1	26.08.09	08:13	77° 26,74' N	0° 15,35' W	3187	ENE 3	237,9	0,3	Heat Flow	HF	hoisting	
PS74/276-1	26.08.09	08:15	77° 26,74' N	0° 15,36' W	3190	NE 3	5,2	0,2	Heat Flow	HF	action	frei vom Grund
PS74/276-1	26.08.09	09:07	77° 26,73' N	0° 14,82' W	3190	ENE 4	152,4	0,3	Heat Flow	HF	on deck	
PS74/276-2	26.08.09	09:11	77° 26,70' N	0° 14,72' W	3188	ENE 4	139	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/276-2	26.08.09	09:12	77° 26,69' N	0° 14,68' W	3189	ENE 4	145,1	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/276-2	26.08.09	09:12	77° 26,69' N	0° 14,68' W	3189	ENE 3	145,1	0,5	Ocean bottom seismometer	OBS	action	geslipt
PS74/276-2	26.08.09	09:12	77° 26,69' N	0° 14,68' W	3189	ENE 3	145,1	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/277-1	26.08.09	10:35	77° 20,22' N	0° 23,77' E	3244	N 4	209,6	1,1	Ocean bottom seismometer	OBS	in the water	
PS74/277-1	26.08.09	10:36	77° 20,19' N	0° 23,70' E	3242	N 4	215,7	2,1	Ocean bottom seismometer	OBS	action	geslipt
PS74/277-1	26.08.09	10:36	77° 20,19' N	0° 23,70' E	3242	N 4	215,7	2,1	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/277-1	26.08.09	10:36	77° 20,19' N	0° 23,70' E	3242	N 4	215,7	2,1	Ocean bottom seismometer	OBS	on deck	
PS74/278-1	26.08.09	11:53	77° 13,40' N	1° 2,46' E	3255	NNE 7	13,6	0,1	Heat Flow	HF	in the water	
PS74/278-1	26.08.09	12:41	77° 13,36' N	1° 2,36' E	3258	NNE 7	341,1	0,1	Heat Flow	HF	action	Winde gestoppt, 3100 m
PS74/278-1	26.08.09	12:43	77° 13,37' N	1° 2,35' E	3257	NNE 6	25,2	0,1	Heat Flow	HF	lowering	
PS74/278-1	26.08.09	12:44	77° 13,37' N	1° 2,33' E	3256	NNE 6	335,5	0,1	Heat Flow	HF	on ground/max depth	3204 m, GE 72.1

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/278-1	26.08.09	12:51	77° 13,40' N	1° 2,26' E	3258	NNE 7	346,1	0,2	Heat Flow	HF	hoisting	
PS74/278-1	26.08.09	12:53	77° 13,40' N	1° 2,29' E	3257	NNE 6	88,3	0,2	Heat Flow	HF	action	Winde gestoppt, 3160 m
PS74/278-1	26.08.09	12:56	77° 13,40' N	1° 2,38' E	3258	NNE 6	93,7	0,2	Heat Flow	HF	lowering	
PS74/278-1	26.08.09	12:57	77° 13,40' N	1° 2,41' E	3256	NNE 6	62,6	0,1	Heat Flow	HF	on ground/max depth	3203 m, GE 72.1
PS74/278-1	26.08.09	13:04	77° 13,41' N	1° 2,48' E	3256	NNE 6	36,9	0,1	Heat Flow	HF	hoisting	
PS74/278-1	26.08.09	13:57	77° 13,41' N	1° 2,48' E	3256	NNE 6	32,4	0,2	Heat Flow	HF	at surface	
PS74/278-1	26.08.09	14:02	77° 13,42' N	1° 2,49' E	3257	NNE 6	357,8	0,1	Heat Flow	HF	on deck	
PS74/278-2	26.08.09	14:06	77° 13,43' N	1° 2,46' E	3258	NNE 6	241,9	0,9	Ocean bottom seismometer	OBS	in the water	
PS74/278-2	26.08.09	14:07	77° 13,42' N	1° 2,40' E	3255	NNE 6	225	1,4	Ocean bottom seismometer	OBS	on ground/max depth	geslippt
PS74/278-2	26.08.09	14:07	77° 13,42' N	1° 2,40' E	3255	NNE 6	225	1,4	Ocean bottom seismometer	OBS	on deck	
PS74/279-1	26.08.09	15:17	77° 6,74' N	1° 39,49' E	3249	NNE 7	166,3	1	Ocean bottom seismometer	OBS	in the water	
PS74/279-1	26.08.09	15:18	77° 6,73' N	1° 39,47' E	3250	NNE 7	244,5	1	Ocean bottom seismometer	OBS	on ground/max depth	geslippt
PS74/279-1	26.08.09	15:18	77° 6,73' N	1° 39,47' E	3250	NNE 7	244,5	1	Ocean bottom seismometer	OBS	on deck	
PS74/280-1	26.08.09	16:32	77° 0,11' N	2° 16,95' E	3275	NNE 8	245,6	0,8	Heat Flow	HF	in the water	
PS74/280-1	26.08.09	17:24	77° 0,13' N	2° 16,86' E	3276	NNE 8	4,1	0,1	Heat Flow	HF	on ground/max depth	im Boden GE72.1 3222m
PS74/280-1	26.08.09	17:31	77° 0,14' N	2° 16,96' E	3276	NNE 8	93,1	0,2	Heat Flow	HF	hoisting	
PS74/280-1	26.08.09	17:33	77° 0,14' N	2° 17,00' E	3275	NNE 8	105,9	0,2	Heat Flow	HF	off ground	
PS74/280-1	26.08.09	17:36	77° 0,14' N	2° 17,03' E	3275	NNE 8	49,1	0,1	Heat Flow	HF	action	im Boden
PS74/280-1	26.08.09	17:45	77° 0,12' N	2° 16,98' E	3274	NNE 9	56,8	0,1	Heat Flow	HF	hoisting	
PS74/280-1	26.08.09	17:46	77° 0,12' N	2° 16,98' E	3275	NNE 9	358,8	0,2	Heat Flow	HF	off ground	
PS74/280-1	26.08.09	18:39	77° 0,14' N	2° 16,82' E	3274	NNE 8	234,5	0,1	Heat Flow	HF	on deck	
PS74/280-2	26.08.09	18:45	77° 0,14' N	2° 16,68' E	3274	NNE 8	222,2	1,5	Ocean bottom seismometer	OBS	in the water	
PS74/280-2	26.08.09	18:45	77° 0,14' N	2° 16,68' E	3274	NNE 8	222,2	1,5	Ocean bottom seismometer	OBS	in the water	
PS74/280-2	26.08.09	18:46	77° 0,12' N	2° 16,59' E	3275	NNE 8	215,8	2,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/280-2	26.08.09	18:46	77° 0,12' N	2° 16,59' E	3275	NNE 8	215,8	2,4	Ocean bottom seismometer	OBS	on deck	
PS74/281-1	26.08.09	19:58	76° 53,40' N	2° 54,38' E	3283	NNE 8	153,5	0,9	Ocean bottom seismometer	OBS	in the water	
PS74/281-1	26.08.09	19:59	76° 53,38' N	2° 54,42' E	3286	NNE 8	121,4	0,5	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/281-1	26.08.09	19:59	76° 53,38' N	2° 54,42' E	3286	NNE 8	121,4	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/282-1	26.08.09	21:20	76° 46,83' N	3° 31,54' E	3291	NE 8	228,6	0,6	Heat Flow	HF	in the water	
PS74/282-1	26.08.09	22:06	76° 46,79' N	3° 31,52' E	3292	NNE 7	211,9	0,4	Heat Flow	HF	action	gestoppt auf 3101m zum auspendeln
PS74/282-1	26.08.09	22:11	76° 46,78' N	3° 31,43' E	3291	NNE 7	261,4	0,3	Heat Flow	HF	on ground/max depth	Lanze im Boden, Ge72.1 3241 m
PS74/282-1	26.08.09	22:17	76° 46,79' N	3° 31,42' E	3292	NNE 7	35	0,5	Heat Flow	HF	hoisting	
PS74/282-1	26.08.09	22:21	76° 46,80' N	3° 31,43' E	3293	NNE 6	31,3	0,2	Heat Flow	HF	action	gestoppt
PS74/282-1	26.08.09	22:23	76° 46,80' N	3° 31,44' E	3293	NE 6	31	0,2	Heat Flow	HF	on ground/max depth	Lanze im Boden, 3240m
PS74/282-1	26.08.09	22:32	76° 46,77' N	3° 31,31' E	3293	NNE 6	28,6	2	Heat Flow	HF	hoisting	
PS74/282-1	26.08.09	22:34	76° 46,81' N	3° 31,42' E	3293	NNE 6	29,8	1	Heat Flow	HF	action	Lanze aus dem Grund
PS74/282-1	26.08.09	23:26	76° 46,83' N	3° 31,46' E	3291	NE 8	36,8	0,1	Heat Flow	HF	on deck	
PS74/282-2	26.08.09	23:29	76° 46,81' N	3° 31,41' E	3293	NE 8	220,4	1	Ocean bottom seismometer	OBS	in the water	
PS74/282-2	26.08.09	23:30	76° 46,80' N	3° 31,34' E	3294	NE 6	230,7	1,3	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/282-2	26.08.09	23:30	76° 46,80' N	3° 31,34' E	3294	NE 6	230,7	1,3	Ocean bottom seismometer	OBS	on deck	
PS74/283-1	27.08.09	02:34	76° 40,20' N	4° 4,42' E	3140	NE 6	340,6	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/283-1	27.08.09	02:35	76° 40,20' N	4° 4,36' E	3140	NE 4	262,9	1,6	Ocean bottom seismometer	OBS	on ground/max depth	geslippt
PS74/283-1	27.08.09	02:35	76° 40,20' N	4° 4,36' E	3140	NE 4	262,9	1,6	Ocean bottom seismometer	OBS	on deck	
PS74/284-1	27.08.09	03:55	76° 33,40' N	4° 44,27' E	3078	NNE 4	29,2	0,2	Heat Flow	HF	in the water	
PS74/284-1	27.08.09	04:41	76° 33,47' N	4° 44,05' E	3076	NE 3	216	0,1	Heat Flow	HF	on ground/max depth	im Boden GE 3020 m
PS74/284-1	27.08.09	04:49	76° 33,47' N	4° 43,92' E	3077	NE 3	8,4	0,3	Heat Flow	HF	hoisting	
PS74/284-1	27.08.09	04:53	76° 33,48' N	4° 43,94' E	3077	NE 4	80	0,5	Heat Flow	HF	lowering	
PS74/284-1	27.08.09	04:55	76° 33,48' N	4° 43,96' E	3078	NE 3	20,1	0,3	Heat Flow	HF	action	im Boden
PS74/284-1	27.08.09	05:02	76° 33,49' N	4° 43,89' E	3078	NNE 3	64,3	0,1	Heat Flow	HF	hoisting	
PS74/284-1	27.08.09	05:04	76° 33,49' N	4° 43,88' E	3077	NNE 3	65,2	0,1	Heat Flow	HF	off ground	
PS74/284-1	27.08.09	05:50	76° 33,53' N	4° 43,64' E	3079	NE 3	146	0,7	Heat Flow	HF	at surface	
PS74/284-1	27.08.09	05:54	76° 33,52' N	4° 43,71' E	3078	NNE 4	117,7	0,8	Heat Flow	HF	on deck	
PS74/284-2	27.08.09	05:58	76° 33,50' N	4° 43,86' E	3076	NNE 4	252,5	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/284-2	27.08.09	05:59	76° 33,50' N	4° 43,84' E	3075	NNE 4	312,2	0,8	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/284-2	27.08.09	05:59	76° 33,50' N	4° 43,84' E	3075	NNE 4	312,2	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/285-1	27.08.09	07:13	76° 26,31' N	5° 22,50' E	2750	NNE 2	111,4	0,2	Ocean bottom seismometer	OBS	action	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/285-1	27.08.09	07:13	76° 26,31' N	5° 22,50' E	2750	NNE 2	111,4	0,2	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/285-1	27.08.09	07:13	76° 26,31' N	5° 22,50' E	2750	NNE 2	111,4	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/286-1	27.08.09	08:09	76° 21,90' N	5° 46,03' E	2679	NNE 3	171,4	0,2	Heat Flow	HF	in the water	
PS74/286-1	27.08.09	08:51	76° 21,95' N	5° 46,04' E	2684	NNE 3	117,4	0,2	Heat Flow	HF	action	auf 2550 m gestoppt zum auspendeln
PS74/286-1	27.08.09	08:54	76° 21,95' N	5° 46,05' E	2684	N 3	119,4	0,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 2635 m
PS74/286-1	27.08.09	09:02	76° 21,97' N	5° 46,07' E	2685	N 4	0,6	0,4	Heat Flow	HF	hoisting	
PS74/286-1	27.08.09	09:04	76° 21,96' N	5° 46,07' E	2685	N 4	181,9	0,2	Heat Flow	HF	off ground	
PS74/286-1	27.08.09	09:06	76° 21,95' N	5° 46,07' E	2683	N 4	1	0	Heat Flow	HF	lowering	
PS74/286-1	27.08.09	09:07	76° 21,95' N	5° 46,07' E	2683	N 4	0,7	0,2	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE27.1 2635 m
PS74/286-1	27.08.09	09:13	76° 21,97' N	5° 46,04' E	2685	N 4	284,8	0,2	Heat Flow	HF	hoisting	
PS74/286-1	27.08.09	09:15	76° 21,97' N	5° 46,03' E	2682	NNE 4	200	0,1	Heat Flow	HF	off ground	
PS74/286-1	27.08.09	09:58	76° 22,02' N	5° 46,03' E	2685	NNE 4	221,3	0,3	Heat Flow	HF	on deck	
PS74/286-2	27.08.09	10:03	76° 21,97' N	5° 46,04' E	2682	N 4	190	1,2	Ocean bottom seismometer	OBS	in the water	
PS74/286-2	27.08.09	10:04	76° 21,95' N	5° 46,03' E	2685	N 4	182,3	1,9	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/286-2	27.08.09	10:04	76° 21,95' N	5° 46,03' E	2685	N 3	182,3	1,9	Ocean bottom seismometer	OBS	on deck	
PS74/287-1	27.08.09	11:14	76° 16,06' N	6° 17,76' E	2239	N 3	0,5	0,7	Ocean bottom seismometer	OBS	in the water	
PS74/287-1	27.08.09	11:14	76° 16,06' N	6° 17,76' E	2239	N 3	0,5	0,7	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/287-1	27.08.09	11:14	76° 16,06' N	6° 17,76' E	2239	N 3	0,5	0,7	Ocean bottom seismometer	OBS	on deck	
PS74/288-1	27.08.09	12:11	76° 10,94' N	6° 44,50' E	2598	NNE 2	0,4	0,2	Heat Flow	HF	in the water	
PS74/288-1	27.08.09	12:48	76° 10,98' N	6° 44,23' E	2599	N 3	307,2	0,1	Heat Flow	HF	action	Winde gestoppt 2500 m
PS74/288-1	27.08.09	12:50	76° 10,98' N	6° 44,22' E	2600	NNW 2	294,1	0,1	Heat Flow	HF	lowering	
PS74/288-1	27.08.09	12:51	76° 10,98' N	6° 44,22' E	2598	NNW 2	343,6	0,1	Heat Flow	HF	on ground/max depth	2550 m, GE 72.1
PS74/288-1	27.08.09	12:59	76° 11,01' N	6° 44,25' E	2600	NNW 3	38,6	0,2	Heat Flow	HF	hoisting	
PS74/288-1	27.08.09	13:03	76° 11,01' N	6° 44,29' E	2598	NNW 4	85,8	0,2	Heat Flow	HF	action	Winde gestoppt 2500 m
PS74/288-1	27.08.09	13:04	76° 11,01' N	6° 44,30' E	2598	N 3	199,6	0,2	Heat Flow	HF	lowering	
PS74/288-1	27.08.09	13:06	76° 11,00' N	6° 44,31' E	2598	N 3	148,8	0,2	Heat Flow	HF	on ground/max depth	2545 m
PS74/288-1	27.08.09	13:15	76° 10,98' N	6° 44,32' E	2600	NNW 3	0,7	0,1	Heat Flow	HF	hoisting	
PS74/288-1	27.08.09	13:17	76° 10,99' N	6° 44,32' E	2599	NNW 4	44,4	0,1	Heat Flow	HF	off ground	
PS74/288-1	27.08.09	13:57	76° 11,05' N	6° 44,07' E	2599	N 4	0,2	0,2	Heat Flow	HF	on deck	
PS74/288-2	27.08.09	14:00	76° 11,04' N	6° 44,04' E	2601	N 5	208,6	0,9	Ocean bottom seismometer	OBS	in the water	
PS74/288-2	27.08.09	14:00	76° 11,04' N	6° 44,04' E	2601	N 5	208,6	0,9	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/288-2	27.08.09	14:01	76° 11,03' N	6° 44,01' E	2600	N 5	212,4	1,2	Ocean bottom seismometer	OBS	on deck	
PS74/289-1	27.08.09	15:22	76° 5,56' N	7° 11,82' E	3447	NE 1	289,8	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/289-1	27.08.09	15:22	76° 5,56' N	7° 11,82' E	3447	NE 1	289,8	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/289-1	27.08.09	15:23	76° 5,56' N	7° 11,76' E	3449	NE 1	276,1	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/290-1	27.08.09	16:23	76° 0,23' N	7° 41,06' E	2730	E 4	306,3	0,2	Heat Flow	HF	in the water	
PS74/290-1	27.08.09	17:10	76° 0,31' N	7° 41,12' E	2729	ENE 3	188,9	0,6	Heat Flow	HF	on ground/max depth	im Boden GE72.1 2685m
PS74/290-1	27.08.09	17:19	76° 0,31' N	7° 41,12' E	2732	ENE 3	190,6	0,2	Heat Flow	HF	hoisting	
PS74/290-1	27.08.09	17:25	76° 0,32' N	7° 41,16' E	2731	E 3	89,1	0,3	Heat Flow	HF	lowering	
PS74/290-1	27.08.09	17:26	76° 0,32' N	7° 41,17' E	2730	E 4	189,8	0,2	Heat Flow	HF	action	im Boden
PS74/290-1	27.08.09	17:35	76° 0,31' N	7° 41,22' E	2730	E 3	42,6	0,3	Heat Flow	HF	hoisting	
PS74/290-1	27.08.09	17:37	76° 0,32' N	7° 41,24' E	2730	E 3	40,1	0,4	Heat Flow	HF	off ground	
PS74/290-1	27.08.09	18:22	76° 0,27' N	7° 41,08' E	2731	NE 1	161,2	0,2	Heat Flow	HF	on deck	
PS74/290-2	27.08.09	18:28	76° 0,24' N	7° 41,12' E	2729	ENE 3	19,9	1,8	Ocean bottom seismometer	OBS	in the water	
PS74/290-2	27.08.09	18:28	76° 0,24' N	7° 41,12' E	2729	ENE 3	19,9	1,8	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/290-2	27.08.09	18:29	76° 0,27' N	7° 41,17' E	2730	ENE 2	14,7	2,1	Ocean bottom seismometer	OBS	on deck	
PS74/291-1	27.08.09	19:39	75° 54,16' N	8° 13,05' E	2334	N 2	119,8	0,3	Heat Flow	HF	in the water	
PS74/291-1	27.08.09	20:14	75° 54,17' N	8° 12,92' E	2331	W 1	301,9	0,6	Heat Flow	HF	action	gestopppt zum auspendeln
PS74/291-1	27.08.09	20:17	75° 54,17' N	8° 12,90' E	2332	SW 1	234,7	0,2	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 2299 m
PS74/291-1	27.08.09	20:24	75° 54,17' N	8° 12,94' E	2333	W 1	338	0,4	Heat Flow	HF	hoisting	
PS74/291-1	27.08.09	20:26	75° 54,18' N	8° 12,95' E	2331	SW 1	20,8	0,3	Heat Flow	HF	off ground	
PS74/291-1	27.08.09	20:28	75° 54,19' N	8° 12,97' E	2331	WSW 1	54,2	0,3	Heat Flow	HF	action	gestoppt zum auspendeln
PS74/291-1	27.08.09	20:28	75° 54,19' N	8° 12,97' E	2331	W 1	54,2	0,3	Heat Flow	HF	lowering	
PS74/291-1	27.08.09	20:29	75° 54,19' N	8° 12,98' E	2333	W 1	52,5	0,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 2296 m
PS74/291-1	27.08.09	20:38	75° 54,20' N	8° 13,04' E	2335	WSW 1	231,4	0,3	Heat Flow	HF	hoisting	
PS74/291-1	27.08.09	20:40	75° 54,19' N	8° 13,03' E	2332	WNW 1	229	0,1	Heat Flow	HF	off ground	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/291-1	27.08.09	21:20	75° 54,14' N	8° 12,98' E	2331	NW 1	191,1	0,3	Heat Flow	HF	on deck	
PS74/291-2	27.08.09	21:24	75° 54,15' N	8° 13,03' E	2333	NW 2	41,2	1,4	Ocean bottom seismometer	OBS	in the water	
PS74/291-2	27.08.09	21:24	75° 54,15' N	8° 13,03' E	2333	NW 2	41,2	1,4	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/291-2	27.08.09	21:25	75° 54,17' N	8° 13,10' E	2332	WNW 1	42,4	1,6	Ocean bottom seismometer	OBS	on deck	
PS74/292-1	27.08.09	23:02	76° 8,96' N	8° 6,02' E	2333	NW 2	259,9	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/292-1	27.08.09	23:02	76° 8,96' N	8° 6,02' E	2333	NW 1	259,9	0,6	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/292-1	27.08.09	23:02	76° 8,96' N	8° 6,02' E	2333	NW 1	259,9	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/293-1	28.08.09	00:33	76° 21,50' N	7° 58,51' E	2331	NE 3	175,9	0,2	Ocean bottom seismometer	OBS	in the water	
PS74/293-1	28.08.09	00:34	76° 21,49' N	7° 58,47' E	2306	NE 3	218,7	1,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/293-1	28.08.09	00:34	76° 21,49' N	7° 58,47' E	2306	NE 3	218,7	1,3	Ocean bottom seismometer	OBS	on deck	
PS74/294-1	28.08.09	02:11	76° 35,14' N	8° 4,89' E	1526	NNE 5	274,5	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/294-1	28.08.09	02:12	76° 35,15' N	8° 4,83' E	1525	NNE 5	303,1	1,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/294-1	28.08.09	02:12	76° 35,15' N	8° 4,83' E	1525	NNE 5	303,1	1,3	Ocean bottom seismometer	OBS	on deck	
PS74/295-1	28.08.09	03:50	76° 37,77' N	7° 9,54' E	2941	NNE 4	336,5	0,6	Ocean bottom seismometer	OBS	action	
PS74/295-1	28.08.09	03:51	76° 37,78' N	7° 9,53' E	2943	NNE 4	336,6	1,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/295-1	28.08.09	03:51	76° 37,78' N	7° 9,53' E	2943	NNE 4	336,6	1,4	Ocean bottom seismometer	OBS	on deck	
PS74/296-1	28.08.09	04:57	76° 45,48' N	7° 22,25' E	3561	NNE 5	328,7	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/296-1	28.08.09	04:58	76° 45,49' N	7° 22,24' E	3560	NNE 4	341,9	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/296-1	28.08.09	04:58	76° 45,49' N	7° 22,24' E	3560	NNE 4	341,9	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/297-1	28.08.09	06:14	76° 42,44' N	6° 35,22' E	2548	NE 5	163,9	0,6	Ocean bottom seismometer	OBS	in the water	
PS74/297-1	28.08.09	06:14	76° 42,44' N	6° 35,22' E	2548	NE 5	163,9	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/297-1	28.08.09	06:14	76° 42,44' N	6° 35,22' E	2548	NE 5	163,9	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/298-1	28.08.09	07:45	76° 31,49' N	6° 23,28' E	2499	NE 6	90,1	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/298-1	28.08.09	07:46	76° 31,50' N	6° 23,32' E	2503	NE 5	54,5	0,8	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/298-1	28.08.09	07:46	76° 31,50' N	6° 23,32' E	2503	NE 5	54,5	0,8	Ocean bottom seismometer	OBS	on deck	
PS74/299-1	28.08.09	09:06	76° 26,93' N	7° 5,15' E	3563	NE 7	9,5	0,4	Ocean bottom seismometer	OBS	in the water	
PS74/299-1	28.08.09	09:07	76° 26,93' N	7° 5,12' E	3562	NE 7	254,5	1,1	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/299-1	28.08.09	09:07	76° 26,93' N	7° 5,12' E	3562	NNE 7	254,5	1,1	Ocean bottom seismometer	OBS	on deck	
PS74/300-1	28.08.09	10:15	76° 17,93' N	7° 5,34' E	3536	NNE 7	253,9	0,7	Ocean bottom seismometer	OBS	in the water	
PS74/300-1	28.08.09	10:15	76° 17,93' N	7° 5,34' E	3536	NNE 7	253,9	0,7	Ocean bottom seismometer	OBS	on ground/max depth	geslipt
PS74/300-1	28.08.09	10:15	76° 17,93' N	7° 5,34' E	3536	NNE 7	253,9	0,7	Ocean bottom seismometer	OBS	on deck	
PS74/301-1	28.08.09	12:51	75° 53,73' N	7° 8,42' E	2930	NE 8	310,6	0,3	Ocean bottom seismometer	OBS	in the water	
PS74/301-1	28.08.09	12:52	75° 53,74' N	7° 8,38' E	2947	NE 8	326,7	1,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/301-1	28.08.09	12:52	75° 53,74' N	7° 8,38' E	2947	NE 8	326,7	1,4	Ocean bottom seismometer	OBS	on deck	
PS74/302-1	28.08.09	14:45	75° 52,99' N	8° 18,91' E	2352	NE 10	2,9	0,1	CTD/rosette water sampler	CTD/RO	in the water	
PS74/302-1	28.08.09	15:13	75° 53,12' N	8° 19,05' E	2353	ENE 9	43,1	0,2	CTD/rosette water sampler	CTD/RO	on ground/max depth	1220 m, SE 32.1
PS74/302-1	28.08.09	15:18	75° 53,12' N	8° 19,10' E	2353	ENE 6	107,1	0,1	CTD/rosette water sampler	CTD/RO	hoisting	
PS74/302-1	28.08.09	15:39	75° 53,14' N	8° 19,31' E	2353	ENE 6	222,2	0,2	CTD/rosette water sampler	CTD/RO	on deck	
PS74/303-1	28.08.09	16:41	75° 53,48' N	8° 16,57' E	2337	E 6	316,7	4,1	Seismic refraction profile	SEISREFR	in the water	
PS74/303-1	28.08.09	16:46	75° 53,69' N	8° 15,39' E	2322	E 6	310,7	4,1	Seismic refraction profile	SEISREFR	in the water	Backbord-Kanone
PS74/303-1	28.08.09	16:53	75° 54,02' N	8° 13,71' E	2334	E 7	313,8	5,2	Seismic refraction profile	SEISREFR	profile start	erster Schuss
PS74/303-1	28.08.09	18:51	76° 0,27' N	7° 41,12' E	2727	E 7	309,8	5,2	Seismic refraction profile	SEISREFR	action	pass OBS 290
PS74/303-1	28.08.09	20:35	76° 5,55' N	7° 12,02' E	3443	ENE 6	309,2	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 289
PS74/303-1	28.08.09	22:20	76° 11,04' N	6° 44,11' E	2599	E 7	311,2	4,8	Seismic refraction profile	SEISREFR	action	pass OBS 288
PS74/303-1	28.08.09	23:55	76° 16,05' N	6° 18,25' E	2223	E 6	309,4	5	Seismic refraction profile	SEISREFR	action	pass OBS 287
PS74/303-1	29.08.09	01:53	76° 21,99' N	5° 45,99' E	2684	E 6	310,1	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 286
PS74/303-1	29.08.09	03:20	76° 26,32' N	5° 22,51' E	2751	ENE 5	307,4	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 285
PS74/303-1	29.08.09	05:35	76° 33,47' N	4° 44,17' E	3076	E 4	306,4	5,1	Seismic refraction profile	SEISREFR	action	pass OBS 284
PS74/303-1	29.08.09	07:47	76° 40,23' N	4° 4,43' E	3142	E 5	305,6	5	Seismic refraction profile	SEISREFR	action	pass OBS 283
PS74/303-1	29.08.09	09:49	76° 46,80' N	3° 31,61' E	3291	ESE 5	310,1	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 282
PS74/303-1	29.08.09	11:56	76° 53,39' N	2° 54,59' E	3285	E 3	306,6	5	Seismic refraction profile	SEISREFR	action	pass OBS 281
PS74/303-1	29.08.09	14:08	77° 0,17' N	2° 16,71' E	3273	ENE 4	307,1	4,8	Seismic refraction profile	SEISREFR	action	pass OBS 280
PS74/303-1	29.08.09	16:17	77° 6,72' N	1° 39,86' E	3249	ENE 6	308,6	5	Seismic refraction profile	SEISREFR	action	pass OBS 279
PS74/303-1	29.08.09	18:25	77° 13,44' N	1° 2,49' E	3258	E 5	308,8	5	Seismic refraction profile	SEISREFR	action	pass OBS 278
PS74/303-1	29.08.09	20:37	77° 20,21' N	0° 23,99' E	3241	ESE 6	306,2	5	Seismic refraction profile	SEISREFR	action	pass OBS 277
PS74/303-1	29.08.09	22:46	77° 26,70' N	0° 14,56' W	3186	ESE 4	305,9	5,1	Seismic refraction profile	SEISREFR	action	pass OBS 276

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/303-1	30.08.09	00:53	77° 33,33' N	0° 52,90' W	3136	ENE 3	308,2	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 275
PS74/303-1	30.08.09	03:07	77° 40,01' N	1° 32,17' W	3082	NE 9	310	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 274
PS74/303-1	30.08.09	11:17	78° 5,11' N	4° 2,83' W	2452	N 5	296,4	1,9	Seismic refraction profile	SEISREFR	on ground/max depth	
PS74/303-1	30.08.09	11:18	78° 5,12' N	4° 2,95' W	2451	N 5	294,7	1,7	Seismic refraction profile	SEISREFR	profile end	
PS74/303-1	30.08.09	11:18	78° 5,12' N	4° 2,95' W	2451	N 5	294,7	1,7	Seismic refraction profile	SEISREFR	on deck	
PS74/304-1	04.09.09	06:09	77° 40,07' N	1° 31,92' W	3081	WNW 7	120,8	0,9	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/304-1	04.09.09	06:14	77° 40,01' N	1° 31,89' W	3081	NW 8	185,7	0,9	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/304-1	04.09.09	06:39	77° 39,76' N	1° 32,75' W	3083	NW 8	258,9	0,5	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/304-1	04.09.09	06:46	77° 39,79' N	1° 32,76' W	3081	WNW 8	351,2	0,7	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/304-1	04.09.09	06:55	77° 39,78' N	1° 32,76' W	3083	NW 8	307,4	0,4	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/304-1	04.09.09	07:04	77° 39,91' N	1° 32,34' W	3082	NW 7	75,8	3,6	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/304-1	04.09.09	07:20	77° 39,30' N	1° 31,90' W	3084	WNW 8	206,8	0,6	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/304-1	04.09.09	07:21	77° 39,29' N	1° 31,90' W	3083	WNW 8	191,3	0,5	Ocean bottom seismometer	OBS	on ground/max depth	nur fuers System
PS74/304-1	04.09.09	07:30	77° 39,21' N	1° 31,82' W	3083	WNW 7	163,3	0,7	Ocean bottom seismometer	OBS	on deck	
PS74/305-1	04.09.09	08:32	77° 33,18' N	0° 53,40' W	3548	WNW 7	105,1	0,4	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/305-1	04.09.09	08:34	77° 33,18' N	0° 53,37' W	3140	NW 8	99,4	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/305-1	04.09.09	08:38	77° 33,17' N	0° 53,30' W	3139	WNW 8	152,9	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/305-1	04.09.09	08:43	77° 33,14' N	0° 53,25' W	3141	WNW 8	162,5	0,3	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/305-1	04.09.09	08:51	77° 33,12' N	0° 53,20' W	3141	N 0	0	0	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/305-1	04.09.09	08:53	77° 33,12' N	0° 53,20' W	3141	N 0	0	0	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/305-1	04.09.09	08:58	77° 33,06' N	0° 53,12' W	3141	WNW 8	159,8	0,4	Ocean bottom seismometer	OBS	action	s
PS74/305-1	04.09.09	09:13	77° 32,95' N	0° 52,98' W	3140	WNW 8	166,6	0,8	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/305-1	04.09.09	09:22	77° 33,10' N	0° 53,10' W	3141	WNW 7	2,2	0,5	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/305-1	04.09.09	09:43	77° 32,13' N	0° 53,07' W	3253	WNW 7	178,2	1,3	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS vebunden
PS74/305-1	04.09.09	09:49	77° 32,03' N	0° 53,14' W	3157	WNW 8	196,7	1	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/305-1	04.09.09	09:49	77° 32,03' N	0° 53,14' W	3157	WNW 8	196,7	1	Ocean bottom seismometer	OBS	on deck	
PS74/306-1	04.09.09	12:27	77° 32,85' N	0° 7,03' W	3166	NW 6	4,6	0,1	Multi corer	MUC	in the water	
PS74/306-1	04.09.09	13:21	77° 32,95' N	0° 7,51' W	3162	WNW 6	73,4	0,1	Multi corer	MUC	action	Winde gestoppt auf 3000 m
PS74/306-1	04.09.09	13:22	77° 32,95' N	0° 7,49' W	3161	WNW 6	52,4	0,2	Multi corer	MUC	lowering	
PS74/306-1	04.09.09	13:28	77° 32,94' N	0° 7,40' W	3162	WNW 6	118,2	0,1	Multi corer	MUC	on ground/max depth	3109 m, GE 72.1
PS74/306-1	04.09.09	13:29	77° 32,93' N	0° 7,39' W	3163	WNW 6	169,1	0,2	Multi corer	MUC	hoisting	
PS74/306-1	04.09.09	13:30	77° 32,93' N	0° 7,38' W	3162	WNW 6	132,6	0,2	Multi corer	MUC	off ground	
PS74/306-1	04.09.09	14:40	77° 32,88' N	0° 7,90' W	3162	WNW 5	19,6	0,2	Multi corer	MUC	at surface	
PS74/306-1	04.09.09	14:44	77° 32,90' N	0° 7,89' W	3162	NW 5	60,8	0,4	Multi corer	MUC	on deck	
PS74/306-2	04.09.09	15:08	77° 32,91' N	0° 7,44' W	3162	NW 5	18,1	0,3	Multi corer	MUC	in the water	
PS74/306-2	04.09.09	16:01	77° 32,93' N	0° 7,40' W	3161	NW 5	315,7	0,3	Multi corer	MUC	action	Wind Gestoppt bei 3000m
PS74/306-2	04.09.09	16:03	77° 32,93' N	0° 7,40' W	3162	NW 5	315,8	0,1	Multi corer	MUC	lowering	
PS74/306-2	04.09.09	16:10	77° 32,93' N	0° 7,47' W	3161	NW 5	295,4	0,3	Multi corer	MUC	on ground/max depth	GE 72,1 3069 m
PS74/306-2	04.09.09	16:12	77° 32,94' N	0° 7,49' W	3162	NW 5	356	0,4	Multi corer	MUC	off ground	
PS74/306-2	04.09.09	17:20	77° 32,97' N	0° 8,38' W	3177	NNW 4	346,2	0,3	Multi corer	MUC	on deck	
PS74/307-1	04.09.09	18:07	77° 26,54' N	0° 15,00' W	3191	NNW 6	308,8	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/307-1	04.09.09	18:09	77° 26,53' N	0° 15,00' W	3190	NNW 6	288,8	0,1	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/307-1	04.09.09	18:15	77° 26,50' N	0° 15,10' W	3189	NNW 5	204,6	0,4	Ocean bottom seismometer	OBS	action	hydrophon aus dem wasser
PS74/307-1	04.09.09	18:27	77° 26,75' N	0° 15,12' W	3191	NNW 5	326,2	0,5	Ocean bottom seismometer	OBS	action	hydrophon zu wasser
PS74/307-1	04.09.09	18:48	77° 26,87' N	0° 14,70' W	3189	NNW 4	315,2	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/307-1	04.09.09	18:54	77° 26,88' N	0° 14,78' W	3191	NNW 4	146,5	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/307-1	04.09.09	19:06	77° 26,61' N	0° 13,45' W	3982	NW 5	51,1	0,4	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/307-1	04.09.09	19:14	77° 26,62' N	0° 13,39' W	4313	NW 4	254,7	0,1	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/307-1	04.09.09	19:14	77° 26,62' N	0° 13,39' W	4313	NW 4	254,7	0,1	Ocean bottom seismometer	OBS	on deck	
PS74/308-1	04.09.09	21:33	77° 20,33' N	0° 23,85' E	3240	NW 6	112,6	0,6	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/308-1	04.09.09	21:35	77° 20,33' N	0° 23,91' E	3244	NNW 6	149,1	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/308-1	04.09.09	21:41	77° 20,31' N	0° 23,99' E	3242	NNW 6	157,8	0,2	Ocean bottom seismometer	OBS	action	Hydophon aus dem Wasser
PS74/308-1	04.09.09	22:02	77° 20,30' N	0° 24,12' E	3242	NW 7	306,2	0,1	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/308-1	04.09.09	22:15	77° 20,27' N	0° 24,39' E	3242	NW 7	47,7	0,3	Ocean bottom seismometer	OBS	action	Hydophon aus dem Wasser
PS74/308-1	04.09.09	22:25	77° 20,27' N	0° 24,46' E	3240	NW 7	137,9	0,5	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/308-1	04.09.09	22:30	77° 20,23' N	0° 24,59' E	3242	NW 6	141,8	0,6	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS vebunden

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/308-1	04.09.09	22:43	77° 20,16' N	0° 24,89' E	3244	NW 7	141,6	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/308-1	04.09.09	22:43	77° 20,16' N	0° 24,89' E	3244	NW 7	141,6	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/309-1	05.09.09	00:56	77° 13,34' N	1° 2,91' E	3259	NW 8	258,8	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/309-1	05.09.09	01:00	77° 13,35' N	1° 2,78' E	3259	NW 7	292	0,2	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/309-1	05.09.09	01:06	77° 13,39' N	1° 2,62' E	3262	NNW 7	325,5	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/309-1	05.09.09	01:28	77° 13,40' N	1° 2,67' E	3260	NW 8	151,5	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/309-1	05.09.09	01:43	77° 13,38' N	1° 2,67' E	3261	NW 6	322,6	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/309-1	05.09.09	01:45	77° 13,39' N	1° 2,64' E	3262	NW 8	333,6	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/309-1	05.09.09	01:53	77° 13,44' N	1° 2,66' E	3260	NW 7	0,9	0,3	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/309-1	05.09.09	02:01	77° 13,52' N	1° 2,88' E	3261	NW 6	33,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/309-1	05.09.09	02:04	77° 13,55' N	1° 3,02' E	3260	NW 6	54,1	0,2	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/310-1	05.09.09	03:05	77° 6,64' N	1° 39,45' E	3251	NW 6	51,5	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/310-1	05.09.09	03:10	77° 6,68' N	1° 39,50' E	3252	NW 7	13,1	0,2	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/310-1	05.09.09	03:17	77° 6,72' N	1° 39,50' E	3251	NW 6	349,1	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/310-1	05.09.09	03:37	77° 6,73' N	1° 39,69' E	3251	NW 5	124,8	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/310-1	05.09.09	03:42	77° 6,71' N	1° 39,77' E	3252	NW 6	110,4	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/310-1	05.09.09	03:58	77° 6,79' N	1° 39,70' E	3250	NW 6	18,6	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/310-1	05.09.09	04:11	77° 6,68' N	1° 39,89' E	3246	WNW 6	3,3	2,2	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/310-1	05.09.09	04:18	77° 6,76' N	1° 40,03' E	3251	NW 5	27,9	0,2	Ocean bottom seismometer	OBS	on ground/max depth	nur für's System
PS74/310-1	05.09.09	04:18	77° 6,76' N	1° 40,03' E	3251	NW 5	27,9	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/311-1	05.09.09	05:21	77° 0,27' N	2° 16,51' E	3274	NW 7	126,2	0,7	Ocean bottom seismometer	OBS	action	Hydrophon geht zu Wasser
PS74/311-1	05.09.09	05:24	77° 0,25' N	2° 16,58' E	3273	NW 7	139,4	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/311-1	05.09.09	05:30	77° 0,23' N	2° 16,78' E	3275	NW 6	104	0,6	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/311-1	05.09.09	05:54	77° 0,14' N	2° 17,45' E	3275	NW 6	163	0,6	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/311-1	05.09.09	06:00	77° 0,10' N	2° 17,58' E	3274	NW 7	135,4	0,6	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/311-1	05.09.09	06:10	77° 0,01' N	2° 17,51' E	3275	NW 6	173	0,6	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/311-1	05.09.09	06:21	77° 0,03' N	2° 16,46' E	3276	NW 6	188,4	0,8	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/311-1	05.09.09	06:28	76° 59,97' N	2° 16,50' E	3276	NW 7	162,9	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/311-1	05.09.09	06:28	76° 59,97' N	2° 16,50' E	3276	NW 7	162,9	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/312-1	05.09.09	07:28	76° 53,46' N	2° 53,82' E	3286	WNW 7	144,3	1	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/312-1	05.09.09	07:31	76° 53,43' N	2° 53,93' E	3286	NW 7	102,8	0,7	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/312-1	05.09.09	07:36	76° 53,45' N	2° 54,13' E	3286	WNW 7	32,4	0,8	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/312-1	05.09.09	07:58	76° 53,55' N	2° 54,50' E	3285	NW 7	88,4	0,2	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/312-1	05.09.09	08:08	76° 53,54' N	2° 54,65' E	3284	NW 7	122,4	0,2	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/312-1	05.09.09	08:19	76° 53,50' N	2° 54,97' E	3284	NW 7	124,7	0,5	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/312-1	05.09.09	08:32	76° 53,51' N	2° 53,42' E	3728	WNW 6	90,7	0,3	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/312-1	05.09.09	08:32	76° 53,51' N	2° 53,42' E	3728	WNW 6	90,7	0,3	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/312-1	05.09.09	08:37	76° 53,52' N	2° 53,56' E	3278	WNW 7	94,1	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/313-1	05.09.09	09:44	76° 46,83' N	3° 31,14' E	3915	NW 7	158,2	0,6	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/313-1	05.09.09	09:45	76° 46,83' N	3° 31,15' E	3482	WNW 6	128,9	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/313-1	05.09.09	09:49	76° 46,83' N	3° 31,23' E	3294	NW 7	84,2	0,5	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/313-1	05.09.09	10:18	76° 46,82' N	3° 31,51' E	3294	NW 7	317	0,3	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/313-1	05.09.09	10:25	76° 46,80' N	3° 31,57' E	3293	NW 8	118,9	0,3	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/313-1	05.09.09	10:32	76° 46,80' N	3° 31,62' E	3293	NW 8	311,5	0,4	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/313-1	05.09.09	10:38	76° 46,85' N	3° 31,27' E	3293	NW 8	264,3	0,3	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/313-1	05.09.09	10:46	76° 46,85' N	3° 31,32' E	3293	NW 7	137,1	0,2	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/313-1	05.09.09	10:46	76° 46,85' N	3° 31,32' E	3293	NW 7	137,1	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/314-1	05.09.09	11:53	76° 40,33' N	4° 3,37' E	3137	NW 7	69,7	0,2	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/314-1	05.09.09	11:57	76° 40,34' N	4° 3,49' E	3135	NW 7	43,3	0,2	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/314-1	05.09.09	11:58	76° 40,35' N	4° 3,52' E	3138	NW 7	38,6	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/314-1	05.09.09	12:21	76° 40,29' N	4° 4,22' E	3142	NW 8	116,2	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/314-1	05.09.09	12:31	76° 40,24' N	4° 4,35' E	3140	NW 8	164	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/314-1	05.09.09	12:38	76° 40,21' N	4° 4,43' E	3139	NW 8	146,3	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/314-1	05.09.09	12:42	76° 40,18' N	4° 4,49' E	3140	NW 8	150,4	0,4	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/314-1	05.09.09	12:47	76° 40,14' N	4° 4,57' E	3139	NW 7	154	0,3	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/314-1	05.09.09	12:48	76° 40,13' N	4° 4,59' E	3140	NW 7	163,3	0,2	Ocean bottom seismometer	OBS	on deck	Sclauchboot an Deck

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/315-1	05.09.09	13:52	76° 33,47' N	4° 43,10' E	3080	NW 8	66,4	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/315-1	05.09.09	13:57	76° 33,48' N	4° 43,27' E	3081	WNW 9	76,7	0,3	Ocean bottom seismometer	OBS	action	ausgelöst
PS74/315-1	05.09.09	14:03	76° 33,49' N	4° 43,48' E	3079	NW 8	73,4	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/315-1	05.09.09	14:31	76° 33,56' N	4° 43,87' E	3075	WNW 8	256,3	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/315-1	05.09.09	14:34	76° 33,56' N	4° 43,85' E	3076	WNW 7	41,1	0,2	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/315-1	05.09.09	14:43	76° 33,55' N	4° 43,93' E	3075	WNW 6	271,3	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/315-1	05.09.09	14:48	76° 33,55' N	4° 43,77' E	3075	WNW 6	255,8	0,4	Ocean bottom seismometer	OBS	action	OBS mit Schlauchboot verbunden
PS74/315-1	05.09.09	14:54	76° 33,50' N	4° 43,75' E	3076	WNW 6	168,4	0,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/315-1	05.09.09	14:56	76° 33,48' N	4° 43,78' E	3078	WNW 7	168,1	0,3	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/316-1	05.09.09	15:58	76° 26,36' N	5° 21,31' E	2737	WNW 6	114,3	0,7	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/316-1	05.09.09	16:05	76° 26,34' N	5° 21,64' E	2739	WNW 7	107,9	0,6	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/316-1	05.09.09	16:08	76° 26,32' N	5° 21,75' E	2738	WNW 7	138,9	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/316-1	05.09.09	16:19	76° 26,25' N	5° 22,06' E	2738	WNW 8	108,1	0,5	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/316-1	05.09.09	16:36	76° 26,12' N	5° 22,49' E	2744	WNW 6	90,9	0,7	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/316-1	05.09.09	16:46	76° 26,10' N	5° 22,87' E	2749	WNW 7	161,4	1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/316-1	05.09.09	16:58	76° 26,08' N	5° 22,63' E	2747	WNW 7	102,9	0,5	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/316-1	05.09.09	17:03	76° 26,05' N	5° 22,83' E	2745	WNW 6	121,7	0,9	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/316-1	05.09.09	17:03	76° 26,05' N	5° 22,83' E	2745	WNW 6	121,7	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/317-1	05.09.09	17:47	76° 22,02' N	5° 45,50' E	2574	NW 7	71,8	0,5	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/317-1	05.09.09	17:51	76° 22,03' N	5° 45,63' E	2682	NW 8	74	0,5	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/317-1	05.09.09	17:53	76° 22,03' N	5° 45,69' E	2682	NW 8	76,1	0,5	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/317-1	05.09.09	17:54	76° 22,03' N	5° 45,73' E	2683	NW 8	71,7	0,5	Ocean bottom seismometer	OBS	action	hydo
PS74/317-1	05.09.09	18:15	76° 22,13' N	5° 46,38' E	2683	NW 6	46,2	0,6	Ocean bottom seismometer	OBS	action	hydrophon zu wasser
PS74/317-1	05.09.09	18:23	76° 22,17' N	5° 46,61' E	2684	NW 6	86,6	0,4	Ocean bottom seismometer	OBS	action	hydrophon an deck
PS74/317-1	05.09.09	18:30	76° 22,13' N	5° 46,84' E	2685	NW 6	139,4	0,8	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/317-1	05.09.09	18:43	76° 21,87' N	5° 46,41' E	2683	WNW 6	198,6	0,7	Ocean bottom seismometer	OBS	action	an Boott angeschlagen
PS74/317-1	05.09.09	18:44	76° 21,86' N	5° 46,39' E	2684	WNW 6	187,8	0,9	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/317-1	05.09.09	18:50	76° 21,79' N	5° 46,47' E	2685	WNW 7	141,7	0,5	Ocean bottom seismometer	OBS	on deck	
PS74/318-1	05.09.09	23:10	76° 46,00' N	7° 21,58' E	3524	WNW 6	196,4	3,5	Seismic refraction profile	SEISREFR	in the water	
PS74/318-1	05.09.09	23:14	76° 45,69' N	7° 21,45' E	3545	WNW 7	176,9	5,1	Seismic refraction profile	SEISREFR	profile start	ester Schuss
PS74/318-1	05.09.09	23:16	76° 45,52' N	7° 21,51' E	3554	WNW 6	174,2	5	Seismic refraction profile	SEISREFR	action	pass OBS 223
PS74/318-1	06.09.09	00:54	76° 37,82' N	7° 9,49' E	2929	W 6	196,6	5,1	Seismic refraction profile	SEISREFR	action	pass OBS 222
PS74/318-1	06.09.09	03:07	76° 26,94' N	7° 5,10' E	3565	NW 5	184,2	4,9	Seismic refraction profile	SEISREFR	action	pass OBS 226
PS74/318-1	06.09.09	04:55	76° 18,00' N	7° 5,26' E	3502	W 3	177,7	5,2	Seismic refraction profile	SEISREFR	action	pass OBS 227
PS74/318-1	06.09.09	07:23	76° 5,62' N	7° 11,76' E	3447	SW 2	174,9	5	Seismic refraction profile	SEISREFR	action	pass OBS 216
PS74/318-1	06.09.09	09:41	75° 53,76' N	7° 8,34' E	2935	SSW 4	182,9	5,4	Seismic refraction profile	SEISREFR	action	pass OBS 228
PS74/318-1	06.09.09	12:30	75° 39,82' N	7° 20,28' E	3462	SW 6	167,7	5	Seismic refraction profile	SEISREFR	profile end	
PS74/318-1	06.09.09	12:42	75° 39,12' N	7° 20,93' E	3463	SW 6	164,9	2,2	Seismic refraction profile	SEISREFR	on deck	
PS74/319-1	06.09.09	14:27	75° 53,80' N	7° 9,46' E	2920	SW 5	68,3	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/319-1	06.09.09	14:32	75° 53,79' N	7° 9,45' E	2921	SW 5	231,4	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/319-1	06.09.09	14:35	75° 53,78' N	7° 9,40' E	2926	SW 6	244,4	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/319-1	06.09.09	14:56	75° 53,74' N	7° 8,81' E	2932	SW 5	288,6	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/319-1	06.09.09	15:06	75° 53,76' N	7° 8,68' E	2931	SW 5	301,8	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/319-1	06.09.09	15:14	75° 53,77' N	7° 8,51' E	2930	SSW 5	296,6	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/319-1	06.09.09	15:18	75° 53,78' N	7° 8,49' E	2930	SSW 6	263,6	0,1	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/319-1	06.09.09	15:26	75° 53,77' N	7° 8,56' E	2930	SSW 6	105,8	0,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/319-1	06.09.09	15:29	75° 53,76' N	7° 8,60' E	2928	SSW 5	147,8	0,3	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/320-1	06.09.09	17:05	76° 0,11' N	7° 40,33' E	2727	SSW 6	76,1	1,7	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/320-1	06.09.09	17:09	76° 0,15' N	7° 40,44' E	2728	SSW 6	23,5	0,6	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/320-1	06.09.09	17:13	76° 0,19' N	7° 40,44' E	2730	SSW 6	347,1	0,8	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/320-1	06.09.09	17:50	76° 0,44' N	7° 40,38' E	2730	S 7	129	0,7	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/320-1	06.09.09	18:04	76° 0,89' N	7° 41,46' E	2733	S 6	333,3	1,3	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/320-1	06.09.09	18:15	76° 1,02' N	7° 41,33' E	2732	S 8	359,7	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/320-1	06.09.09	18:15	76° 1,02' N	7° 41,33' E	2732	S 8	359,7	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/321-1	06.09.09	19:18	75° 54,30' N	8° 12,10' E	2330	S 7	163,5	1,1	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/321-1	06.09.09	19:21	75° 54,29' N	8° 12,18' E	2331	S 7	69,5	0,4	Ocean bottom seismometer	OBS	action	ausgeloest

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/321-1	06.09.09	19:47	75° 54,29' N	8° 12,56' E	2335	SSE 7	54,1	0,4	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/321-1	06.09.09	19:54	75° 54,31' N	8° 12,64' E	2335	SSE 7	83,9	0,3	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/321-1	06.09.09	20:07	75° 54,39' N	8° 14,70' E	2343	SSE 7	334,1	0,6	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS vebunden
PS74/321-1	06.09.09	20:12	75° 54,43' N	8° 14,68' E	2344	SSE 7	13,2	0,7	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/321-1	06.09.09	20:14	75° 54,45' N	8° 14,71' E	2343	SSE 7	25	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/322-1	06.09.09	21:47	76° 9,03' N	8° 5,01' E	2332	SSE 10	77,8	0,7	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/322-1	06.09.09	21:50	76° 9,05' N	8° 5,11' E	2332	S 9	38,4	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/322-1	06.09.09	22:19	76° 9,19' N	8° 5,70' E	2332	S 9	93,1	0,2	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/322-1	06.09.09	22:22	76° 9,19' N	8° 5,76' E	2332	S 9	79,1	0,4	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/322-1	06.09.09	22:35	76° 9,05' N	8° 6,68' E	1821	SSE 10	5,7	0,4	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS vebunden
PS74/322-1	06.09.09	22:37	76° 9,06' N	8° 6,68' E	2327	SSE 10	2,9	0,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/322-1	06.09.09	22:40	76° 9,07' N	8° 6,65' E	2331	S 9	277,9	0,2	Ocean bottom seismometer	OBS	on deck	
PS74/323-1	07.09.09	00:30	76° 21,58' N	7° 58,97' E	2427	SSW 9	125,3	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/323-1	07.09.09	00:32	76° 21,57' N	7° 59,00' E	2327	SSW 8	139,5	0,2	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/323-1	07.09.09	00:35	76° 21,56' N	7° 59,00' E	2324	SSW 8	217,8	0,1	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/323-1	07.09.09	00:52	76° 21,53' N	7° 58,75' E	2332	SSW 9	214,8	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/323-1	07.09.09	00:58	76° 21,49' N	7° 58,72' E	2331	S 8	193,2	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/323-1	07.09.09	01:05	76° 21,47' N	7° 58,71' E	2331	SSW 8	200,7	0,1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/323-1	07.09.09	01:12	76° 21,51' N	7° 58,61' E	2331	SSW 9	339,5	0,2	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/323-1	07.09.09	01:18	76° 21,57' N	7° 58,50' E	2334	SSW 9	332,8	0,3	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/323-1	07.09.09	01:21	76° 21,61' N	7° 58,42' E	2333	SSW 9	329,5	0,1	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/324-1	07.09.09	02:56	76° 35,29' N	8° 5,36' E	1533	SSW 9	68	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/324-1	07.09.09	03:00	76° 35,30' N	8° 5,46' E	1534	SSW 9	47,7	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/324-1	07.09.09	03:14	76° 35,28' N	8° 5,51' E	1529	SSW 8	202,4	0,3	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/324-1	07.09.09	03:22	76° 35,22' N	8° 5,35' E	1521	SSW 8	211,4	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/324-1	07.09.09	03:26	76° 35,23' N	8° 5,21' E	1527	SSW 8	314,9	0,2	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/324-1	07.09.09	03:31	76° 35,28' N	8° 5,05' E	1532	SSW 8	328,3	0,3	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/324-1	07.09.09	03:32	76° 35,29' N	8° 5,03' E	1533	SSW 8	336,1	0,3	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/325-1	07.09.09	05:56	76° 37,88' N	7° 10,63' E	2973	S 7	27,2	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/325-1	07.09.09	06:00	76° 37,89' N	7° 10,65' E	2982	S 6	21,6	0,6	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/325-1	07.09.09	06:05	76° 37,93' N	7° 10,72' E	2978	S 7	32,3	0,6	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/325-1	07.09.09	06:29	76° 38,21' N	7° 10,49' E	2982	S 7	350,3	0,5	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/325-1	07.09.09	06:36	76° 38,27' N	7° 10,44' E	3021	S 7	2,3	0,4	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/325-1	07.09.09	06:39	76° 38,29' N	7° 10,46' E	3039	SSE 7	335,4	0,5	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/325-1	07.09.09	06:57	76° 37,99' N	7° 10,50' E	2961	S 7	53,8	0,7	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/325-1	07.09.09	06:57	76° 37,99' N	7° 10,50' E	2961	S 7	53,8	0,7	Ocean bottom seismometer	OBS	on deck	
PS74/326-1	07.09.09	08:23	76° 45,50' N	7° 22,14' E	3563	SSE 7	32,9	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/326-1	07.09.09	08:25	76° 45,51' N	7° 22,16' E	3563	SSE 8	18,8	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/326-1	07.09.09	08:30	76° 45,54' N	7° 22,17' E	3563	SSE 8	12,6	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/326-1	07.09.09	09:01	76° 45,55' N	7° 22,36' E	3563	SSE 8	340,1	0,3	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/326-1	07.09.09	09:11	76° 45,50' N	7° 22,28' E	3561	SSE 8	193,1	0,9	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/326-1	07.09.09	09:15	76° 45,52' N	7° 22,22' E	3563	SSE 8	347,9	0,9	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/326-1	07.09.09	09:21	76° 45,59' N	7° 21,97' E	3558	SSE 8	316,9	0,9	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/326-1	07.09.09	09:22	76° 45,59' N	7° 21,94' E	3563	SSE 8	328,6	0,8	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/326-1	07.09.09	09:26	76° 45,64' N	7° 21,86' E	3557	SSE 8	356,6	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/327-1	07.09.09	10:36	76° 42,31' N	6° 35,30' E	2548	SSE 11	291	0,7	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/327-1	07.09.09	10:37	76° 42,32' N	6° 35,25' E	2552	SSE 11	291,7	0,8	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/327-1	07.09.09	10:43	76° 42,33' N	6° 35,07' E	2548	SSE 10	159,7	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/327-1	07.09.09	11:00	76° 42,48' N	6° 35,40' E	2546	SSE 10	39,3	0,4	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/327-1	07.09.09	11:04	76° 42,48' N	6° 35,44' E	2544	SSE 12	158,9	0,1	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/327-1	07.09.09	11:13	76° 42,49' N	6° 35,48' E	2543	SSE 11	347,2	0,6	Ocean bottom seismometer	OBS	action	OBS 224 aufgetaucht
PS74/327-1	07.09.09	11:20	76° 42,57' N	6° 35,30' E	2549	SSE 11	322,4	1,1	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/327-1	07.09.09	11:27	76° 42,66' N	6° 34,80' E	2551	SSE 11	315,1	1,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/327-1	07.09.09	11:33	76° 42,75' N	6° 34,43' E	2553	SSE 10	321,7	1,3	Ocean bottom seismometer	OBS	on deck	
PS74/328-1	07.09.09	12:52	76° 31,63' N	6° 23,57' E	2497	S 10	266,3	0,1	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/328-1	07.09.09	12:55	76° 31,63' N	6° 23,53' E	2498	S 10	304,1	0,1	Ocean bottom seismometer	OBS	action	ausgeloest

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/328-1	07.09.09	12:59	76° 31,63' N	6° 23,52' E	2499	S 10	336,7	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/328-1	07.09.09	13:31	76° 31,60' N	6° 23,64' E	2500	SSE 9	175,8	0,1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/328-1	07.09.09	13:36	76° 31,63' N	6° 23,46' E	2499	SSE 8	288,7	0,2	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/328-1	07.09.09	13:44	76° 31,69' N	6° 22,91' E	2501	SSE 9	294,2	0,2	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/328-1	07.09.09	13:49	76° 31,73' N	6° 22,58' E	2503	SSE 9	301,3	0,3	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/329-1	07.09.09	16:02	76° 27,04' N	7° 5,57' E	3573	SSE 8	352	0,8	Ocean bottom seismometer	OBS	action	hydrophon z wss
PS74/329-1	07.09.09	16:05	76° 27,09' N	7° 5,55' E	3571	SSE 8	359,4	1,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/329-1	07.09.09	16:08	76° 27,14' N	7° 5,58' E	3572	SSE 9	17,8	0,7	Ocean bottom seismometer	OBS	action	hydrophon a.d.
PS74/329-1	07.09.09	16:40	76° 27,36' N	7° 5,78' E	3563	SSE 8	242,5	0,3	Ocean bottom seismometer	OBS	action	hydrophon.z.wss
PS74/329-1	07.09.09	16:53	76° 27,45' N	7° 5,76' E	3566	SSE 8	3,5	0,8	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/329-1	07.09.09	16:56	76° 27,50' N	7° 5,79' E	3562	SSE 8	9,9	1,1	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/329-1	07.09.09	17:10	76° 26,85' N	7° 5,14' E	3571	SSE 8	52,8	0,4	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/329-1	07.09.09	17:10	76° 26,85' N	7° 5,14' E	3571	SSE 8	52,8	0,4	Ocean bottom seismometer	OBS	on deck	
PS74/330-1	07.09.09	18:37	76° 18,09' N	7° 5,90' E	3498	S 7	195,6	0,2	Ocean bottom seismometer	OBS	action	Hydrophon geht zu Wasser
PS74/330-1	07.09.09	18:40	76° 18,10' N	7° 5,85' E	3496	N 0	336,3	0,2	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/330-1	07.09.09	18:43	76° 18,10' N	7° 5,83' E	3496	SSE 7	21,6	0	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/330-1	07.09.09	19:16	76° 18,06' N	7° 6,19' E	3500	SSE 7	41,3	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasse
PS74/330-1	07.09.09	19:25	76° 18,06' N	7° 6,30' E	3497	S 7	94,8	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/330-1	07.09.09	19:32	76° 18,06' N	7° 6,42' E	3495	S 6	89,3	0,4	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/330-1	07.09.09	19:46	76° 17,61' N	7° 5,16' E	3514	SSE 5	6,3	0,1	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/330-1	07.09.09	19:57	76° 17,74' N	7° 5,24' E	3509	SSE 6	8	0,9	Ocean bottom seismometer	OBS	on deck	
PS74/331-1	07.09.09	21:33	76° 5,75' N	7° 12,15' E	3445	SSE 6	298,9	0,2	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/331-1	07.09.09	21:34	76° 5,75' N	7° 12,12' E	3384	SSE 6	272,7	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/331-1	07.09.09	21:40	76° 5,73' N	7° 12,05' E	3446	SSE 6	263,2	0,3	Ocean bottom seismometer	OBS	action	Hydophon an Deck
PS74/331-1	07.09.09	22:10	76° 5,71' N	7° 11,98' E	3446	SSE 6	160,8	0,1	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/331-1	07.09.09	22:16	76° 5,70' N	7° 11,97' E	3444	SSE 6	240,6	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/331-1	07.09.09	22:21	76° 5,71' N	7° 11,92' E	3447	SSE 6	278,3	0,3	Ocean bottom seismometer	OBS	action	OBS aufgetaucht
PS74/331-1	07.09.09	22:32	76° 5,49' N	7° 11,51' E	3452	SSE 5	289,9	0,5	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS vebunden
PS74/331-1	07.09.09	22:38	76° 5,52' N	7° 11,34' E	3449	SSE 5	310,5	0,6	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/331-1	07.09.09	22:38	76° 5,52' N	7° 11,34' E	3449	SSE 5	310,5	0,6	Ocean bottom seismometer	OBS	on deck	
PS74/332-1	07.09.09	23:34	76° 10,97' N	6° 44,22' E	2598	SSW 4	303,1	0,4	Ocean bottom seismometer	OBS	action	Hydophon zu Wasser
PS74/332-1	07.09.09	23:38	76° 10,97' N	6° 44,15' E	2601	SSW 4	274,1	0,4	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/332-1	07.09.09	23:43	76° 10,98' N	6° 44,13' E	2601	SSW 4	17,1	0,2	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/332-1	07.09.09	23:59	76° 11,03' N	6° 44,30' E	2598	S 3	344,9	0,2	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/332-1	08.09.09	00:08	76° 11,03' N	6° 44,29' E	2598	S 4	180,9	0,1	Ocean bottom seismometer	OBS	action	Hydrophon aus dem Wasser
PS74/332-1	08.09.09	00:14	76° 11,03' N	6° 44,29' E	2598	S 4	181	0,2	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/332-1	08.09.09	00:25	76° 10,78' N	6° 44,14' E	2603	SSW 4	231	0,2	Ocean bottom seismometer	OBS	action	Schlauchboot mit OBS verbunden
PS74/332-1	08.09.09	00:30	76° 10,79' N	6° 44,09' E	2603	SSW 3	16	0,3	Ocean bottom seismometer	OBS	on ground/max depth	OBS an Deck
PS74/332-1	08.09.09	00:32	76° 10,81' N	6° 44,13' E	2603	SSW 3	33,1	0,3	Ocean bottom seismometer	OBS	on deck	Schlauchboot an Deck
PS74/333-1	08.09.09	03:36	76° 16,12' N	6° 18,13' E	2222	S 4	204,3	0,3	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/333-1	08.09.09	03:40	76° 16,09' N	6° 18,15' E	2224	S 4	163,1	0,3	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/333-1	08.09.09	04:05	76° 16,03' N	6° 18,31' E	2222	S 3	221	0,3	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/333-1	08.09.09	04:12	76° 16,02' N	6° 18,24' E	2226	S 4	64,6	0	Ocean bottom seismometer	OBS	action	aufgetaucht
PS74/333-1	08.09.09	04:14	76° 16,02' N	6° 18,27' E	2225	S 4	60,8	0,3	Ocean bottom seismometer	OBS	action	an Schlauchboot angeschlagen
PS74/333-1	08.09.09	04:15	76° 16,03' N	6° 18,28' E	2225	SW 4	54	0,5	Ocean bottom seismometer	OBS	on ground/max depth	
PS74/333-1	08.09.09	04:21	76° 16,04' N	6° 18,41' E	2220	S 4	55,4	0,3	Ocean bottom seismometer	OBS	on deck	
PS74/334-1	08.09.09	22:42	75° 44,89' N	6° 17,61' W	3294	SSE 7	211,6	2,9	Seismic reflection profile	SEISREFL	in the water	Streamer zu Wasser
PS74/334-1	08.09.09	23:00	75° 43,82' N	6° 19,55' W	3305	SSE 8	219,2	4,2	Seismic reflection profile	SEISREFL	in the water	Kannonengestell
PS74/334-1	08.09.09	23:06	75° 43,45' N	6° 20,85' W	3303	SSE 7	215,8	4,9	Seismic reflection profile	SEISREFL	action	erster Schuss
PS74/334-1	09.09.09	02:19	75° 29,36' N	6° 56,84' W	3390	ESE 6	213,5	5	Seismic reflection profile	SEISREFL	profile start	pass position Dillhole
PS74/334-1	09.09.09	12:58	74° 42,00' N	8° 36,38' W	3359	NE 4	209,4	5	Seismic reflection profile	SEISREFL	profile end	
PS74/334-1	09.09.09	13:23	74° 41,03' N	8° 40,58' W	3347	NE 3	227,4	1,9	Seismic reflection profile	SEISREFL	on deck	Streamer
PS74/334-1	09.09.09	13:28	74° 40,92' N	8° 40,95' W	3349	NE 3	218,3	1,6	Seismic reflection profile	SEISREFL	on deck	Kannonengestell
PS74/335-1	10.09.09	00:58	73° 29,97' N	2° 29,95' W	3229	SSW 1	238,2	0,2	Heat Flow	HF	in the water	
PS74/335-1	10.09.09	01:45	73° 30,00' N	2° 30,07' W	3226	SW 1	324,3	0,1	Heat Flow	HF	action	Winde gestoppt, 3100 m
PS74/335-1	10.09.09	01:48	73° 30,00' N	2° 30,08' W	3223	SW 1	74,9	0,1	Heat Flow	HF	lowering	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/335-1	10.09.09	01:50	73° 30,00' N	2° 30,08' W	3225	WSW 1	130,3	0,1	Heat Flow	HF	on ground/max depth	3177 m, GE 72.1
PS74/335-1	10.09.09	01:58	73° 29,99' N	2° 30,11' W	3223	WSW 2	224,2	0,1	Heat Flow	HF	hoisting	
PS74/335-1	10.09.09	02:02	73° 29,98' N	2° 30,13' W	3223	WSW 2	32,1	0,2	Heat Flow	HF	action	Winde gestoppt 3130 m
PS74/335-1	10.09.09	02:03	73° 29,98' N	2° 30,13' W	3225	WSW 2	30,8	0,1	Heat Flow	HF	lowering	
PS74/335-1	10.09.09	02:04	73° 29,98' N	2° 30,13' W	3223	WSW 2	347,5	0,1	Heat Flow	HF	on ground/max depth	3173 m,GE 72.1
PS74/335-1	10.09.09	02:14	73° 29,97' N	2° 30,08' W	3225	WSW 1	354,8	0,2	Heat Flow	HF	hoisting	
PS74/335-1	10.09.09	03:09	73° 30,00' N	2° 29,96' W	3223	SW 2	2,7	0,1	Heat Flow	HF	at surface	
PS74/335-1	10.09.09	03:14	73° 30,01' N	2° 30,03' W	3223	SW 2	262,4	0,2	Heat Flow	HF	on deck	
PS74/336-1	10.09.09	07:48	73° 49,74' N	4° 54,50' W	3659	WNW 9	291,2	0,2	Heat Flow	HF	in the water	
PS74/336-1	10.09.09	08:41	73° 49,60' N	4° 54,72' W	3655	WNW 7	29,7	0,8	Heat Flow	HF	action	3500 m gestoppt, auspebdeln
PS74/336-1	10.09.09	08:45	73° 49,61' N	4° 54,73' W	3655	WNW 9	328,7	1	Heat Flow	HF	on ground/max depth	GE72.1 3594 m, Lanze im Boden
PS74/336-1	10.09.09	08:53	73° 49,62' N	4° 54,84' W	3654	WNW 9	37,2	0,5	Heat Flow	HF	hoisting	
PS74/336-1	10.09.09	08:57	73° 49,62' N	4° 54,82' W	3653	WNW 9	317,7	0,3	Heat Flow	HF	action	gestoppt auf 3540 m, auspendeln
PS74/336-1	10.09.09	08:57	73° 49,62' N	4° 54,82' W	3653	WNW 9	317,7	0,3	Heat Flow	HF	lowering	
PS74/336-1	10.09.09	08:59	73° 49,62' N	4° 54,81' W	3653	WNW 10	94,2	0,5	Heat Flow	HF	on ground/max depth	GE72.1 3594 m, Lanze im Boden
PS74/336-1	10.09.09	09:09	73° 49,64' N	4° 54,83' W	3653	NW 8	255	1,5	Heat Flow	HF	hoisting	
PS74/336-1	10.09.09	10:05	73° 49,55' N	4° 55,68' W	3652	WNW 8	263,1	0,2	Heat Flow	HF	at surface	
PS74/336-1	10.09.09	10:10	73° 49,52' N	4° 55,74' W	3652	WNW 7	0,5	0,7	Heat Flow	HF	on deck	
PS74/337-1	10.09.09	13:36	74° 6,00' N	7° 0,03' W	3395	WNW 10	315,9	0,1	Heat Flow	HF	in the water	
PS74/337-1	10.09.09	14:23	74° 6,01' N	6° 59,97' W	3394	WNW 8	4,7	0,1	Heat Flow	HF	action	Winde gestoppt 3250 m
PS74/337-1	10.09.09	14:25	74° 6,01' N	6° 59,97' W	3395	WNW 8	30,4	0,1	Heat Flow	HF	lowering	
PS74/337-1	10.09.09	14:30	74° 6,02' N	6° 59,97' W	3395	WNW 9	317,8	0,1	Heat Flow	HF	on ground/max depth	3350 m, GE72.1 - umgefallen
PS74/337-1	10.09.09	14:33	74° 6,02' N	6° 59,95' W	3394	WNW 9	247,4	0,1	Heat Flow	HF	hoisting	
PS74/337-1	10.09.09	15:21	74° 6,04' N	7° 0,10' W	3393	WNW 7	188,9	0,2	Heat Flow	HF	at surface	
PS74/337-1	10.09.09	15:27	74° 6,00' N	7° 0,07' W	3395	WNW 8	144,1	0,4	Heat Flow	HF	on deck	
PS74/338-1	10.09.09	19:42	74° 25,01' N	9° 38,89' W	3230	SSW 10	213,6	0,3	Heat Flow	HF	in the water	
PS74/338-1	10.09.09	20:27	74° 24,97' N	9° 38,50' W	3232	SW 10	314,2	0,9	Heat Flow	HF	action	Winde gestoppt 3100 m, auspendeln
PS74/338-1	10.09.09	20:27	74° 24,97' N	9° 38,50' W	3232	SW 10	314,2	0,9	Heat Flow	HF	lowering	
PS74/338-1	10.09.09	20:29	74° 24,98' N	9° 38,53' W	3231	SW 10	327,2	0,3	Heat Flow	HF	on ground/max depth	Vesuch fehlgeschlagen
PS74/338-1	10.09.09	20:29	74° 24,98' N	9° 38,53' W	3231	SW 10	327,2	0,3	Heat Flow	HF	hoisting	
PS74/338-1	10.09.09	20:32	74° 24,98' N	9° 38,54' W	3230	SW 10	313,6	0,6	Heat Flow	HF	action	Winde gestopppt, auspendeln
PS74/338-1	10.09.09	20:32	74° 24,98' N	9° 38,54' W	3230	SW 10	313,6	0,6	Heat Flow	HF	lowering	
PS74/338-1	10.09.09	20:33	74° 24,98' N	9° 38,55' W	3231	SW 10	133,1	0,4	Heat Flow	HF	on ground/max depth	Fehlgeschlagen, Stationsabbruch
PS74/338-1	10.09.09	20:34	74° 24,99' N	9° 38,55' W	3229	SSW 11	358,5	0,1	Heat Flow	HF	hoisting	
PS74/338-1	10.09.09	20:35	74° 24,99' N	9° 38,55' W	3231	SW 11	18,3	0,5	Heat Flow	HF	off ground	
PS74/338-1	10.09.09	20:42	74° 24,99' N	9° 38,49' W	3230	SSW 12	77,2	0,5	Heat Flow	HF	lowering	
PS74/338-1	10.09.09	20:46	74° 24,99' N	9° 38,46' W	3229	SSW 13	216,5	0,3	Heat Flow	HF	action	auf 3100m gestoppt
PS74/338-1	10.09.09	20:48	74° 24,99' N	9° 38,47' W	3230	SSW 12	154	1	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 3175 m
PS74/338-1	10.09.09	20:58	74° 24,99' N	9° 38,55' W	3232	SW 12	193,9	0,3	Heat Flow	HF	hoisting	
PS74/338-1	10.09.09	21:01	74° 24,98' N	9° 38,57' W	3230	SW 11	185,5	0,5	Heat Flow	HF	off ground	
PS74/338-1	10.09.09	21:03	74° 24,98' N	9° 38,58' W	3229	SSW 11	210,9	0,2	Heat Flow	HF	lowering	geht zum Grund
PS74/338-1	10.09.09	21:05	74° 24,97' N	9° 38,60' W	3229	SW 11	216,9	0,4	Heat Flow	HF	on ground/max depth	fehlgeschlagen
PS74/338-1	10.09.09	21:08	74° 24,96' N	9° 38,59' W	3229	SW 12	165,1	0,3	Heat Flow	HF	action	3100 m gestoppt, auspendeln
PS74/338-1	10.09.09	21:10	74° 24,96' N	9° 38,57' W	3230	SW 12	40,1	0,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 3171 m
PS74/338-1	10.09.09	21:18	74° 24,97' N	9° 38,47' W	3230	SW 12	16,2	0,2	Heat Flow	HF	hoisting	
PS74/338-1	10.09.09	21:20	74° 24,97' N	9° 38,45' W	3231	SSW 11	329,5	0,5	Heat Flow	HF	off ground	
PS74/338-1	10.09.09	22:09	74° 25,00' N	9° 38,67' W	3229	SW 10	154,3	0,8	Heat Flow	HF	at surface	
PS74/338-1	10.09.09	22:13	74° 24,99' N	9° 38,66' W	3229	SSW 11	216,9	0,2	Heat Flow	HF	on deck	
PS74/339-1	11.09.09	00:49	74° 37,06' N	11° 18,24' W	3071	SSW 12	280,7	0,2	Heat Flow	HF	in the water	
PS74/339-1	11.09.09	01:33	74° 37,03' N	11° 18,11' W	3074	SSW 13	195	0,1	Heat Flow	HF	action	Winde gestoppt 2900 m
PS74/339-1	11.09.09	01:34	74° 37,02' N	11° 18,12' W	3071	SSW 13	314,3	0,1	Heat Flow	HF	lowering	
PS74/339-1	11.09.09	01:36	74° 37,02' N	11° 18,11' W	3073	SSW 13	101,3	0,1	Heat Flow	HF	on ground/max depth	3020 m, GE 72.1
PS74/339-1	11.09.09	01:44	74° 37,02' N	11° 18,01' W	3072	SSW 12	87,7	0,2	Heat Flow	HF	hoisting	
PS74/339-1	11.09.09	01:47	74° 37,02' N	11° 17,97' W	3073	SSW 12	17,5	0,1	Heat Flow	HF	action	Winde gestoppt 2975 m
PS74/339-1	11.09.09	01:49	74° 37,03' N	11° 17,96' W	3071	SSW 13	121,5	0,2	Heat Flow	HF	lowering	
PS74/339-1	11.09.09	01:50	74° 37,03' N	11° 17,95' W	3072	SSW 12	298,3	0,1	Heat Flow	HF	on ground/max depth	3020 m, GE 72.1

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/339-1	11.09.09	02:00	74° 37,03' N	11° 17,99' W	3072	SSW 13	185,5	0,1	Heat Flow	HF	hoisting	
PS74/339-1	11.09.09	02:02	74° 37,03' N	11° 18,00' W	3073	SSW 12	297,8	0,1	Heat Flow	HF	off ground	
PS74/339-1	11.09.09	02:56	74° 37,07' N	11° 18,04' W	3072	SSW 14	200,7	0,2	Heat Flow	HF	at surface	
PS74/339-1	11.09.09	03:02	74° 37,06' N	11° 18,10' W	3072	SSW 14	325,1	0,2	Heat Flow	HF	on deck	
PS74/340-1	11.09.09	04:46	74° 45,06' N	12° 20,06' W	2116	SSW 18	7,5	0,2	Heat Flow	HF	in the water	
PS74/340-1	11.09.09	05:20	74° 45,05' N	12° 20,19' W	2116	S 17	52,4	0,6	Heat Flow	HF	action	gestoppt 2000m
PS74/340-1	11.09.09	05:21	74° 45,05' N	12° 20,18' W	2116	S 17	190,1	0,5	Heat Flow	HF	lowering	
PS74/340-1	11.09.09	05:22	74° 45,06' N	12° 20,17' W	2115	S 14	320,5	0,3	Heat Flow	HF	on ground/max depth	im Boden GE72.1 2070m
PS74/340-1	11.09.09	05:32	74° 45,06' N	12° 20,01' W	2116	S 17	98	0,9	Heat Flow	HF	hoisting	
PS74/340-1	11.09.09	05:34	74° 45,06' N	12° 19,98' W	2118	S 16	190,8	0,4	Heat Flow	HF	action	gestoppt
PS74/340-1	11.09.09	05:37	74° 45,05' N	12° 19,95' W	2116	S 15	211,9	0,6	Heat Flow	HF	on ground/max depth	im Boden 2071m
PS74/340-1	11.09.09	05:46	74° 45,04' N	12° 19,94' W	2120	S 16	234,4	0,6	Heat Flow	HF	hoisting	
PS74/340-1	11.09.09	06:14	74° 45,03' N	12° 20,05' W	2117	S 18	312,3	0,2	Heat Flow	HF	action	gestoppt, einzelne Draehte gerissen, aufkuerzen
PS74/340-1	11.09.09	06:45	74° 44,93' N	12° 20,33' W	2117	SSW 18	328	0,8	Heat Flow	HF	hoisting	
PS74/340-1	11.09.09	07:00	74° 44,97' N	12° 20,24' W	2117	S 17	18,8	0,7	Heat Flow	HF	on deck	
PS74/341-1	11.09.09	07:59	74° 48,49' N	12° 47,74' W	1399	S 16	11,3	0	Heat Flow	HF	in the water	
PS74/341-1	11.09.09	08:28	74° 48,48' N	12° 47,92' W	1395	SSW 19	307,7	0,7	Heat Flow	HF	action	Winde gestoppt, auspendeln
PS74/341-1	11.09.09	08:35	74° 48,44' N	12° 48,03' W	1399	S 18	267,1	0,2	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 1370 m
PS74/341-1	11.09.09	08:43	74° 48,40' N	12° 48,06' W	1402	S 17	232,8	0,5	Heat Flow	HF	hoisting	
PS74/341-1	11.09.09	08:48	74° 48,41' N	12° 48,10' W	1399	S 18	135,1	0,8	Heat Flow	HF	on ground/max depth	Lanze im Boden, Ge72.1 3170 m
PS74/341-1	11.09.09	08:56	74° 48,40' N	12° 48,10' W	1401	S 17	132,4	0,5	Heat Flow	HF	hoisting	
PS74/341-1	11.09.09	09:46	74° 48,08' N	12° 48,21' W	1429	S 17	278,6	0,5	Heat Flow	HF	at surface	
PS74/341-1	11.09.09	09:47	74° 48,08' N	12° 48,21' W	1429	S 18	139,3	0,4	Heat Flow	HF	on deck	
PS74/342-1	11.09.09	11:26	74° 54,00' N	13° 37,22' W	332	SSW 13	248,5	0,3	Heat Flow	HF	in the water	
PS74/342-1	11.09.09	11:30	74° 53,99' N	13° 37,20' W	222,7	SSW 12	75	0,4	Heat Flow	HF	action	Winde gestoppt, auspendeln
PS74/342-1	11.09.09	11:46	74° 53,90' N	13° 37,37' W	222,2	SSW 12	2	0,7	Heat Flow	HF	on ground/max depth	Abbruch
PS74/342-1	11.09.09	11:46	74° 53,90' N	13° 37,37' W	222,2	SSW 12	2	0,7	Heat Flow	HF	hoisting	
PS74/342-1	11.09.09	11:51	74° 53,93' N	13° 37,32' W	222,2	SSW 13	8	0,5	Heat Flow	HF	at surface	
PS74/342-1	11.09.09	11:53	74° 53,94' N	13° 37,27' W	222,9	SSW 12	41	0,9	Heat Flow	HF	on deck	
PS74/343-1	11.09.09	21:39	73° 29,71' N	14° 0,40' W	2504	NNE 5	192,7	2,5	Seismic reflection profile	SEISREFL	in the water	600 m Streamer
PS74/343-1	11.09.09	21:55	73° 28,54' N	14° 1,71' W	2505	N 7	223,8	4,2	Seismic reflection profile	SEISREFL	in the water	Kannongestell zu Wasser
PS74/343-1	11.09.09	22:00	73° 28,27' N	14° 2,76' W	2500	NNE 6	198,7	4,6	Seismic reflection profile	SEISREFL	profile start	erster Schuss
PS74/343-1	12.09.09	03:56	72° 59,98' N	14° 28,32' W	2447	NE 6	95	4,9	Seismic reflection profile	SEISREFL	alter course	Kurs 90
PS74/343-1	12.09.09	05:30	72° 59,98' N	14° 0,78' W	2549	NE 6	88,3	4,9	Seismic reflection profile	SEISREFL	alter course	Kurs 16
PS74/343-1	12.09.09	11:34	73° 29,66' N	13° 30,26' W	2632	NE 4	17,3	5,2	Seismic reflection profile	SEISREFL	alter course	Kurs auf 90 Grad
PS74/343-1	12.09.09	13:20	73° 29,59' N	13° 0,47' W	2710	NE 2	187,6	5	Seismic reflection profile	SEISREFL	alter course	Kurs 196
PS74/343-1	12.09.09	17:12	73° 10,58' N	13° 19,52' W	2689	E 6	195,8	4,9	Seismic reflection profile	SEISREFL	alter course	Kurs 270
PS74/343-1	12.09.09	22:44	73° 9,93' N	14° 59,96' W	2338	E 10	273,1	5,4	Seismic reflection profile	SEISREFL	profile end	letzter Messschuss
PS74/343-1	12.09.09	23:11	73° 10,40' N	14° 59,48' W	2337	ENE 11	71,7	3,6	Seismic reflection profile	SEISREFL	on deck	Streamer
PS74/343-1	12.09.09	23:15	73° 10,48' N	14° 58,69' W	2341	E 11	72,6	3,3	Seismic reflection profile	SEISREFL	on deck	Kannonengestell
PS74/344-1	13.09.09	06:02	72° 0,34' N	16° 0,58' W	1439	NW 1	224,5	3,3	Seismic reflection profile	SEISREFL	in the water	3000m streamer
PS74/344-1	13.09.09	06:11	71° 59,88' N	16° 2,14' W	1450	W 1	259,5	3,4	Seismic reflection profile	SEISREFL	on ground/max depth	
PS74/344-1	13.09.09	07:19	72° 1,44' N	16° 9,90' W	1499	WSW 3	276,1	2	Seismic reflection profile	SEISREFL	profile start	
PS74/344-1	13.09.09	07:19	72° 1,44' N	16° 9,90' W	1499	WSW 3	276,1	2	Seismic reflection profile	SEISREFL	profile end	
PS74/344-1	13.09.09	07:20	72° 1,45' N	16° 10,01' W	1500	WSW 3	273	2,6	Seismic reflection profile	SEISREFL	on deck	
PS74/345-1	13.09.09	21:20	72° 3,83' N	16° 19,92' W	1574	NNE 7	299,9	4,4	Seismic reflection profile	SEISREFL	in the water	Streamer
PS74/345-1	13.09.09	21:47	72° 4,99' N	16° 25,14' W	1623	NE 5	318,4	4,1	Seismic reflection profile	SEISREFL	in the water	Kannonengestell
PS74/345-1	13.09.09	21:54	72° 5,45' N	16° 26,45' W	1636	NE 6	305,3	5,1	Seismic reflection profile	SEISREFL	profile start	erster Schuss
PS74/345-1	14.09.09	12:18	72° 45,86' N	20° 4,29' W	200,2	NNE 8	301,7	5,2	Seismic reflection profile	SEISREFL	profile end	
PS74/345-1	14.09.09	13:14	72° 44,38' N	20° 1,03' W	199,9	NNE 10	35,1	4,9	Seismic reflection profile	SEISREFL	profile start	
PS74/345-1	14.09.09	21:45	73° 18,12' N	18° 34,81' W	199,9	NNE 23	40,1	5,4	Seismic reflection profile	SEISREFL	profile end	
PS74/345-1	14.09.09	23:15	73° 19,07' N	18° 40,45' W	194,2	NNE 22	140,2	4,2	Seismic reflection profile	SEISREFL	profile start	
PS74/345-1	15.09.09	04:19	73° 10,03' N	17° 30,43' W	316,4	N 20	120,4	4,1	Seismic reflection profile	SEISREFL	profile end	
PS74/345-1	15.09.09	06:05	73° 10,11' N	17° 30,96' W	310,8	N 21	205,3	5,2	Seismic reflection profile	SEISREFL	profile start	
PS74/345-1	15.09.09	07:10	73° 5,55' N	17° 40,30' W	303,2	N 22	215,8	4,9	Seismic reflection profile	SEISREFL	profile end	
PS74/345-1	15.09.09	09:34	73° 12,57' N	17° 41,11' W	292,1	N 20	299,9	3,4	Seismic reflection profile	SEISREFL	on deck	Streamer

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/345-1	15.09.09	09:41	73° 13,07' N	17° 41,47' W	276,7	N 19	344,5	5,3	Seismic reflection profile	SEISREFL	on deck	Kannonengestell
PS74/346-1	16.09.09	06:12	72° 22,09' N	24° 0,57' W	451,4	SW 3	91	1	Seismic reflection profile	SEISREFL	action	Beginn Aussetzen 3000m Streamer
PS74/346-1	16.09.09	07:43	72° 17,71' N	23° 43,79' W	238,6	WSW 2	129,7	5,2	Seismic reflection profile	SEISREFL	in the water	Streamer
PS74/346-1	16.09.09	07:48	72° 17,40' N	23° 42,70' W	230,8	WSW 1	133	5,5	Seismic reflection profile	SEISREFL	in the water	Kanonengestell
PS74/346-1	16.09.09	07:55	72° 17,02' N	23° 41,17' W	222,8	WSW 2	128,7	5,3	Seismic reflection profile	SEISREFL	profile start	
PS74/346-1	16.09.09	07:57	72° 16,90' N	23° 40,71' W	217,7	WSW 1	129,4	5,4	Seismic reflection profile	SEISREFL	action	erster Schuss
PS74/346-1	17.09.09	16:53	70° 34,38' N	16° 21,81' W	1100	E 12	126,7	5,2	Seismic reflection profile	SEISREFL	profile end	
PS74/346-1	17.09.09	16:56	70° 34,24' N	16° 21,16' W	1160	E 13	121,4	4,5	Seismic reflection profile	SEISREFL	hoisting	
PS74/346-1	17.09.09	18:29	70° 32,27' N	16° 6,37' W	1046	E 13	107,8	3	Seismic reflection profile	SEISREFL	on deck	Kanonengestell
PS74/347-1	18.09.09	00:15	70° 56,07' N	17° 54,09' W	1737	ENE 11	21,4	0,2	Heat Flow	HF	in the water	
PS74/347-1	18.09.09	00:40	70° 56,01' N	17° 53,76' W	1737	ENE 11	183,2	0,3	Heat Flow	HF	action	Winde gestoppt, 1600 m
PS74/347-1	18.09.09	00:50	70° 56,01' N	17° 53,80' W	1738	ENE 10	89,6	0,3	Heat Flow	HF	lowering	
PS74/347-1	18.09.09	00:52	70° 56,02' N	17° 53,82' W	1737	ENE 10	0,5	0,3	Heat Flow	HF	on ground/max depth	1700 m,GE 72.1
PS74/347-1	18.09.09	00:58	70° 56,02' N	17° 53,88' W	1736	ENE 10	203	0,3	Heat Flow	HF	hoisting	
PS74/347-1	18.09.09	01:02	70° 56,01' N	17° 53,89' W	1737	ENE 10	328,5	0,1	Heat Flow	HF	action	Winde gestoppt 1658 m
PS74/347-1	18.09.09	01:03	70° 56,01' N	17° 53,88' W	1737	ENE 10	102,2	0,2	Heat Flow	HF	lowering	
PS74/347-1	18.09.09	01:05	70° 56,01' N	17° 53,88' W	1736	ENE 10	214,7	0,1	Heat Flow	HF	on ground/max depth	1700 m, GE 72.1
PS74/347-1	18.09.09	01:11	70° 56,01' N	17° 53,88' W	1736	ENE 10	29,8	0,2	Heat Flow	HF	hoisting	
PS74/347-1	18.09.09	01:13	70° 56,01' N	17° 53,88' W	1736	ENE 10	209,9	0,1	Heat Flow	HF	off ground	
PS74/347-1	18.09.09	01:37	70° 56,03' N	17° 53,89' W	1735	ENE 9	52	0,3	Heat Flow	HF	at surface	
PS74/347-1	18.09.09	01:42	70° 56,05' N	17° 53,90' W	1736	ENE 10	347,5	0,4	Heat Flow	HF	on deck	
PS74/348-1	18.09.09	03:01	71° 0,58' N	18° 13,45' W	1722	ENE 9	115,9	0,2	Heat Flow	HF	in the water	
PS74/348-1	18.09.09	03:25	71° 0,62' N	18° 13,03' W	1724	ENE 9	93,1	0,1	Heat Flow	HF	action	Winde gestoppt, 1600 m
PS74/348-1	18.09.09	03:26	71° 0,62' N	18° 13,03' W	1720	ENE 9	273,3	0,1	Heat Flow	HF	lowering	
PS74/348-1	18.09.09	03:29	71° 0,62' N	18° 13,03' W	1719	ENE 8	111,9	0,1	Heat Flow	HF	on ground/max depth	1685 m, GE 72.1
PS74/348-1	18.09.09	03:35	71° 0,62' N	18° 12,98' W	1722	ENE 8	93,1	0,2	Heat Flow	HF	hoisting	
PS74/348-1	18.09.09	03:38	71° 0,62' N	18° 12,96' W	1722	ENE 8	73,5	0,2	Heat Flow	HF	action	Winde gestoppt, 1640 m
PS74/348-1	18.09.09	03:40	71° 0,62' N	18° 12,94' W	1723	ENE 8	63	0,2	Heat Flow	HF	lowering	
PS74/348-1	18.09.09	03:41	71° 0,63' N	18° 12,94' W	1722	ENE 8	12,3	0,1	Heat Flow	HF	on ground/max depth	1685 m, GE 72.1
PS74/348-1	18.09.09	03:47	71° 0,63' N	18° 12,88' W	1724	ENE 8	78,5	0,2	Heat Flow	HF	hoisting	
PS74/348-1	18.09.09	03:49	71° 0,63' N	18° 12,85' W	1722	ENE 8	91,8	0,2	Heat Flow	HF	off ground	
PS74/348-1	18.09.09	04:14	71° 0,67' N	18° 12,65' W	1724	ENE 7	21,2	0,6	Heat Flow	HF	at surface	
PS74/348-1	18.09.09	04:18	71° 0,67' N	18° 12,63' W	1722	ENE 6	281,3	0,8	Heat Flow	HF	on deck	
PS74/349-1	18.09.09	06:58	71° 10,99' N	19° 3,63' W	622,7	NNW 9	262,8	1,2	Heat Flow	HF	action	
PS74/349-1	18.09.09	07:10	71° 10,99' N	19° 4,18' W	599,7	NNW 9	292,7	1,4	Heat Flow	HF	on ground/max depth	im Boden, GE72.1 600m
PS74/349-1	18.09.09	07:16	71° 11,00' N	19° 4,34' W	593,5	NNW 9	288,9	1	Heat Flow	HF	action	im Boden 615m
PS74/349-1	18.09.09	07:18	71° 11,00' N	19° 4,37' W	592	NNW 9	246,3	0,6	Heat Flow	HF	action	im Boden 625m
PS74/349-1	18.09.09	07:21	71° 11,00' N	19° 4,40' W	591,4	NNW 10	323,4	0,4	Heat Flow	HF	hoisting	
PS74/349-1	18.09.09	07:23	71° 11,01' N	19° 4,42' W	589,7	NNW 10	302,2	0,5	Heat Flow	HF	off ground	
PS74/349-1	18.09.09	07:34	71° 11,08' N	19° 4,53' W	585,8	NNW 10	357	0,1	Heat Flow	HF	at surface	
PS74/349-1	18.09.09	07:37	71° 11,08' N	19° 4,54' W	585,6	NNW 10	177,3	0,7	Heat Flow	HF	on deck	
PS74/350-1	18.09.09	11:33	70° 41,91' N	16° 53,47' W	1508	WSW 12	120,6	0,6	Heat Flow	HF	in the water	
PS74/350-1	18.09.09	11:55	70° 41,88' N	16° 53,44' W	1503	W 11	280,9	0,5	Heat Flow	HF	action	Winde gestoppt,auspendeln
PS74/350-1	18.09.09	11:57	70° 41,87' N	16° 53,48' W	1504	WSW 10	267,4	0,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 1475m
PS74/350-1	18.09.09	12:05	70° 41,87' N	16° 53,42' W	1503	WSW 12	72,4	0,2	Heat Flow	HF	hoisting	
PS74/350-1	18.09.09	12:08	70° 41,87' N	16° 53,37' W	1501	WSW 12	172,3	0,2	Heat Flow	HF	action	Winde gestoppt, 1427 m
PS74/350-1	18.09.09	12:09	70° 41,87' N	16° 53,36' W	1498	W 12	98,5	0,2	Heat Flow	HF	lowering	
PS74/350-1	18.09.09	12:10	70° 41,87' N	16° 53,34' W	1499	W 12	127,9	0,3	Heat Flow	HF	on ground/max depth	1475 m, GE72.1
PS74/350-1	18.09.09	12:17	70° 41,85' N	16° 53,29' W	1496	W 12	51,1	0,2	Heat Flow	HF	hoisting	
PS74/350-1	18.09.09	12:19	70° 41,84' N	16° 53,29' W	1494	W 12	198,7	0,2	Heat Flow	HF	off ground	
PS74/350-1	18.09.09	12:40	70° 41,79' N	16° 53,42' W	1499	W 13	274,7	0,2	Heat Flow	HF	at surface	
PS74/350-1	18.09.09	12:45	70° 41,81' N	16° 53,40' W	1503	W 13	38,3	0,3	Heat Flow	HF	on deck	
PS74/351-1	18.09.09	13:36	70° 45,78' N	17° 9,69' W	1662	W 14	103,1	0,2	Heat Flow	HF	in the water	
PS74/351-1	18.09.09	14:00	70° 45,74' N	17° 9,65' W	1661	W 13	225,3	0,2	Heat Flow	HF	action	Winde gestoppt, 1550m
PS74/351-1	18.09.09	14:01	70° 45,74' N	17° 9,65' W	1662	W 16	157,6	0,2	Heat Flow	HF	lowering	
PS74/351-1	18.09.09	14:04	70° 45,72' N	17° 9,62' W	1666	W 14	190,3	0,3	Heat Flow	HF	on ground/max depth	1632m, GE 72.1

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/351-1	18.09.09	14:10	70° 45,71' N	17° 9,62' W	1665	WNW 13	230,4	0,1	Heat Flow	HF	hoisting	
PS74/351-1	18.09.09	14:13	70° 45,71' N	17° 9,64' W	1665	WNW 15	3,3	0,1	Heat Flow	HF	action	Winde gestoppt, 1590m
PS74/351-1	18.09.09	14:14	70° 45,71' N	17° 9,65' W	1663	WNW 14	270,1	0,2	Heat Flow	HF	lowering	
PS74/351-1	18.09.09	14:15	70° 45,71' N	17° 9,65' W	1667	W 14	6,5	0,2	Heat Flow	HF	on ground/max depth	1632m, GE 72.1
PS74/351-1	18.09.09	14:20	70° 45,72' N	17° 9,62' W	1666	WNW 15	185,5	0,2	Heat Flow	HF	hoisting	
PS74/351-1	18.09.09	14:23	70° 45,71' N	17° 9,60' W	1665	W 15	79,5	0,1	Heat Flow	HF	off ground	
PS74/351-1	18.09.09	14:46	70° 45,74' N	17° 9,72' W	1659	W 15	246,3	0,3	Heat Flow	HF	at surface	
PS74/351-1	18.09.09	14:51	70° 45,76' N	17° 9,84' W	1659	W 15	6,3	0,2	Heat Flow	HF	on deck	
PS74/351-2	18.09.09	15:12	70° 46,86' N	17° 14,30' W	1709	W 13	150,3	0,2	CTD/rosette water sampler	CTD/RO	in the water	
PS74/351-2	18.09.09	15:39	70° 46,73' N	17° 14,36' W	1709	WNW 14	329,2	0,2	CTD/rosette water sampler	CTD/RO	on ground/max depth	1300 m, SE 32.1
PS74/351-2	18.09.09	16:05	70° 46,72' N	17° 14,22' W	1709	WNW 14	279,5	1,5	CTD/rosette water sampler	CTD/RO	on deck	
PS74/351-3	18.09.09	16:43	70° 46,79' N	17° 14,18' W	1707	W 14	289,1	0,9	Ocean bottom seismometer	OBS	action	Hydrophon zu Wasser
PS74/351-3	18.09.09	16:47	70° 46,78' N	17° 14,20' W	1709	W 12	145,1	0,8	Ocean bottom seismometer	OBS	action	ausgeloest
PS74/351-3	18.09.09	17:13	70° 46,69' N	17° 14,24' W	1708	WNW 13	224	0,7	Ocean bottom seismometer	OBS	action	Hydrophon an Deck
PS74/351-3	18.09.09	17:42	70° 46,83' N	17° 14,04' W	1781	W 12	39,6	4,2	Ocean bottom seismometer	OBS	action	nicht aufgetaucht
PS74/351-3	18.09.09	17:42	70° 46,83' N	17° 14,04' W	1781	W 12	39,6	4,2	Ocean bottom seismometer	OBS	on ground/max depth	nu fuers System
PS74/351-3	18.09.09	17:42	70° 46,83' N	17° 14,04' W	1781	W 12	39,6	4,2	Ocean bottom seismometer	OBS	on deck	nur fuers System
PS74/352-1	18.09.09	19:54	70° 32,42' N	16° 15,95' W	1233	W 9	189,3	0,4	Heat Flow	HF	in the water	
PS74/352-1	18.09.09	20:15	70° 32,33' N	16° 16,03' W	1237	W 9	82	0,3	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 1211m
PS74/352-1	18.09.09	20:25	70° 32,31' N	16° 16,14' W	1236	W 8	241,3	0,9	Heat Flow	HF	hoisting	
PS74/352-1	18.09.09	20:28	70° 32,30' N	16° 16,22' W	1235	W 8	268,4	0,7	Heat Flow	HF	action	Winde gestoppt, auspendeln
PS74/352-1	18.09.09	20:28	70° 32,30' N	16° 16,22' W	1235	W 8	268,4	0,7	Heat Flow	HF	lowering	
PS74/352-1	18.09.09	20:29	70° 32,30' N	16° 16,24' W	1236	WNW 8	270,9	1,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, Ge72.1 1210m
PS74/352-1	18.09.09	20:37	70° 32,30' N	16° 16,33' W	1236	W 8	68,5	0,4	Heat Flow	HF	hoisting	
PS74/352-1	18.09.09	20:40	70° 32,29' N	16° 16,33' W	1238	W 6	58,3	0,9	Heat Flow	HF	off ground	
PS74/352-1	18.09.09	20:57	70° 32,26' N	16° 16,43' W	1235	WNW 8	264,4	0,7	Heat Flow	HF	at surface	
PS74/352-1	18.09.09	21:00	70° 32,25' N	16° 16,45' W	1240	WNW 8	234,1	1,5	Heat Flow	HF	on deck	
PS74/353-1	18.09.09	22:09	70° 27,95' N	15° 55,77' W	1206	W 6	16,9	1,3	Heat Flow	HF	in the water	
PS74/353-1	18.09.09	22:29	70° 27,95' N	15° 55,90' W	1209	W 6	174,1	0,8	Heat Flow	HF	on ground/max depth	Lanze im Boden, GE72.1 1180 m
PS74/353-1	18.09.09	22:37	70° 27,94' N	15° 55,87' W	1210	WNW 5	234,3	0,6	Heat Flow	HF	hoisting	
PS74/353-1	18.09.09	22:39	70° 27,93' N	15° 55,86' W	1211	W 6	199,7	1	Heat Flow	HF	action	Winde gestoppt, auspendeln
PS74/353-1	18.09.09	22:40	70° 27,93' N	15° 55,86' W	1208	W 6	280,4	0,1	Heat Flow	HF	on ground/max depth	Lanze im Boden, Ge72.1 1181 m
PS74/353-1	18.09.09	22:49	70° 27,91' N	15° 55,90' W	1208	W 7	63	0,4	Heat Flow	HF	hoisting	
PS74/353-1	18.09.09	23:08	70° 27,86' N	15° 55,74' W	1202	NNW 6	184,5	0,5	Heat Flow	HF	at surface	
PS74/353-1	18.09.09	23:12	70° 27,85' N	15° 55,73' W	1204	WNW 5	127,8	0,6	Heat Flow	HF	on deck	
PS74/354-1	19.09.09	00:13	70° 23,31' N	15° 35,35' W	1028	W 4	228,2	0,1	Heat Flow	HF	in the water	
PS74/354-1	19.09.09	00:27	70° 23,31' N	15° 35,59' W	1031	W 4	311,2	0,2	Heat Flow	HF	action	Winde gestoppt, 900 m
PS74/354-1	19.09.09	00:28	70° 23,31' N	15° 35,61' W	1031	W 4	331,3	0,2	Heat Flow	HF	lowering	
PS74/354-1	19.09.09	00:31	70° 23,31' N	15° 35,66' W	1032	W 3	294,6	0,1	Heat Flow	HF	on ground/max depth	1015 m, GE 72.1
PS74/354-1	19.09.09	00:37	70° 23,29' N	15° 35,59' W	1030	W 4	71,5	0,2	Heat Flow	HF	hoisting	
PS74/354-1	19.09.09	00:40	70° 23,28' N	15° 35,55' W	1030	W 3	132,6	0,3	Heat Flow	HF	action	Winde gestoppt, 970 m
PS74/354-1	19.09.09	00:41	70° 23,27' N	15° 35,54' W	1032	W 3	191,4	0,2	Heat Flow	HF	lowering	
PS74/354-1	19.09.09	00:42	70° 23,27' N	15° 35,54' W	1032	W 3	59,8	0,1	Heat Flow	HF	on ground/max depth	1010 m, GE 72.1
PS74/354-1	19.09.09	00:48	70° 23,27' N	15° 35,55' W	1032	W 3	264,8	0,1	Heat Flow	HF	hoisting	
PS74/354-1	19.09.09	00:50	70° 23,28' N	15° 35,59' W	1031	WNW 3	350,1	0,2	Heat Flow	HF	off ground	
PS74/354-1	19.09.09	01:04	70° 23,28' N	15° 35,62' W	1030	W 3	98,6	0,2	Heat Flow	HF	at surface	
PS74/354-1	19.09.09	01:08	70° 23,27' N	15° 35,59' W	1032	W 3	116,1	0,2	Heat Flow	HF	on deck	
PS74/355-1	19.09.09	03:24	70° 13,57' N	14° 59,63' W	1171	NNW 2	219,9	0,2	Heat Flow	HF	in the water	
PS74/355-1	19.09.09	03:40	70° 13,52' N	14° 59,81' W	1164	NNW 2	239,2	0,2	Heat Flow	HF	action	Winde gestoppt, 1050 m
PS74/355-1	19.09.09	03:41	70° 13,52' N	14° 59,81' W	1166	NNW 3	246,5	0,2	Heat Flow	HF	lowering	
PS74/355-1	19.09.09	03:42	70° 13,52' N	14° 59,82' W	1164	NW 3	236	0,1	Heat Flow	HF	on ground/max depth	1160 m, GE 72.1
PS74/355-1	19.09.09	03:47	70° 13,52' N	14° 59,82' W	1165	N 3	312,7	0,2	Heat Flow	HF	hoisting	
PS74/355-1	19.09.09	03:50	70° 13,52' N	14° 59,83' W	1165	N 3	28,4	0,2	Heat Flow	HF	action	Winde gestoppt, 1095 m
PS74/355-1	19.09.09	03:51	70° 13,52' N	14° 59,83' W	1163	NNW 2	53,6	0,1	Heat Flow	HF	lowering	
PS74/355-1	19.09.09	03:52	70° 13,53' N	14° 59,83' W	1163	N 2	268,8	0	Heat Flow	HF	on ground/max depth	1140 m, GE 72.1
PS74/355-1	19.09.09	03:58	70° 13,53' N	14° 59,85' W	1164	NNW 3	278,4	0,1	Heat Flow	HF	hoisting	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/355-1	19.09.09	04:00	70° 13,53' N	14° 59,85' W	1166	NNW 3	235,5	0	Heat Flow	HF	off ground	
PS74/355-1	19.09.09	04:18	70° 13,53' N	14° 59,85' W	1166	N 3	55,7	0,5	Heat Flow	HF	at surface	
PS74/355-1	19.09.09	04:22	70° 13,51' N	14° 59,83' W	1164	NNW 3	127,3	0,7	Heat Flow	HF	on deck	
PS74/356-1	19.09.09	05:46	70° 9,28' N	14° 38,97' W	1303	N 3	101,7	0,7	Heat Flow	HF	in the water	
PS74/356-1	19.09.09	06:08	70° 9,17' N	14° 38,58' W	1305	N 3	86,7	0,8	Heat Flow	HF	on ground/max depth	im Boden GE72.1 1280m
PS74/356-1	19.09.09	06:16	70° 9,16' N	14° 38,62' W	1304	NNE 3	185,2	0,4	Heat Flow	HF	hoisting	
PS74/356-1	19.09.09	06:19	70° 9,14' N	14° 38,63' W	1304	NNE 3	169	0,6	Heat Flow	HF	off ground	
PS74/356-1	19.09.09	06:19	70° 9,14' N	14° 38,63' W	1304	NNE 3	169	0,6	Heat Flow	HF	lowering	
PS74/356-1	19.09.09	06:21	70° 9,14' N	14° 38,62' W	1307	NNE 3	97,3	1,1	Heat Flow	HF	on ground/max depth	im Boden GE72.1 1280m
PS74/356-1	19.09.09	06:27	70° 9,15' N	14° 38,56' W	1306	N 2	74,4	0,7	Heat Flow	HF	hoisting	
PS74/356-1	19.09.09	06:29	70° 9,16' N	14° 38,57' W	1306	N 3	326,3	0,2	Heat Flow	HF	off ground	
PS74/356-1	19.09.09	06:50	70° 9,06' N	14° 38,38' W	1301	N 3	127,1	0,3	Heat Flow	HF	at surface	
PS74/356-1	19.09.09	06:55	70° 9,03' N	14° 38,31' W	1290	N 3	171,2	0,7	Heat Flow	HF	on deck	
PS74/357-1	19.09.09	07:59	70° 4,61' N	14° 19,16' W	1365	NNE 4	271,7	0,8	Heat Flow	HF	in the water	
PS74/357-1	19.09.09	08:18	70° 4,64' N	14° 19,10' W	1366	NNE 4	36,1	0,9	Heat Flow	HF	action	1200 m gestoppt, auspendeln
PS74/357-1	19.09.09	08:18	70° 4,64' N	14° 19,10' W	1366	NNE 4	36,1	0,9	Heat Flow	HF	lowering	
PS74/357-1	19.09.09	08:22	70° 4,66' N	14° 19,09' W	1365	NNE 4	34,9	0,5	Heat Flow	HF	on ground/max depth	GE72.1, 1340 m
PS74/357-1	19.09.09	08:29	70° 4,67' N	14° 19,08' W	1365	N 4	214,1	0,5	Heat Flow	HF	hoisting	
PS74/357-1	19.09.09	08:32	70° 4,67' N	14° 19,07' W	1365	N 4	25,7	0,3	Heat Flow	HF	action	1300 m, gestoppt
PS74/357-1	19.09.09	08:33	70° 4,68' N	14° 19,06' W	1366	NNE 4	341,1	0,2	Heat Flow	HF	lowering	
PS74/357-1	19.09.09	08:34	70° 4,68' N	14° 19,05' W	1365	NNE 4	58,1	0,7	Heat Flow	HF	on ground/max depth	GE72.1 , 1340 m
PS74/357-1	19.09.09	08:41	70° 4,71' N	14° 19,03' W	1364	N 4	359,6	0,2	Heat Flow	HF	hoisting	
PS74/357-1	19.09.09	08:43	70° 4,72' N	14° 19,04' W	1366	N 4	70,1	1	Heat Flow	HF	off ground	
PS74/357-1	19.09.09	09:03	70° 4,74' N	14° 19,05' W	1365	N 4	45,1	0,3	Heat Flow	HF	at surface	
PS74/357-1	19.09.09	09:07	70° 4,76' N	14° 19,06' W	1364	NNE 4	349,8	0,4	Heat Flow	HF	on deck	
PS74/358-1	19.09.09	10:14	70° 0,03' N	14° 0,91' W	1617	N 4	44,2	0,5	Heat Flow	HF	in the water	
PS74/358-1	19.09.09	10:37	69° 59,99' N	14° 0,97' W	1620	N 4	277,2	1,4	Heat Flow	HF	action	1450 m , auspendeln
PS74/358-1	19.09.09	10:40	70° 0,00' N	14° 0,99' W	1619	N 4	41,3	0,5	Heat Flow	HF	on ground/max depth	GE72.1, 1585 m
PS74/358-1	19.09.09	10:49	70° 0,00' N	14° 0,98' W	1619	N 4	101,9	0,9	Heat Flow	HF	hoisting	
PS74/358-1	19.09.09	10:51	69° 59,99' N	14° 0,97' W	1620	N 4	104,3	0,6	Heat Flow	HF	action	1540 m, auspendeln
PS74/358-1	19.09.09	10:52	69° 59,99' N	14° 0,96' W	1617	N 4	229,4	0,6	Heat Flow	HF	lowering	
PS74/358-1	19.09.09	10:53	69° 59,99' N	14° 0,96' W	1619	N 4	68,3	1,7	Heat Flow	HF	on ground/max depth	GE72.1, 1585 m
PS74/358-1	19.09.09	11:02	69° 59,99' N	14° 0,97' W	1616	N 4	54,3	0,6	Heat Flow	HF	hoisting	
PS74/358-1	19.09.09	11:06	70° 0,01' N	14° 1,00' W	1619	N 4	38,9	1,1	Heat Flow	HF	off ground	
PS74/358-1	19.09.09	11:28	70° 0,02' N	14° 1,06' W	1619	N 4	143,8	0,4	Heat Flow	HF	at surface	
PS74/358-1	19.09.09	11:31	70° 0,02' N	14° 1,06' W	1619	N 4	242,1	1,1	Heat Flow	HF	on deck	
PS74/359-1	19.09.09	13:18	69° 48,23' N	13° 14,38' W	1607	N 6	52	0,4	Heat Flow	HF	in the water	
PS74/359-1	19.09.09	13:42	69° 48,30' N	13° 14,42' W	1610	N 7	54,8	0,3	Heat Flow	HF	action	Winde gestoppt, 1500 m
PS74/359-1	19.09.09	13:43	69° 48,30' N	13° 14,42' W	1610	N 7	1,1	0,2	Heat Flow	HF	lowering	
PS74/359-1	19.09.09	13:45	69° 48,30' N	13° 14,43' W	1609	N 7	76,5	0,2	Heat Flow	HF	on ground/max depth	1575 m, GE 72.1
PS74/359-1	19.09.09	13:50	69° 48,30' N	13° 14,46' W	1611	N 7	11,8	0,2	Heat Flow	HF	hoisting	
PS74/359-1	19.09.09	13:53	69° 48,30' N	13° 14,48' W	1610	N 7	269,5	0,2	Heat Flow	HF	action	Winde gestoppt, 1525 m
PS74/359-1	19.09.09	13:54	69° 48,30' N	13° 14,48' W	1608	N 7	271,2	0,2	Heat Flow	HF	lowering	
PS74/359-1	19.09.09	13:55	69° 48,31' N	13° 14,49' W	1610	N 7	1,6	0,1	Heat Flow	HF	on ground/max depth	1575 m, GE 72.1
PS74/359-1	19.09.09	14:01	69° 48,32' N	13° 14,52' W	1612	N 6	279,4	0,1	Heat Flow	HF	hoisting	
PS74/359-1	19.09.09	14:03	69° 48,32' N	13° 14,52' W	1610	N 7	302,1	0,1	Heat Flow	HF	off ground	
PS74/359-1	19.09.09	14:26	69° 48,32' N	13° 14,49' W	1609	NNW 7	90,1	0,2	Heat Flow	HF	at surface	
PS74/359-1	19.09.09	14:30	69° 48,29' N	13° 14,37' W	1608	NNW 7	149,3	0,4	Heat Flow	HF	on deck	
PS74/360-1	19.09.09	16:21	69° 36,96' N	12° 27,43' W	1877	N 8	174,9	0,4	Heat Flow	HF	in the water	
PS74/360-1	19.09.09	16:52	69° 36,94' N	12° 27,28' W	1884	NNW 9	302,8	0,4	Heat Flow	HF	on ground/max depth	Im Boden GE72.1 1840m
PS74/360-1	19.09.09	17:00	69° 36,93' N	12° 27,27' W	1884	NNW 8	101,7	0,3	Heat Flow	HF	hoisting	
PS74/360-1	19.09.09	17:04	69° 36,93' N	12° 27,26' W	1883	NNW 8	267,9	0,2	Heat Flow	HF	action	gestoppt
PS74/360-1	19.09.09	17:05	69° 36,93' N	12° 27,25' W	1886	NNW 8	83,6	0,7	Heat Flow	HF	lowering	
PS74/360-1	19.09.09	17:06	69° 36,94' N	12° 27,25' W	1884	NNW 8	271,5	0,5	Heat Flow	HF	on ground/max depth	Im Boden GE72.1 1840m
PS74/360-1	19.09.09	17:18	69° 36,97' N	12° 27,21' W	1883	NNW 8	142,9	0,4	Heat Flow	HF	hoisting	
PS74/360-1	19.09.09	17:20	69° 36,96' N	12° 27,20' W	1885	NNW 8	239,2	0,6	Heat Flow	HF	off ground	

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Windstrength [m/s]	Course [°]	Speed [kn]	Gear	Gear Abbr.	Action	Comment
PS74/360-1	19.09.09	17:46	69° 36,92' N	12° 27,17' W	1886	NNW 8	137,3	0,4	Heat Flow	HF	at surface	
PS74/360-1	19.09.09	17:50	69° 36,90' N	12° 27,15' W	1886	NNW 9	132,9	1	Heat Flow	HF	on deck	
PS74/361-1	19.09.09	19:26	69° 48,41' N	13° 14,86' W	1616	NW 10	300,9	3,9	Seismic reflection profile	SEISREFL	action	Beginn Aussetzen
PS74/361-1	19.09.09	19:30	69° 48,56' N	13° 15,44' W	1624	NW 9	311,9	4,1	Seismic reflection profile	SEISREFL	in the water	Streamer 600m
PS74/361-1	19.09.09	19:40	69° 49,14' N	13° 17,69' W	1613	NW 10	311,3	4,3	Seismic reflection profile	SEISREFL	in the water	Streamer komplett Ausgesteckt
PS74/361-1	19.09.09	19:44	69° 49,35' N	13° 18,26' W	1629	NW 9	339,8	4,3	Seismic reflection profile	SEISREFL	in the water	Kanonengestell
PS74/361-1	19.09.09	19:53	69° 49,81' N	13° 19,67' W	1709	NW 10	306,4	5,3	Seismic reflection profile	SEISREFL	profile start	erster Schuss
PS74/361-1	20.09.09	10:50	70° 36,99' N	16° 34,52' W	1573	N 9	341,2	4,4	Seismic reflection profile	SEISREFL	profile end	K
PS74/361-1	20.09.09	11:30	70° 39,33' N	16° 37,38' W	1563	NNE 9	333,7	2,3	Seismic reflection profile	SEISREFL	on deck	Streamer
PS74/361-1	20.09.09	11:35	70° 39,61' N	16° 37,70' W	1553	N 8	342,7	4,4	Seismic reflection profile	SEISREFL	on deck	Kanonnengestell
PS74/362-1	20.09.09	11:43	70° 40,32' N	16° 38,40' W	1432	N 9	340,6	7,7	Magnetic Turn Circle	MTC	profile start	
PS74/362-1	20.09.09	13:20	70° 40,24' N	16° 38,38' W	1423	NNE 9	352,4	7,7	Magnetic Turn Circle	MTC	on ground/max depth	
PS74/362-1	20.09.09	13:21	70° 40,34' N	16° 38,44' W	1437	NNE 9	348,3	7,8	Magnetic Turn Circle	MTC	profile end	
PS74/363-1	21.09.09	11:11	67° 29,91' N	6° 0,20' W	4579	SW 5	11,4	0,4	Heat Flow	HF	in the water	
PS74/363-1	21.09.09	11:17	67° 29,93' N	6° 0,22' W	3246,7	SW 5	240,9	0,7	Heat Flow	HF	action	gestoppt, keine Daten, 344 m
PS74/363-1	21.09.09	11:20	67° 29,93' N	6° 0,25' W	3255	SW 5	294,3	0,6	Heat Flow	HF	lowering	
PS74/363-1	21.09.09	11:59	67° 29,93' N	6° 0,20' W	3256	SW 6	29,3	0,7	Heat Flow	HF	action	Winde gestoppt, 3000 m
PS74/363-1	21.09.09	12:00	67° 29,93' N	6° 0,20' W	3257	SW 6	4,2	0,4	Heat Flow	HF	lowering	
PS74/363-1	21.09.09	12:05	67° 29,94' N	6° 0,19' W	3255	WSW 5	359	0	Heat Flow	HF	on ground/max depth	3215 m, GE 72.1
PS74/363-1	21.09.09	12:09	67° 29,93' N	6° 0,20' W	3258	WSW 6	152,4	0,2	Heat Flow	HF	hoisting	
PS74/363-1	21.09.09	12:13	67° 29,90' N	6° 0,20' W	3259	SW 6	143,3	0,2	Heat Flow	HF	action	Winde gestoppt, 3160 m
PS74/363-1	21.09.09	12:14	67° 29,89' N	6° 0,21' W	3255	SW 5	200,6	0,3	Heat Flow	HF	lowering	
PS74/363-1	21.09.09	12:15	67° 29,89' N	6° 0,21' W	3254	SW 5	306,3	0,1	Heat Flow	HF	on ground/max depth	3215 m, GE 72.1
PS74/363-1	21.09.09	12:20	67° 29,89' N	6° 0,20' W	3256	SW 6	1,4	0,3	Heat Flow	HF	hoisting	
PS74/363-1	21.09.09	12:23	67° 29,89' N	6° 0,18' W	3256	SW 5	88,9	0,1	Heat Flow	HF	off ground	
PS74/363-1	21.09.09	13:10	67° 29,91' N	5° 59,93' W	3261	WSW 6	79	0,6	Heat Flow	HF	at surface	
PS74/363-1	21.09.09	13:14	67° 29,91' N	5° 59,89' W	3262	WSW 5	314,7	0,3	Heat Flow	HF	on deck	
PS74/364-1	21.09.09	14:59	67° 18,02' N	5° 11,21' W	3686	SW 9	218,6	0,5	Heat Flow	HF	in the water	
PS74/364-1	21.09.09	15:52	67° 18,06' N	5° 11,20' W	3614	SW 9	331,1	0,1	Heat Flow	HF	action	Winde gestoppt, 3410 m
PS74/364-1	21.09.09	15:54	67° 18,06' N	5° 11,22' W	3614	SW 9	356,9	0,1	Heat Flow	HF	lowering	
PS74/364-1	21.09.09	15:57	67° 18,06' N	5° 11,25' W	3616	SW 9	261,5	0,4	Heat Flow	HF	on ground/max depth	3570 m, GE 72.1
PS74/364-1	21.09.09	16:03	67° 18,06' N	5° 11,32' W	3616	SW 9	21,1	0,7	Heat Flow	HF	hoisting	
PS74/364-1	21.09.09	16:06	67° 18,06' N	5° 11,33' W	3619	SW 9	273	1,1	Heat Flow	HF	lowering	
PS74/364-1	21.09.09	16:09	67° 18,06' N	5° 11,35' W	3619	SW 10	322,9	1,2	Heat Flow	HF	on ground/max depth	im Boden 3565m
PS74/364-1	21.09.09	16:15	67° 18,05' N	5° 11,34' W	3615	SW 9	214,7	0,5	Heat Flow	HF	hoisting	
PS74/364-1	21.09.09	16:17	67° 18,05' N	5° 11,34' W	3613	SW 8	321	0,6	Heat Flow	HF	off ground	
PS74/364-1	21.09.09	17:13	67° 17,94' N	5° 10,92' W	3620	WSW 11	88,1	0,2	Heat Flow	HF	at surface	
PS74/364-1	21.09.09	17:15	67° 17,94' N	5° 10,93' W	3617	SW 9	230,3	1,1	Heat Flow	HF	on deck	
PS74/365-1	21.09.09	18:38	67° 8,39' N	4° 32,35' W	189,5	SW 11	87,5	0,8	Heat Flow	HF	in the water	
PS74/365-1	21.09.09	19:39	67° 8,30' N	4° 32,34' W	3732	SW 10	2,2	1	Heat Flow	HF	on ground/max depth	im Boden GE 72.1 3685m
PS74/365-1	21.09.09	19:47	67° 8,31' N	4° 32,32' W	3732	SW 9	73,7	0,6	Heat Flow	HF	hoisting	
PS74/365-1	21.09.09	19:53	67° 8,32' N	4° 32,32' W	3732	SW 9	328,8	1,2	Heat Flow	HF	lowering	
PS74/365-1	21.09.09	19:55	67° 8,32' N	4° 32,33' W	3733	SW 9	11,1	1,3	Heat Flow	HF	on ground/max depth	3685 m, GE72.1
PS74/365-1	21.09.09	20:03	67° 8,33' N	4° 32,37' W	3731	SW 10	276,2	0,5	Heat Flow	HF	hoisting	
PS74/365-1	21.09.09	21:05	67° 8,17' N	4° 33,24' W	3734	SSW 10	6,6	0,8	Heat Flow	HF	at surface	
PS74/365-1	21.09.09	21:10	67° 8,14' N	4° 33,37' W	3732	SSW 10	256,2	1,5	Heat Flow	HF	on deck	