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Dr. John Mortensen

November 21. 2005

Cruise Report
Árni Friðriksson 08/2005

Ship:	RV Árni Friðriksson
Cruise:	A0805
Dates:	July 25th – August 8th 2005
Port Calls:	Reykjavík/Iceland
Institute:	ZMAW, Institut für Meereskunde, Universität Hamburg
Scientific crew:	14
Chief Scientist:	John Mortensen
Principal Project:	EU project ASOF-W (Arctic Subarctic Ocean Fluxes – West, for more information on the program see asof.npolar.no)
Research area:	North Atlantic: northern and western Irminger Sea
Working Time Zone:	UTC
Master:	Guðmundur Bjarnason

Scientific crew:

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Read, John	mooring	CEFAS
Needham, Neil	mooring	CEFAS
Marnela, Marika	CTD	FIMR
Provost, Paul. G., Dr.	HOMER	SAMS
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Research Program

The RV Árni Friðriksson A0805 cruise was conducted by the **ZMAW, Institut für Meereskunde, Universität Hamburg** with the main objective to collect observations in the overflow waters along the East Greenland continental slope and the freshwater on the shelf as part of the EU project ASOF-W (Arctic/Subarctic Ocean Fluxes – West). The main goal of ASOF is the development of an optimised measurement system for studies on the role of the Arctic region for global circulation. Decade-long time series are necessary to obtain the crucial information on the interplay of the atmosphere - ocean system which is not available yet. The cruise is a repeat of the cruises METEOR M39/5 in 1997, VALDIVIA 173 in 1998, METEOR M45/4 in 1999, POSEIDON 263 in 2000, METEOR M50/3 in 2001, POSEIDON 290 in 2002, METEOR M59/1 in 2003 and A.v. HUMBOLDT in 2004. The Árni Friðriksson cruise A0805 had the following aims:

1. to carry out hydrographic investigations in the overflow waters along the East Greenland continental slope and the freshwater on the shelf. The investigation included CTD-casts (a Sea-Bird 911 plus CTD, titanium, was used during the cruise).

2. recover 7 deep moorings (O1, F2, UK1, G1, UK2, G2 and O2), one HOMER (HOMER or HOMing Environmental Recorder) and one AQUALAB (a water sampler), on the East Greenland continental slope as part of the EU project ASOF-W. The later two are bottom mounted frame moorings.

3. deploy 5 deep moorings (F12, UK1, G1, UK2 and G2), one HOMER and one AQUALAB on the East Greenland continental slope.

4. service two Tube and two ADCP moorings (in Tube15, Tube16, ADCP15 and ADCP 16; out Tube20, Tube21, ADCP 20 and ADCP 21) on the East Greenland shelf as part of the EU project ASOF-W.

5. collect samples for analysis of CFCs (IUP HB).

6. collect continuous underway measurements of surface temperature and salinity.

Narrative of the cruise

The scientific parties from Germany, Finland and Great Britain all arrived according to schedule in Reykjavik, Iceland, in the afternoon and evening of Sunday July 24th. Monday morning, July 25th, scientific equipment arriving at the ship as piece of cargo and in containers was loaded. Only one piece of cargo didn´t turn up as planned and was tracked back to an airport in Germany where it was stocked. By some improvisation the lack of the missing parts was compensated by other means. The afternoon and evening were used to install equipment and make it sea safe.

RV Árni Friðriksson left the harbour pier of Reykjavik Monday evening, July 25th at 2000 UTC heading for the oil terminal. After bunkering at 0100 UTC Tuesday morning, July 26th, course was set for the EU ASOF-W section 3 and the first of nine moorings to be recovered along this section. The plan was to start recovery early morning Wednesday July 27th and continue recovery work all day until all moorings were on board. On leaving Reykjavik winds were light and the sea calm. In the early hours of Tuesday 26th and during the day the CTD system was tested and made ready for use.

The recovery of the first EU ASOF-W deep mooring O2-04 (Figure 1 and Figure 6) started on Wednesday morning July 27th at 0820 UTC. With ideal weather conditions for mooring work a good and clear contact was established with the releaser, and release code was given at 0829 UTC. After a few minutes of waiting it became clear that the mooring was not ascending towards the surface. An analysis of the build-in tilt meter of the releaser revealed that the releaser was lying on its side on the bottom. The remaining mooring located at 2755m depth was probably missing most of its buoyancy. Dredging for the mooring came into question but the idea was given up due to limited lengths of wire available for dredging. A trawl wire of less than 3000m was the longest available wire on board. The station was abandoned at 0855 UTC with the hope to return next year with appropriate dredging gear. The recovery of the second EU ASOF-W deep mooring G2-04 started at 1103 UTC. What happen just at the mooring before happened again: technicians' and cruise leaders' nightmare. As with the previous mooring a good and clear contact was established with the releaser, and release code was given and confirmed. But no ascent towards the surface was observed. No declination meter was build into this releaser so it could only be presumed that the releaser was lying on its side on the bottom. With bottom depth of 2579m dredging for the mooring was still out of question, making it necessary to wait for another cruise where enough dredging wire would be available. Both moorings were of IfM HH origin and the failed recoveries suggest that there exist serious material problems for this type of mooring configuration. The G2-04 mooring site was abandoned at 1206 UTC and course was set for the next of the remaining seven moorings to be recovered.

Luck now changed, so during the afternoon and evening all remaining seven moorings (UK2-04, G1-04, UK1-04, AQUALAB-04, HOMER, F2-04 and O1-04) were recovered without problems. The last instrument hit the deck at 0036 UTC Thursday July 28th in rapidly decreasing daylight. That the luck had turned was observed during the recovery of AQUALAB-04, where a whale sighting led us to the just surfaced mooring. After recovery of O1-04, course was set for the first of two EU ASOF-W freshwater mooring sites around 110 nm away (63°N, 41°W) on the East Greenland continental shelf. The two freshwater sites were both made up by a Tube mooring in combination with a bottom-mounted ADCP mooring. All four moorings were constructed to be recovered by dredging.

Dredging for ADCP-16 was started at 0958 UTC Thursday morning, July 28th, with ice of smaller size and amount covering the area. Only one attempt was needed and the ADCP was safely brought on board at 1031 UTC. One lead weight on the ADCP frame was lost during recovery. A later inspection of the ADCP frame revealed that corrosion of the attachment screws could explain the loss. Search for the nearby Tube-16 started at 1050 UTC. After three dredging attempts it became clear that something was wrong. Listening for the transponder on the Tube yielded no response signal, a sonar sweep of the area was also negative. During the search operation no Tube imprint on the echosounder was observed. The dredging was resumed after the sonar sweep with additional dredging hooks added. That stones of variable size were frequent on the seabed was clearly observed from the deformation of some of the added hooks. The search for Tube-16 was ended at 1729 UTC and course was set for ADCP-15.

Dredging for ADCP-15 was started at 1857 UTC Thursday evening, July 28th, and was hooked up in the first attempt. The ADCP frame was recovered but unfortunately the ADCP was gone. An inspection of the ADCP frame revealed a number of factors which could have led to the loss of the ADCP. Firstly, not all the gluing of the hard PVC pieces making up the frame was of an acceptable quality. Secondly, the frame and the ADCP didn´t fit each other perfectly from the start, which made it nearly impossible to merge the two units in a secure manner. Thirdly, a rocky bottom, dredging speed and duration played a role, as the PVC frame showed evidence of contacts with rocks and fractures in some of the glued joints. The recovery was ended at 1937 UTC and course was set for the last mooring to be recovered, Tube-15.

The recovery of Tube-15 was started at 1950 UTC in an area covered by many icebergs. However, icebergs had no limiting effect on the ongoing dredging work and weather was fine. So it was just a misfortune that this Tube was not recovered this evening. After four dredging attempts and listening for the transponder, search for Tube-15 was stopped at 2200 UTC. After a short steam the first CTD station of ASOF-W Section 4 was started at 2226 UTC Thursday evening, July 28th, in nice weather. The loss of moorings on this cruise highlighted the thought that though we may control their deployment it is within the gift of the ocean to allow us to recover them.

A passing low pressure system and a troublesome hydrographic wire made the CTD work along this section tiresome. Section 4 was completed Saturday afternoon July 30th in the deepest part of the section and course was set for Tube-16 where a second attempt to look for it was planned. Dredging for Tube-16 was started at 0500 UTC Sunday morning, July 31st. After four attempts, dredging was stopped at 0752 UTC and preparation for deployment of Tube-21 in the neighbourhood of Tube-16 was started. Tube-21 was deployed at 1016 UTC in strong winds and currents which were working against each other. Two hours later also ADCP-21 was deployed, using a new construction to minimize the risk of losing the ADCP during recovery. Course was now set for Tube-11 which had not been recovered as planned in 2004. After two attempts at dredging, work at Tube-11 was stopped at 1421 UTC and course was set for the shallowest CTD station planned on section 3.

CTD work commenced along ASOF-W Section 3 on Monday night August 1st at 0259 UTC starting in the shallowest part of the section. During the afternoon the sea increased and worsened additionally by swells arriving from several directions. Therefore, station work was postponed at 1642 UTC, and we were forced to wait for better conditions. Work along section 3 was first resumed at 0805 UTC Tuesday morning, August 2nd. With improving sea state and weather condition section 3 was finished on Wednesday night August 3rd at 0418 UTC. Course was now set for the first of seven planned moorings to be deployed this day along section 3.

The deployment of the first EU ASOF-W mooring G2-05 started on Wednesday morning August 3rd at 0858 UTC in ideal weather for mooring work. The first mooring was out 37 minutes later at 0935 UTC. During the morning we deployed mooring UK2-05. The afternoon began with the deployment of G1-05 at 1309 UTC, followed by UK1-05 and F12-05. The last mooring to be deployed this day was the AQAULAB as a malfunctioning pressure sensor postponed the deployment of HOMER to a later and more appropriate time. The lowering of the AQUALAB was started at 1733 UTC and the station was finished at 1926 UTC. Due to unfortunate circumstances during deployment the deploying/recovering line was lost. Therefore, a future recovery of AQUALAB requires that a zodiac be set into the water to attach new recovery lines. On request of the AQUALAB team a CTD station was occupied at the deployment site.

CTD work commenced along ASOF-W section 2 on Thursday morning August 4th at 0521 UTC in the deepest part of the section. Section 2 was finished on Friday night August 5th at 0105 UTC. The next ASOF-W section, section 1, was started on Friday morning August 5th at 0944 UTC in the shallowest part of the Greenland continental shelf. The planned northernmost station was located in a sea ice field of high concentration. With careful navigation we entered the ice field and came within 1nm of the planned position where a substitute CTD station was occupied (Figure 2). After the occupation of the northernmost CTD station, work continued along section 1 in ice-free waters and fine weather. The weather forecast had long predicted the arrival of a low pressure system with winds around 20m/s. At 0800 UTC Saturday morning, August 6th, the wind started to increase. Arriving at the third to last planned station of section 1, wind and waves had grown to a level where CTD-work was no longer advisable. Work along section 1 was stopped at 1905 UTC and course was set for Faxaflói station 9 35nm away. At this position the plan was to wait and see how weather developed. At 0500 UTC Sunday morning, August 7th, the condition was as if we had entered a winter storm with gusts around 30m/s. With no evidence of immediate improving conditions order was given to set course for Reykjavik 160nm away. 19 hours later RV Árni Friðriksson berthed in Reykjavik the night to Monday August 8th at 0030 UTC.

CTD (SBE 911plus CTD system) Sensor Status

Sensor	Serial no.	Calibration date
Temperature	4022	31.Mar. 2004
Conductivity	2433	08.Apr. 2004
Pressure	86555	17.Jul. 2001

For the control of the temperature and pressure SIS GmbH digital reversing thermometers and pressure sensor, RTM4002X and RPM6000X were applied. Additionally a Benthos Altimeter Model PSA-916D was mounted on the rosette.

Preliminary hydrographic results

The present, August 2005, salinity and potential temperature distribution along section 1 is shown in Figure 3. In the upper 700m to 1000m we find the Subpolar Mode Water (SPMW) which, since 1997, has become significantly warmer and saltier. Due to the low pressure passage near the end of the cruise, described above, we were not able to obtain information about the properties of the SPMW in a position where we could compared it with a long Icelandic time series. A comparison of the SPMW properties at section 1 with data obtained in July 2003, reveals that salinities and temperatures have not decreased. The properties in the southward flowing Irminger Current at the East Greenland continental break even shows an increasing tendency in salinity. The SPMW at the Icelandic shelf break in July 2003 was at the Icelandic standard station one of the warmest and the most saline ever observed since the start of the seasonal time series in 1971. Maximum salinities in the SPMW of section 1 were found over the Icelandic slope with value of 35.1845 at 149m depth with a corresponding potential temperature of 7.4485°C. For comparison the similar values in August 1997 were 35.1416, 72m and 7.9180°C.

To the south at section 4 off Cape Møsting in the Irminger Current we observed in July 2005 maximum salinities in the SPMW of 35.1236 at 117m depth. The corresponding potential temperature was 7.88°C. These salinity and temperature values are comparable and even higher than the maximum values reported by Blindheim (1968) for the period 1962 to 1964, this period being considered a warm and saline period for this region. In the Polar Water of the East Greenland Current near Cape Møsting minimum potential temperature was found at -0.6269°C at 103m depth with corresponding salinity of 33.4354. This value is an extreme value (in the lower end) compared with those presented by Blindheim (1968) for the period 1962 to 1964.

Below the SPMW in the deeper part of the section 1 a salinity minimum core of modified Labrador Sea Water (mLSW) centre around 1000m was observed (Figure 3). This LSW core is of recent origin and we use the term modified as a significant amount of ambient waters have mixed with the LSW during its transit to section 1. The next three water masses following the mLSW are given in the order of increasing depth: We have Reykjanes Ridge Water (RRW, observed as a salinity maximum, see below), the last very weak remnants of the LSW produced in the early 1990'es and, finally, modified Iceland-Scotland Overflow Water (mISOW). In some cases nearest to the bottom we found Denmark Strait Overflow Water (DSOW).

Over the East Greenland continental slope of section 1 the cold and relatively fresh DSOW was found in a bottom near layer below the 1000m isobath.

Since the start of the EU VEINS programme in 1997 there has been much speculation about whether waters of northern origin contributing to the DSOW take another path than through the generally accepted relatively narrow deeper part of the Denmark Strait. Rudels et al. (1999, 2002) argues that a lighter version of the DSOW is formed by dense waters passing the wide East Greenland shelf in Denmark Strait, later entering at depth south of Denmark Strait.

In a recent paper Pickart et al. (2005) even introduced the term East Greenland Spill Jet, about an intense, narrow current banked against the upper continental slope. They believe it to be the result of dense water cascading over the shelf edge and entraining ambient water. Based on few data, only one section, where essential findings are highly based on extrapolated values, Pickart et al. introduce the so-called East Greenland Spill Jet. They even state in the introduction, citation "In some ways this is akin to the sinking of dense water through Denmark Strait itself. However, the cascading shelf water is not as dense as the Denmark Strait overflow water (Rudels et al. 1999)". We now wonder if the Denmark Strait Overflow plume also should be referred to as the East Greenland Spill Jet. The chief scientist is of the opinion that a new current should be introduced with care. However, Pickart et al. (2005) in a single paper introduce three to four new current names in a limited area.

During the August 2005 occupation of section 1 which is found in the neighbourhood of the section used by Pickart et al. there were no hydrographic signs of a spill jet. The upper continental slope was occupied by SPMW in August 2005. However, we notice that a lens of dense bottom water was located on the East Greenland Shelf (Figure 4) which, in an unmixed state, easily could contribute to the dense DSOW.

That dense shelf water crosses the shelf break south of the sill and adds to the DSOW in some way seems to be well established with the EU VEINS and EU ASOF-W observations. However, the routes/paths taken by the dense shelf water from the north to the south of Denmark Strait are still unknown. Also, as indicated above, the East Greenland Spill Jet introduced by Pickart et al. (2005) is highly questionable. We hope that an ongoing or near future research program will shed light on these issues.

As already mentioned above, the hydrographic conditions have changed considerably since the first occupation of the EU ASOF-W hydrographic sections in August 1997, at that time the EU VEINS programme. We have here used section 2 to give an impression of which variations have taken place, Figure 5. At all depth levels outside the Denmark Strait Overflow layer the trend is towards both higher temperatures and salinities. There are two likely explanations for the observed increase: firstly, the inflowing SPMW has become warmer and more saline, occupying even a greater volume than previously. Secondly, the previously so voluminous cold and fresh LSW produced in the 1990'es is now hardly distinguishable in the northern part of the Irminger Sea. The LSW is being replaced to some extent by RRW. The initial source of the RRW is a mixture of SPMW and ISOW found south of Iceland which during its transit around the Reykjanes Ridge is further modified by mixing with ambient waters, therefore the name RRW.

The water mass which surprisingly showed the smallest changes during the eight years was the densest part of the DSOW, an observation which was made earlier by Mann (1969).

ASOF Moorings

One of the tasks of Árni Friðriksson A08/05 was to service the long-term moorings on the shelf and slope off SE Greenland, part of the EU ASOF-W project (Figure 6). The first deployment of the Angmagssalik Current Meter Array was in 1986 (for location see Figure 1) and there has been a continuous presence since 1996. Over time the Array has grown into 8 current meter moorings. This array is designed to measure the transport of overflow from the Denmark Strait. At this point on its pathway to the Labrador Sea the overflow core has descended to about 2000m. The use of moored CTDs (SBE16 and SBE37) in the Array has increased considerably during recent years (Figure 7). The focus of these measurements has changed from being a near bottom point measurement to measuring horizontal structure and finally ending up also including measurements of the vertical structure of the overflow. Figure 8 shows the longest salinity records yet recovered from near-bottom depths (ca. 20m above bottom) in the core of the Denmark Strait Overflow. Unfortunately there are a few gaps in the UK1 20m time series, therefore we cannot at present say how frequent the observed freshening events are. However, combined with Icelandic hydrographic data from Faxaflói it appears that the freshening events have a seasonal character appearing in the months between February to July i.e. between mid-winter and early summer. In Figure 9, provisional results from the first vertical array of microcats to be recovered in August 2005 from the overflow plume are shown.

Since 2000, protected PVC Tube moorings have been in place on the shelf at 63°N designed to measure and investigate the variability of the freshwater flux out of the Nordic Seas and the Arctic. In 2004 the Freshwater Flux Array was strengthened by the deployment of two bottom mounted ADCPs. Preliminary results from the ADCP recovered in 2005 are shown in Figure 10.

The deployment plan for the Freshwater Flux Array during Árni Friðriksson A08/05 had to be altered when Tube 15, Tube 16 and ADCP 15 were lost, only allowing one Tube mooring to be constructed and deployed together with an ADCP. Tube 21 was deployed near the position of Tube 12 (Tube16) with an additional microcat deeper in the water column than on previous deployments (300m depth). ADCP 21 was deployed near Tube 21.

References

Blindheim, J., Hydrographic investigations in the Irminger Sea in the years 1954-1964, **FiskDir. Skr. Ser. HavUnderk.**, 14, 72-97, 1968

Mann, C.R., Temperature and salinity characteristics of the Denmark Strait overflow, **Deep-Sea Res.**, 16, 125-137, 1969.

Pickart, R.S., D.J. Torres and P.S. Fratantoni, The East Greenland Spill Jet, **J. Phys. Oceanogr.**, 35, 1037-1053, 2005.

Rudels, B., P. Eriksson, H. Gronvall, R. Hietala, and J. Launiainen, Hydrographic observations in Denmark Strait in fall 1997, and their implications for the entrainment into the overflow plume, **Geophys. Res. Lett.**, 26**,** 1325–1328, 1999

Rudels, B., E. Fahrbach, J. Meincke, G. Budeus, and P. Eriksson, The East Greenland Current and its contribution to the Denmark Strait overflow, **ICES J. Mar. Sci.**, 59**,** 1133–1154, 2002

Further Remarks

We would like to thank Captain Bjarnason and his crew of RV Árni Friðriksson for good seamanship and co-operation during the A0805 cruise. Sincere thanks go to the authorities of Greenland/Denmark and Iceland for research permissions. We also send our regards to the persons at the Greenland Commando. Funding of ship time and logistics was kindly provided by the **Deutsche Forschungsgemeinschaft**. Financial support came from EU EC FP5 ASOF-W, through contract EVK2-CT-2002-00149.

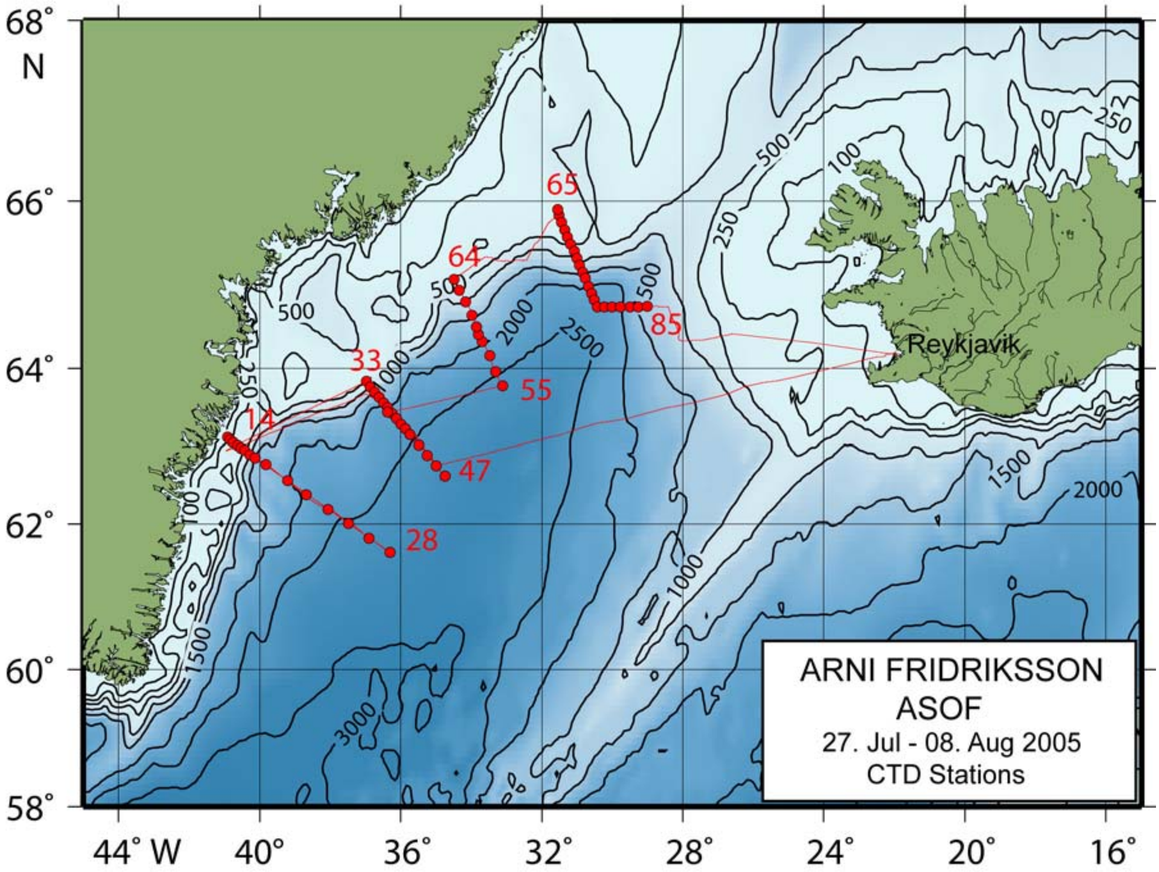

Figure 1. Ship track and position of the CTD stations occupied during A0805. The northernmost section is referred to as section 1, with increasing section numbering going southward. The Angmagssalik Current Meter Array is located along section 3 and the Freshwater Flux Array is located on the shelf at the western end of section 4.

Figure 2. Working conditions at the northernmost station of section 1, Friday morning August 5th 2005 (Photo: G. Bjarnason).

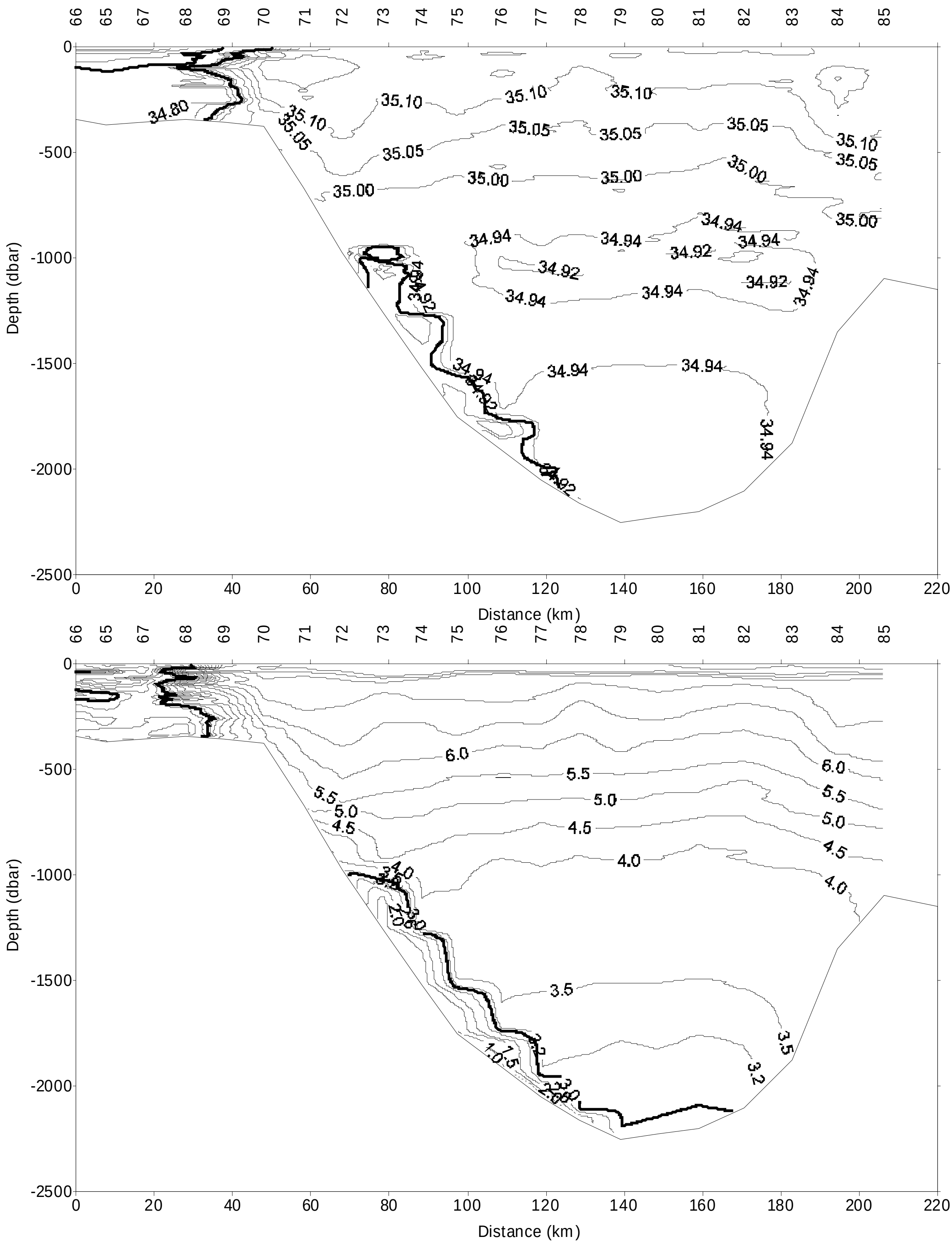

Figure 3. Salinity (upper) and potential temperature (lower) distribution along section 1 in August 2005. The East Greenland shelf is to the left and Iceland to the right.

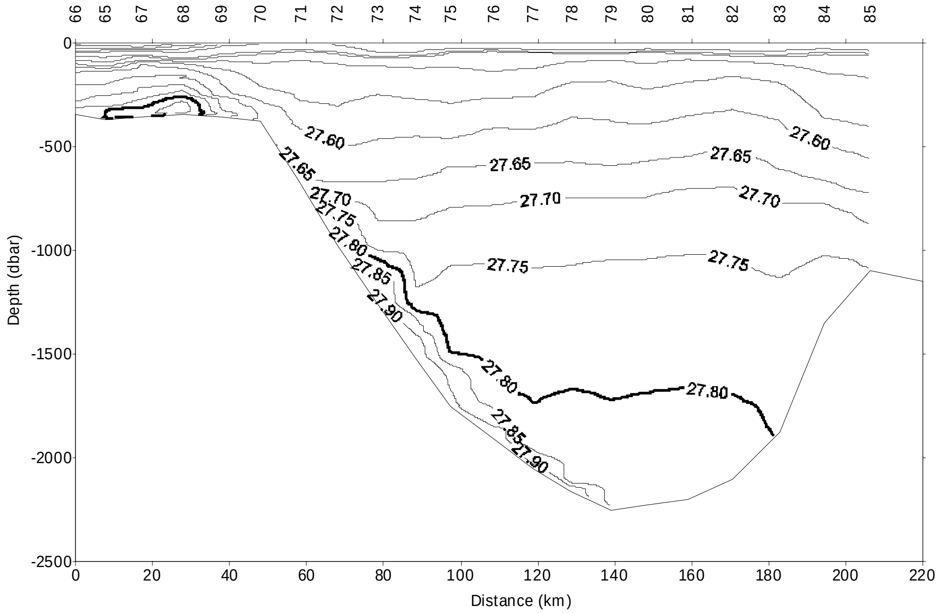

Figure 4. Potential density anomaly distribution along section 1 in August 2005. The East Greenland shelf is to the left and Iceland to the right.

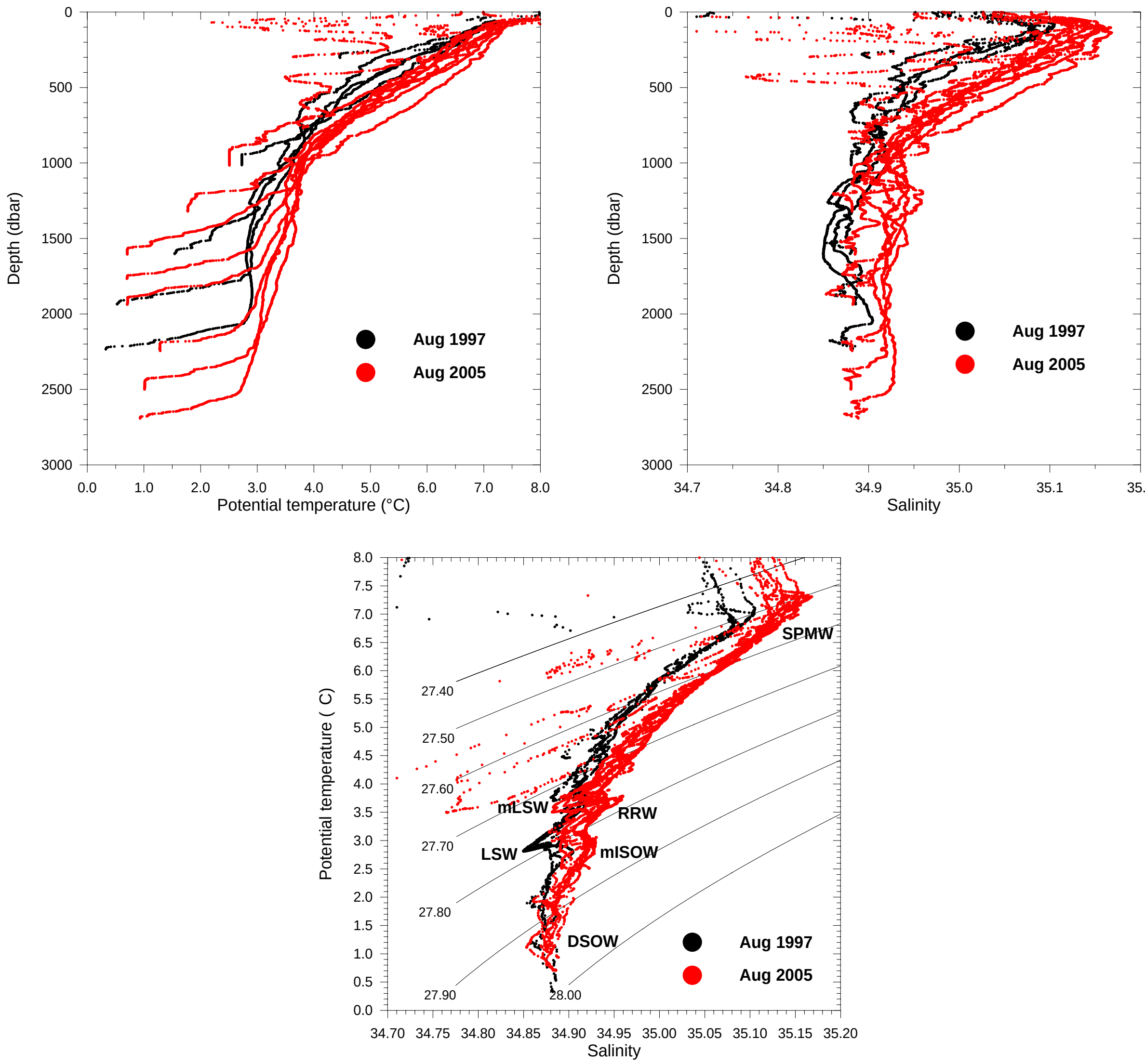

Figure 5. Profiles (1dbar means) of potential temperature, salinity and Θ-S curves from all stations along section 2 in August 1997 and August 2005.

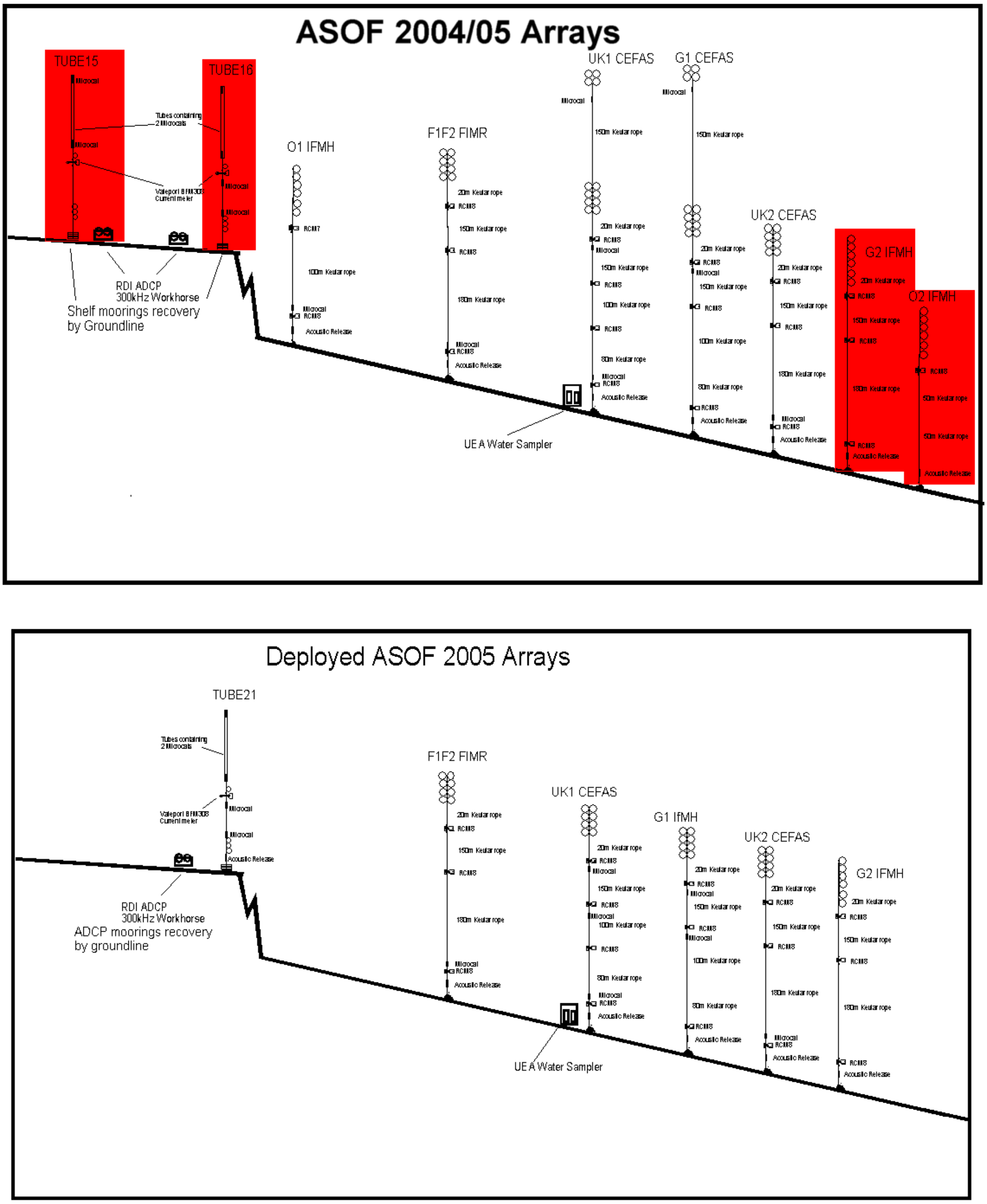

Figure 6. Mooring diagrams showing the 2004 arrays recovered (upper Panel) and the 2005 arrays deployed (lower Panel) by Árni Friðriksson A08/05 (for app. location see Figure 1). The unrecoverable equipment is highlighted in red. Not shown in the upper Panel is the recovery of HOMER-05 deployed by an Icelandic vessel earlier in 2005.

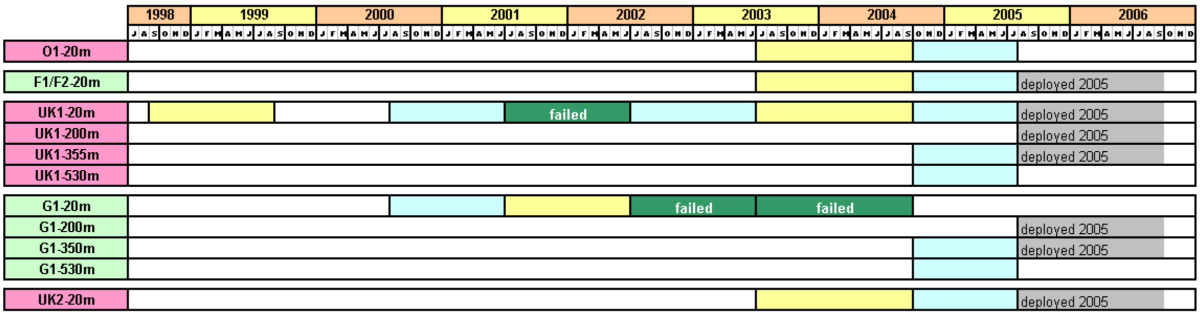

Figure 7. Time-line showing the SBE 16 and SBE 37 moored CTDs deployments along the Angmagssalik Current Meter Array and the data recovery since the first deployment in 1998. Length unit yields high above bottom.

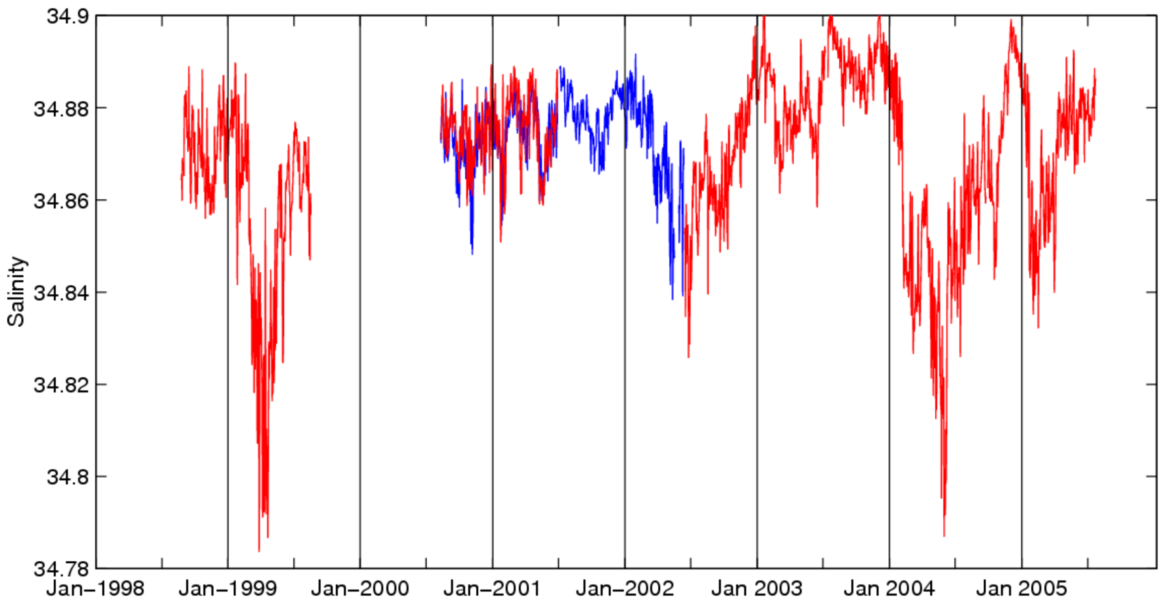

Figure 8. The longest salinity records yet recovered from near-bottom depths (ca. 20m above bottom) in the core of the Denmark Strait Overflow. Red shows data from the UK1 mooring and blue data from the G1 mooring. The time series shows that extreme freshening by up to 0.1 usually passed through the array in the months February to July.

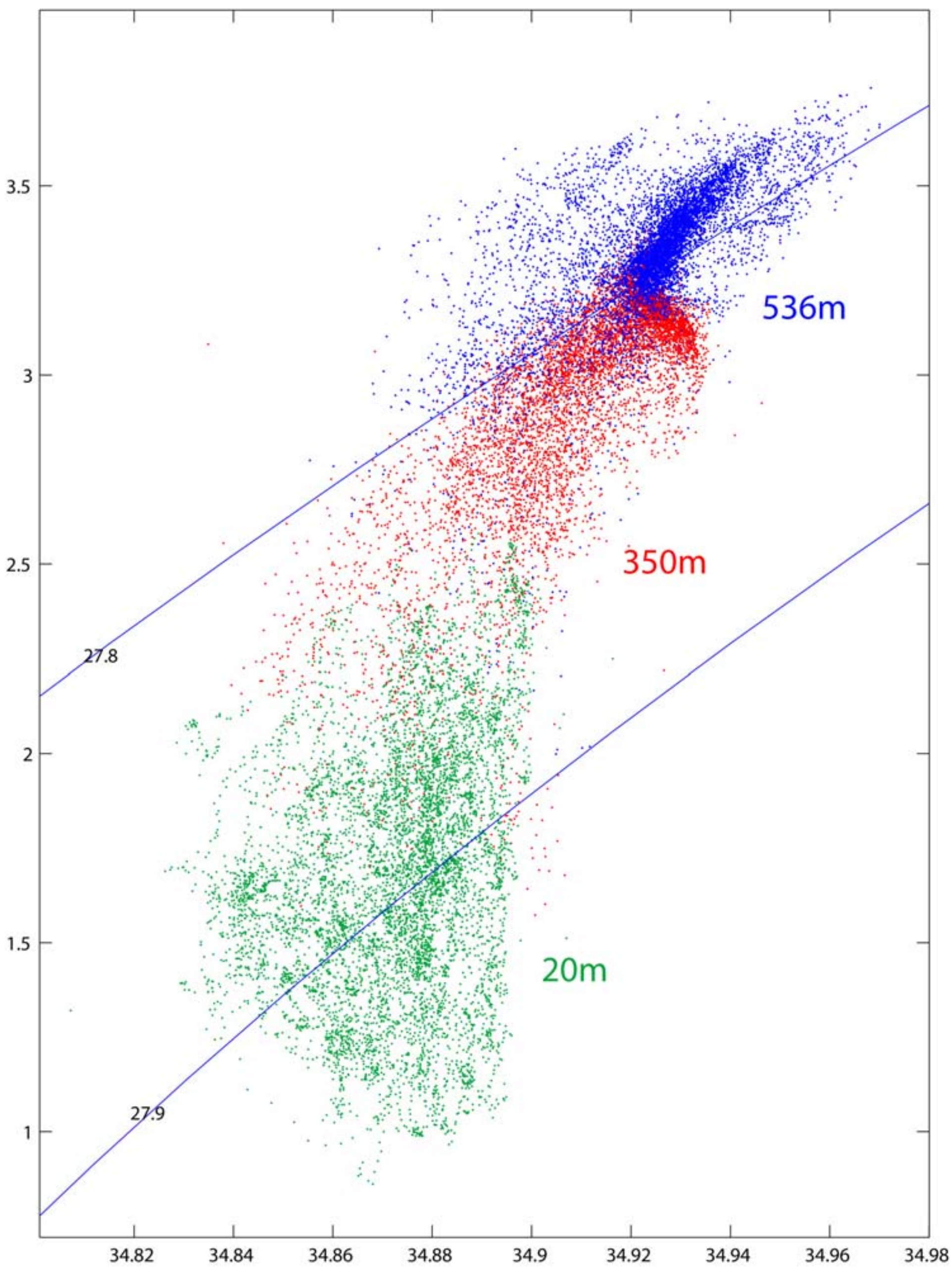

Figure 9. Provisional results from the first vertical array of microcats to be recovered in 2005 from the Denmark Strait Overflow plume. The Figure shows temperature and salinity for three different microcats of UK1-04 as dicrete 10-minule samples. The nominal depth of the different instruments are 20m (green), 350m (red) and 536m (blue) of the bottom.

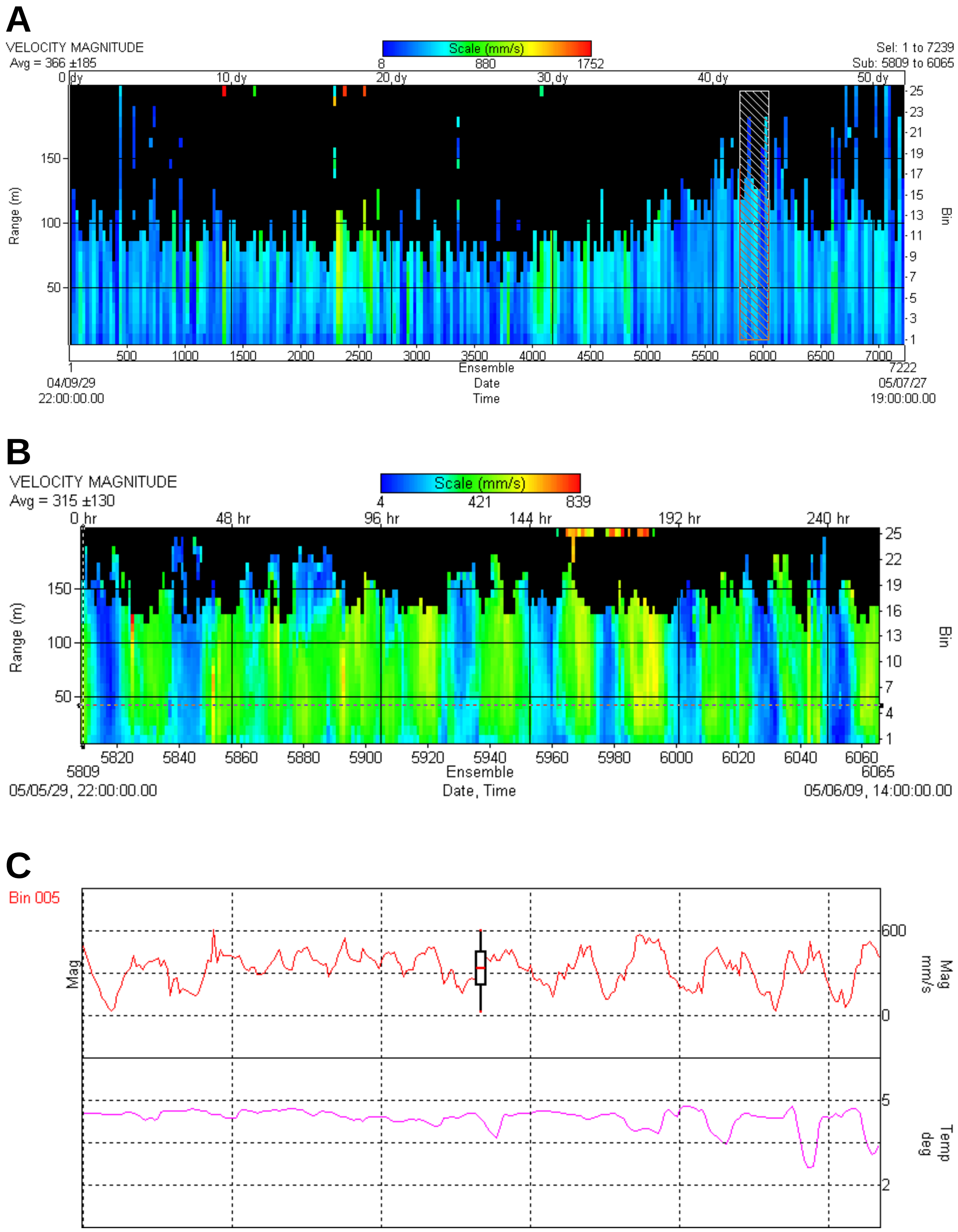

Figure 10. Raw data collected from the first moored ADCP deployment on the ASOF 63ºN Freshwater Flux Array, deployed from RRS Charles Darwin in September 2004, recovered by RV Árni Friðriksson in July 2005. **Panel A**: Speed derived from all ping ensembles during the deployment period, hatched section is then blown up in **Panel B**: 11 days with speed contours on a shorter scale highlighting the daily tide, with a mean flow of 315 ± 130 mm/s. Speed in bin 5 at height 40 m is then shown in **Panel C**: together with the near bottom temperature over the same 11 day period.

Station list for A0805

EXPO-CODE	Section Name	Stat. No.	Cast No.	Cast Type	Date mmddyy	Time UTC	Code	Position Latitude	Position Longitude	Code	Bottom depth	Max Press.	Bottom Dist.	Comments
46AF0805	VEINS-3	001	01	MOR	072705	0820	BE	62 45.98 N	34 58.98 W	GPS				Recovery of mooring O2-04
46AF0805	VEINS-3	001	01	MOR	072705	0855	EN	62 46.10 N	34 58.15 W	GPS				failed
46AF0805	VEINS-3	002	01	MOR	072705	1103	BE	63 07.08 N	35 32.44 W	GPS	2540			Recovery of mooring G2-04
46AF0805	VEINS-3	002	01	MOR	072705	1206	EN	63 07.60 N	35 31.11 W	GPS	2546			failed
46AF0805	VEINS-3	003	01	MOR	072705	1318	BE	63 16.52 N	35 51.35 W	GPS	2335			Recovery of mooring UK2-04
46AF0805	VEINS-3	003	01	MOR	072705	1421	EN	63 16.71 N	35 51.99 W	GPS	2326			
46AF0805	VEINS-3	004	01	MOR	072705	1505	BE	63 21.82 N	36 03.49 W	GPS	2172			Recovery of mooring G1-04
46AF0805	VEINS-3	004	01	MOR	072705	1606	EN	63 22.07 N	36 03.94 W	GPS	2165			
46AF0805	VEINS-3	005	01	MOR	072705	1702	BE	63 28.59 N	36 17.14 W	GPS	1969			Recovery of mooring UK1-04
46AF0805	VEINS-3	005	01	MOR	072705	1804	EN	63 28.55 N	36 18.76 W	GPS	1963			
46AF0805	VEINS-3	006	01	MOR	072705	1810	BE	63 28.13 N	36 19.03 W	GPS	1971			Recovery of AQUALAB-04
46AF0805	VEINS-3	006	01	MOR	072705	1937	EN	63 27.84 N	36 20.52 W	GPS	1984			
46AF0805	VEINS-3	007	01	MOR	072705	2017	BE	63 33.81 N	36 28.18 W	GPS	1763			Recovery of HOMER-05
46AF0805	VEINS-3	007	01	MOR	072705	2144	EN	63 34.08 N	36 28.99 W	GPS	1751			
46AF0805	VEINS-3	008	01	MOR	072705	2212	BE	63 35.16 N	36 38.29 W	GPS	1691			Recovery of mooring F2-04
46AF0805	VEINS-3	008	01	MOR	072705	2258	EN	63 35.77 N	36 39.94 W	GPS	1680			
46AF0805	VEINS-3	009	01	MOR	072705	2353	BE	63 40.73 N	36 59.84 W	GPS	1340			Recovery of mooring O1-04
46AF0805	VEINS-3	009	01	MOR	072805	0036	EN	63 40.58 N	37 01.06 W	GPS	1317			
46AF0805	VEINS-4	010	01	MOR	072805	0958	BE	63 01.11 N	40 32.13 W	GPS	231			Recovery of ADCP 16
46AF0805	VEINS-4	010	01	MOR	072805	1031	EN	63 00.86 N	40 33.02 W	GPS	276			
46AF0805	VEINS-4	011	01	MOR	072805	1050	BE	63 00.29 N	40 32.87 W	GPS	295			Recovery of TUBE 16
46AF0805	VEINS-4	011	01	MOR	072805	1729	EN	63 00.92 N	40 33.03 W	GPS	269			failed
46AF0805	VEINS-4	012	01	MOR	072805	1857	BE	63 07.44 N	40 48.63 W	GPS	209			Recovery of ADCP 15
46AF0805	VEINS-4	012	01	MOR	072805	1937	EN	63 07.66 N	40 50.08 W	GPS	267			got the frame but ADCP was missing
46AF0805	VEINS-4	013	01	MOR	072805	1950	BE	63 08.90 N	40 50.46 W	GPS	189			Recovery of TUBE 15
46AF0805	VEINS-4	013	01	MOR	072805	2200	EN	63 08.90 N	40 50.46 W	GPS	189			failed
46AF0805	VEINS-4	014	01	ROS/CTD	072805	2226	BE	63 07.68 N	40 53.98 W	GPS	220			Sound velocity
46AF0805	VEINS-4	014	01	ROS/CTD	072805	2233	BO	63 07.57 N	40 54.20 W	GPS	240	268	17	set to 1480m/s
46AF0805	VEINS-4	014	01	ROS/CTD	072805	2245	EN	63 07.38 N	40 54.51 W	GPS	202			during all cruise
46AF0805	VEINS-4	015	01	ROS/CTD	072805	2315	BE	63 05.82 N	40 49.97 W	GPS	308			
46AF0805	VEINS-4	015	01	ROS/CTD	072805	2324	BO	63 05.53 N	40 50.19 W	GPS	375	387	16	
46AF0805	VEINS-4	015	01	ROS/CTD	072805	2333	EN	63 05.37 N	40 50.46 W	GPS	254			

46AF0805	VEINS-4	016	01	ROS/CTD	072905	0017	BE	63 03.91 N	40 43.89 W	GPS	226			
46AF0805	VEINS-4	016	01	ROS/CTD	072905	0027	BO	63 03.86 N	40 44.13 W	GPS	237	222	13	
46AF0805	VEINS-4	016	01	ROS/CTD	072905	0038	EN	63 03.83 N	40 44.37 W	GPS	284			
46AF0805	VEINS-4	017	01	ROS/CTD	072905	0123	BE	63 01.55 N	40 36.90 W	GPS	338			
46AF0805	VEINS-4	017	01	ROS/CTD	072905	0131	BO	63 01.54 N	40 36.95 W	GPS	340	335	10	
46AF0805	VEINS-4	017	01	ROS/CTD	072905	0143	EN	63 01.60 N	40 37.21 W	GPS	339			
46AF0805	VEINS-4	018	01	ROS/CTD	072905	0214	BE	62 59.57 N	40 31.11 W	GPS	257			
46AF0805	VEINS-4	018	01	ROS/CTD	072905	0220	BO	62 59.52 N	40 31.29 W	GPS	260	256	9	
46AF0805	VEINS-4	018	01	ROS/CTD	072905	0228	EN	62 59.48 N	40 31.50 W	GPS	267			
46AF0805	VEINS-4	019	01	ROS/CTD	072905	0257	BE	62 58.09 N	40 24.99 W	GPS	200			
46AF0805	VEINS-4	019	01	ROS/CTD	072905	0303	BO	62 58.16 N	40 24.96 W	GPS	201	196	10	
46AF0805	VEINS-4	019	01	ROS/CTD	072905	0311	EN	62 58.21 N	40 24.99 W	GPS	208			
46AF0805	VEINS-4	020	01	ROS/CTD	072905	0730	BE	62 54.76 N	40 15.98 W	GPS	1292			
46AF0805	VEINS-4	020	01	ROS/CTD	072905	0758	BO	62 54.84 N	40 17.49 W	GPS	1190	1205	16	
46AF0805	VEINS-4	020	01	ROS/CTD	072905	0830	EN	62 54.73 N	40 18.91 W	GPS				
46AF0805	VEINS-4	021	01	ROS/CTD	072905	0917	BE	62 52.01 N	40 07.30 W	GPS	1662			
46AF0805	VEINS-4	021	01	ROS/CTD	072905	1001	BO	62 52.74 N	40 08.26 W	GPS	1641	1661	7	
46AF0805	VEINS-4	021	01	ROS/CTD	072905	1042	EN	62 53.09 N	40 08.68 W	GPS	1629			
46AF0805	VEINS-4	022	01	ROS/CTD	072905	1220	BE	62 46.91 N	39 48.78 W	GPS	1898			
46AF0805	VEINS-4	022	01	ROS/CTD	072905	1259	BO	62 47.17 N	39 48.92 W	GPS	1894	1922	13	
46AF0805	VEINS-4	022	01	ROS/CTD	072905	1340	EN	62 47.28 N	39 48.92 W	GPS	1829			
46AF0805	VEINS-4	023	01	ROS/CTD	072905	1603	BE	62 34.70 N	39 11.96 W	GPS	2003			
46AF0805	VEINS-4	023	01	ROS/CTD	072905	1646	BO	62 34.32 N	39 11.53 W	GPS	1989	2020	20	
46AF0805	VEINS-4	023	01	ROS/CTD	072905	1810	EN	62 33.79 N	39 11.08 W	GPS	1986			
46AF0805	VEINS-4	024	01	ROS/CTD	072905	2015	BE	62 23.51 N	38 39.63 W	GPS	2214			
46AF0805	VEINS-4	024	01	ROS/CTD	072905	2110	BO	62 22.54 N	38 40.47 W	GPS	2195	2237	12	
46AF0805	VEINS-4	024	01	ROS/CTD	072905	2200	EN	62 21.76 N	38 40.85 W	GPS	2188			
46AF0805	VEINS-4	025	01	ROS/CTD	073005	0001	BE	62 11.94 N	38 03.38 W	GPS	2445			
46AF0805	VEINS-4	025	01	ROS/CTD	073005	0051	BO	62 12.25 N	38 02.61 W	GPS	2468	2494	10	
46AF0805	VEINS-4	025	01	ROS/CTD	073005	0212	EN	62 12.84 N	38 01.76 W	GPS	2469			
46AF0805	VEINS-4	026	01	ROS/CTD	073005	0424	BE	62 00.73 N	37 28.00 W	GPS	2524			
46AF0805	VEINS-4	026	01	ROS/CTD	073005	0520	BO	62 01.07 N	37 27.30 W	GPS	2520	2565	11	
46AF0805	VEINS-4	026	01	ROS/CTD	073005	0624	EN	62 01.38 N	37 26.38 W	GPS	2520			
46AF0805	VEINS-4	027	01	ROS/CTD	073005	0820	BE	61 48.80 N	36 53.00 W	GPS	2645			
46AF0805	VEINS-4	027	01	ROS/CTD	073005	0928	BO	61 48.78 N	36 51.94 W	GPS	2645	2694	9	
46AF0805	VEINS-4	027	01	ROS/CTD	073005	1030	EN	61 48.77 N	36 51.01 W	GPS	2647			
46AF0805	VEINS-4	028	01	ROS/CTD	073005	1234	BE	61 37.66 N	36 17.78 W	GPS	2757			cable problems
46AF0805	VEINS-4	028	01	ROS/CTD	073005	1331	BO	61 37.20 N	36 17.73 W	GPS	2759	2812	10	during ascend
46AF0805	VEINS-4	028	01	ROS/CTD	073005	1509	EN	61 36.33 N	36 14.87 W	GPS	2770			

46AF0805	VEINS-4	029	01	MOR	073105	0500	BE	63 00.16 N	40 32.36 W	GPS	283	Recovery of TUBE 16	
46AF0805	VEINS-4	029	01	MOR	073105	0752	EN	62 59.83 N	40 31.76 W	GPS	282	failed	
46AF0805	VEINS-4	030	01	MOR	073105	0930	BE	63 00.29 N	40 32.86 W	GPS	294	Deployment of TUBE 21	
46AF0805	VEINS-4	030	01	MOR	073105	1016	EN	63 00.25 N	40 32.75 W	GPS	295		
46AF0805	VEINS-4	031	01	MOR	073105	1125	BE	63 00.80 N	40 31.78 W	GPS	233	Deployment of ADCP 21	
46AF0805	VEINS-4	031	01	MOR	073105	1156	EN	63 01.12 N	40 31.49 W	GPS	219		
46AF0805	VEINS-4	032	01	MOR	073105	1259	BE	62 58.06 N	40 54.39 W	GPS	354	Recovery of TUBE 11	
46AF0805	VEINS-4	032	01	MOR	073105	1421	EN	62 58.02 N	40 55.71 W	GPS	332	failed	
46AF0805	VEINS-3	033	01	ROS/CTD	080105	0259	BE	63 49.99 N	36 58.25 W	GPS	346		
46AF0805	VEINS-3	033	01	ROS/CTD	080105	0307	BO	63 50.01 N	36 58.57 W	GPS	348	342	8
46AF0805	VEINS-3	033	01	ROS/CTD	080105	0317	EN	63 49.98 N	36 58.85 W	GPS	345		
46AF0805	VEINS-3	034	01	ROS/CTD	080105	0402	BE	63 45.83 N	36 51.15 W	GPS	645		
46AF0805	VEINS-3	034	01	ROS/CTD	080105	0416	BO	63 45.74 N	36 51.32 W	GPS	644	644	11
46AF0805	VEINS-3	034	01	ROS/CTD	080105	0438	EN	63 45.71 N	36 51.94 W	GPS	638		
46AF0805	VEINS-3	035	01	ROS/CTD	080105	0516	BE	63 41.80 N	36 43.62 W	GPS	1565		
46AF0805	VEINS-3	035	01	ROS/CTD	080105	0548	BO	63 41.73 N	36 43.98 W	GPS	1598	1631	7
46AF0805	VEINS-3	035	01	ROS/CTD	080105	0627	EN	63 41.62 N	36 44.40 W	GPS	1595		
46AF0805	VEINS-3	036	01	ROS/CTD	080105	0705	BE	63 38.25 N	36 35.84 W	GPS	1631		
46AF0805	VEINS-3	036	01	ROS/CTD	080105	0742	BO	63 38.19 N	36 35.63 W	GPS	1632	1647	10
46AF0805	VEINS-3	036	01	ROS/CTD	080105	0819	EN	63 37.98 N	36 35.78 W	GPS	1633		
46AF0805	VEINS-3	037	01	ROS/CTD	080105	0856	BE	63 33.98 N	36 28.37 W	GPS	1764		
46AF0805	VEINS-3	037	01	ROS/CTD	080105	0932	BO	63 33.84 N	36 28.80 W	GPS	1755	1781	9
46AF0805	VEINS-3	037	01	ROS/CTD	080105	1010	EN	63 33.75 N	36 29.63 W	GPS	1743		
46AF0805	VEINS-3	038	01	ROS/CTD	080105	1046	BE	63 30.18 N	36 21.52 W	GPS	1888		
46AF0805	VEINS-3	038	01	ROS/CTD	080105	1125	BO	63 30.32 N	36 21.71 W	GPS	1882	1909	9
46AF0805	VEINS-3	038	01	ROS/CTD	080105	1207	EN	63 30.52 N	36 21.71 W	GPS	1873		
46AF0805	VEINS-3	039	01	ROS/CTD	080105	1248	BE	63 26.07 N	36 14.11 W	GPS	2052		
46AF0805	VEINS-3	039	01	ROS/CTD	080105	1328	BO	63 26.29 N	36 13.77 W	GPS	2051	2081	11
46AF0805	VEINS-3	039	01	ROS/CTD	080105	1412	EN	63 26.18 N	36 13.88 W	GPS			
46AF0805	VEINS-3	040	01	ROS/CTD	080105	1515	BE	63 21.89 N	36 06.69 W	GPS	2164		
46AF0805	VEINS-3	040	01	ROS/CTD	080105	1555	BO	63 22.03 N	36 06.82 W	GPS	2162	2195	8
46AF0805	VEINS-3	040	01	ROS/CTD	080105	1642	EN	63 22.24 N	36 06.81 W	GPS			
46AF0805	VEINS-3	041	01	ROS/CTD	080205	0805	BE	63 17.90 N	35 58.96 W	GPS	2269		
46AF0805	VEINS-3	041	01	ROS/CTD	080205	0902	BO	63 18.07 N	36 00.07 W	GPS	2261	2308	10
46AF0805	VEINS-3	041	01	ROS/CTD	080205	0953	EN	63 18.23 N	36 00.78 W	GPS	2255		
46AF0805	VEINS-3	042	01	ROS/CTD	080205	1031	BE	63 14.13 N	35 51.79 W	GPS	2365		
46AF0805	VEINS-3	042	01	ROS/CTD	080205	1134	BO	63 14.42 N	35 52.63 W	GPS	2357	2400	10
46AF0805	VEINS-3	042	01	ROS/CTD	080205	1256	EN	63 14.34 N	35 54.57 W	GPS	2350		

46AF0805	VEINS-3	043	01	ROS/CTD	080205	1345	BE	63 09.96 N	35 43.77 W	GPS	2464			
46AF0805	VEINS-3	043	01	ROS/CTD	080205	1431	BO	63 10.10 N	35 44.81 W	GPS	2457	2500	14	
46AF0805	VEINS-3	043	01	ROS/CTD	080205	1532	EN	63 10.19 N	35 45.99 W	GPS	2449			
46AF0805	VEINS-3	044	01	ROS/CTD	080205	1642	BE	63 02.18 N	35 28.97 W	GPS	2607			
46AF0805	VEINS-3	044	01	ROS/CTD	080205	1736	BO	63 02.97 N	35 30.58 W	GPS	2602	2659	3	
46AF0805	VEINS-3	044	01	ROS/CTD	080205	1840	EN	63 03.10 N	35 31.95 W	GPS	2590			
46AF0805	VEINS-3	045	01	ROS/CTD	080205	1954	BE	62 54.14 N	35 13.92 W	GPS	2673			
46AF0805	VEINS-3	045	01	ROS/CTD	080205	2058	BO	62 54.56 N	35 14.92 W	GPS	2665	2716	11	
46AF0805	VEINS-3	045	01	ROS/CTD	080205	2224	EN	62 54.78 N	35 16.29 W	GPS	2660			
46AF0805	VEINS-3	046	01	ROS/CTD	080205	2331	BE	62 46.10 N	34 59.21 W	GPS	2719			
46AF0805	VEINS-3	046	01	ROS/CTD	080305	0024	BO	62 46.05 N	35 00.39 W	GPS	2716	2775	10	
46AF0805	VEINS-3	046	01	ROS/CTD	080305	0120	EN	62 46.21 N	35 00.96 W	GPS	2713			
46AF0805	VEINS-3	047	01	ROS/CTD	080305	0229	BE	62 38.04 N	34 44.19 W	GPS	2763			
46AF0805	VEINS-3	047	01	ROS/CTD	080305	0320	BO	62 38.07 N	34 44.72 W	GPS	2765	2812	15	
46AF0805	VEINS-3	047	01	ROS/CTD	080305	0418	EN	62 38.10 N	34 45.81 W	GPS	2766			
46AF0805	VEINS-3	048	01	MOR	080305	0858	BE	63 07.04 N	35 32.37 W	GPS	2547			Deployment of G2-05
46AF0805	VEINS-3	048	01	MOR	080305	0935	EN	63 07.19 N	35 32.50 W	GPS	2545			
46AF0805	VEINS-3	049	01	MOR	080305	1059	BE	63 17.17 N	35 51.66 W	GPS	2320			Deployment of UK2-05
46AF0805	VEINS-3	049	01	MOR	080305	1127	EN	63 16.94 N	35 52.24 W	GPS	2320			
46AF0805	VEINS-3	050	01	MOR	080305	1242	BE	63 22.78 N	36 03.51 W	GPS	2160			Deployment of G1-05
46AF0805	VEINS-3	050	01	MOR	080305	1309	EN	63 21.99 N	36 04.20 W	GPS	2165			
46AF0805	VEINS-3	051	01	MOR	080305	1406	BE	63 29.46 N	36 17.16 W	GPS	1952			Deployment of UK1-05
46AF0805	VEINS-3	051	01	MOR	080305	1431	EN	63 29.07 N	36 18.10 W	GPS	1954			
46AF0805	VEINS-3	052	01	MOR	080305	1540	BE	63 35.49 N	36 38.03 W	GPS	1682			Deployment of F12-05
46AF0805	VEINS-3	052	01	MOR	080305	1606	EN	63 35.48 N	36 38.90 W	GPS	1687			
46AF0805	VEINS-3	053	01	MOR	080305	1730	BE	63 27.95 N	36 20.08 W	GPS	1981			Deployment of AQUALAB-05
46AF0805	VEINS-3	053	01	MOR	080305	1926	EN	63 26.99 N	36 21.54 W	GPS	2025			
46AF0805		054	01	ROS/CTD	080305	1937	BE	63 26.78 N	36 21.87 W	GPS	2029			
46AF0805		054	01	ROS/CTD	080305	2020	BO	63 26.45 N	36 22.90 W	GPS	2052	2073	9	
46AF0805		054	01	ROS/CTD	080305	2105	EN	63 26.29 N	36 24.21 W	GPS	2092			
46AF0805	VEINS-2	055	01	ROS/CTD	080405	0521	BE	63 46.75 N	33 06.14 W	GPS	2636			
46AF0805	VEINS-2	055	01	ROS/CTD	080405	0609	BO	63 46.52 N	33 06.74 W	GPS	2638	2689	10	
46AF0805	VEINS-2	055	01	ROS/CTD	080405	0708	EN	63 46.22 N	33 08.03 W	GPS	2639			
46AF0805	VEINS-2	056	01	ROS/CTD	080405	0817	BE	63 57.22 N	33 18.32 W	GPS	2446			
46AF0805	VEINS-2	056	01	ROS/CTD	080405	0916	BO	63 56.95 N	33 19.47 W	GPS	2447	2499	9	
46AF0805	VEINS-2	056	01	ROS/CTD	080405	1008	EN	63 56.88 N	33 20.15 W	GPS	2447			
46AF0805	VEINS-2	057	01	ROS/CTD	080405	1116	BE	64 09.16 N	33 27.85 W	GPS	2202			

46AF0805	VEINS-2	057	01	ROS/CTD	080405	1204	BO	64 08.90 N	33 27.74 W	GPS	2207	2244	9
46AF0805	VEINS-2	057	01	ROS/CTD	080405	1248	EN	64 08.64 N	33 27.71 W	GPS	2209		
46AF0805	VEINS-2	058	01	ROS/CTD	080405	1357	BE	64 19.61 N	33 40.24 W	GPS	1909		
46AF0805	VEINS-2	058	01	ROS/CTD	080405	1432	BO	64 19.62 N	33 40.64 W	GPS	1907	1938	9
46AF0805	VEINS-2	058	01	ROS/CTD	080405	1511	EN	64 19.50 N	33 40.31 W	GPS	1913		
46AF0805	VEINS-2	059	01	ROS/CTD	080405	1554	BE	64 25.04 N	33 47.34 W	GPS	1746		
46AF0805	VEINS-2	059	01	ROS/CTD	080405	1626	BO	64 25.25 N	33 46.95 W	GPS	1743	1767	9
46AF0805	VEINS-2	059	01	ROS/CTD	080405	1715	EN	64 25.09 N	33 47.03 W	GPS	1745		
46AF0805	VEINS-2	060	01	ROS/CTD	080405	1752	BE	64 30.50 N	33 50.67 W	GPS	1588		
46AF0805	VEINS-2	060	01	ROS/CTD	080405	1824	BO	64 30.66 N	33 50.01 W	GPS	1582	1603	9
46AF0805	VEINS-2	060	01	ROS/CTD	080405	1858	EN	64 30.83 N	33 49.43 W	GPS	1586		
46AF0805	VEINS-2	061	01	ROS/CTD	080405	1957	BE	64 38.77 N	33 58.48 W	GPS	1310		
46AF0805	VEINS-2	061	01	ROS/CTD	080405	2024	BO	64 38.87 N	33 57.73 W	GPS	1311	1320	9
46AF0805	VEINS-2	061	01	ROS/CTD	080405	2053	EN	64 39.07 N	33 57.23 W	GPS	1308		
46AF0805	VEINS-2	062	01	ROS/CTD	080405	2152	BE	64 48.64 N	34 08.52 W	GPS	1013		
46AF0805	VEINS-2	062	01	ROS/CTD	080405	2216	BO	64 48.83 N	34 08.76 W	GPS	1008	1016	9
46AF0805	VEINS-2	062	01	ROS/CTD	080405	2235	EN	64 49.04 N	34 09.04 W	GPS	1003		
46AF0805	VEINS-2	063	01	ROS/CTD	080405	2326	BE	64 56.99 N	34 19.70 W	GPS	768		
46AF0805	VEINS-2	063	01	ROS/CTD	080405	2343	BO	64 57.13 N	34 19.49 W	GPS	765	768	9
46AF0805	VEINS-2	063	01	ROS/CTD	080405	2359	EN	64 57.18 N	34 19.30 W	GPS	761		
46AF0805	VEINS-2	064	01	ROS/CTD	080505	0052	BE	65 05.14 N	34 28.28 W	GPS	301		
46AF0805	VEINS-2	064	01	ROS/CTD	080505	0058	BO	65 05.20 N	34 28.45 W	GPS	305	298	13
46AF0805	VEINS-2	064	01	ROS/CTD	080505	0105	EN	65 05.28 N	34 28.65 W	GPS	303		
46AF0805	VEINS-1	065	01	ROS/CTD	080505	0944	BE	65 49.98 N	31 30.07 W	GPS	360		
46AF0805	VEINS-1	065	01	ROS/CTD	080505	0953	BO	65 49.96 N	31 30.02 W	GPS	364	363	8
46AF0805	VEINS-1	065	01	ROS/CTD	080505	1001	EN	65 50.01 N	31 29.93 W	GPS	362		
46AF0805	VEINS-1	066	01	ROS/CTD	080505	1045	BE	65 54.00 N	31 32.35 W	GPS	333		
46AF0805	VEINS-1	066	01	ROS/CTD	080505	1055	BO	65 54.00 N	31 32.25 W	GPS	336	333	8
46AF0805	VEINS-1	066	01	ROS/CTD	080505	1102	EN	65 54.02 N	31 32.16 W	GPS	338		
46AF0805	VEINS-1	067	01	ROS/CTD	080505	1212	BE	65 45.20 N	31 25.87 W	GPS	352		
46AF0805	VEINS-1	067	01	ROS/CTD	080505	1220	BO	65 45.29 N	31 25.90 W	GPS	354	346	12
46AF0805	VEINS-1	067	01	ROS/CTD	080505	1231	EN	65 45.34 N	31 25.90 W	GPS	343		
46AF0805	VEINS-1	068	01	ROS/CTD	080505	1306	BE	65 40.03 N	31 19.87 W	GPS	334		
46AF0805	VEINS-1	068	01	ROS/CTD	080505	1313	BO	65 40.03 N	31 19.95 W	GPS	336	336	10
46AF0805	VEINS-1	068	01	ROS/CTD	080505	1325	EN	65 40.07 N	31 20.08 W	GPS	342		
46AF0805	VEINS-1	069	01	ROS/CTD	080505	1357	BE	65 35.04 N	31 15.54 W	GPS	315		
46AF0805	VEINS-1	069	01	ROS/CTD	080505	1404	BO	65 35.09 N	31 15.56 W	GPS	344	347	11
46AF0805	VEINS-1	069	01	ROS/CTD	080505	1414	EN	65 35.20 N	31 15.52 W	GPS	352		
46AF0805	VEINS-1	070	01	ROS/CTD	080505	1449	BE	65 30.02 N	31 10.21 W	GPS	362		

46AF0805	VEINS-1	070	01	ROS/CTD	080505	1457	BO	65 30.15 N	31 10.39 W	GPS	364	366	12	
46AF0805	VEINS-1	070	01	ROS/CTD	080505	1508	EN	65 30.29 N	31 10.49 W	GPS	357			
46AF0805	VEINS-1	071	01	ROS/CTD	080505	1550	BE	65 25.02 N	31 04.29 W	GPS	653			
46AF0805	VEINS-1	071	01	ROS/CTD	080505	1603	BO	65 25.02 N	31 04.45 W	GPS	654	658	10	
46AF0805	VEINS-1	071	01	ROS/CTD	080505	1619	EN	65 25.02 N	31 04.57 W	GPS	658			
46AF0805	VEINS-1	072	01	ROS/CTD	080505	1653	BE	65 20.13 N	30 59.98 W	GPS	951			
46AF0805	VEINS-1	072	01	ROS/CTD	080505	1711	BO	65 20.10 N	31 00.36 W	GPS	956	964	10	
46AF0805	VEINS-1	072	01	ROS/CTD	080505	1734	EN	65 20.10 N	31 00.76 W	GPS	956			
46AF0805	VEINS-1	073	01	ROS/CTD	080505	1809	BE	65 14.83 N	30 55.56 W	GPS	1233			
46AF0805	VEINS-1	073	01	ROS/CTD	080505	1832	BO	65 14.72 N	30 55.93 W	GPS	1238	1250	11	
46AF0805	VEINS-1	073	01	ROS/CTD	080505	1857	EN	65 14.67 N	30 56.16 W	GPS	1242			
46AF0805	VEINS-1	074	01	ROS/CTD	080505	1930	BE	65 10.00 N	30 50.19 W	GPS	1489			
46AF0805	VEINS-1	074	01	ROS/CTD	080505	2001	BO	65 09.93 N	30 50.29 W	GPS	1492	1511	9	
46AF0805	VEINS-1	074	01	ROS/CTD	080505	2028	EN	65 09.92 N	30 50.37 W	GPS	1493			
46AF0805	VEINS-1	075	01	ROS/CTD	080505	2100	BE	65 05.63 N	30 45.11 W	GPS	1716			
46AF0805	VEINS-1	075	01	ROS/CTD	080505	2137	BO	65 05.69 N	30 45.08 W	GPS	1713	1740	8	
46AF0805	VEINS-1	075	01	ROS/CTD	080505	2207	EN	65 05.76 N	30 44.91 W	GPS	1712			
46AF0805	VEINS-1	076	01	ROS/CTD	080505	2244	BE	65 00.00 N	30 40.29 W	GPS	1866			
46AF0805	VEINS-1	076	01	ROS/CTD	080505	2325	BO	64 59.90 N	30 41.39 W	GPS	1867	1897	8	
46AF0805	VEINS-1	076	01	ROS/CTD	080505	2359	EN	64 59.69 N	30 41.87 W	GPS	1873			
46AF0805	VEINS-1	077	01	ROS/CTD	080605	0035	BE	64 54.93 N	30 35.10 W	GPS	2006			
46AF0805	VEINS-1	077	01	ROS/CTD	080605	0111	BO	64 54.61 N	30 34.75 W	GPS	2012	2038	11	
46AF0805	VEINS-1	077	01	ROS/CTD	080605	0154	EN	64 54.30 N	30 34.64 W	GPS	2020			
46AF0805	VEINS-1	078	01	ROS/CTD	080605	0221	BE	64 50.03 N	30 30.27 W	GPS	2110			
46AF0805	VEINS-1	078	01	ROS/CTD	080605	0300	BO	64 49.72 N	30 30.36 W	GPS	2116	2149	10	
46AF0805	VEINS-1	078	01	ROS/CTD	080605	0342	EN	64 49.38 N	30 30.85 W	GPS	2122			
46AF0805	VEINS-1	079	01	ROS/CTD	080605	0415	BE	64 44.87 N	30 25.06 W	GPS	2201			
46AF0805	VEINS-1	079	01	ROS/CTD	080605	0455	BO	64 44.57 N	30 25.69 W	GPS	2206	2240	11	
46AF0805	VEINS-1	079	01	ROS/CTD	080605	0540	EN	64 44.28 N	30 26.57 W	GPS	2216			
46AF0805	VEINS-1	080	01	ROS/CTD	080605	0618	BE	64 45.05 N	30 13.21 W	GPS	2179			
46AF0805	VEINS-1	080	01	ROS/CTD	080605	0707	BO	64 45.25 N	30 14.06 W	GPS	2176	2215	10	
46AF0805	VEINS-1	080	01	ROS/CTD	080605	0752	EN	64 45.46 N	30 14.83 W	GPS	2170			
46AF0805	VEINS-1	081	01	ROS/CTD	080605	0833	BE	64 45.04 N	29 59.81 W	GPS	2158			
46AF0805	VEINS-1	081	01	ROS/CTD	080605	0923	BO	64 45.23 N	30 00.57 W	GPS	2153	2191	8	
46AF0805	VEINS-1	081	01	ROS/CTD	080605	1003	EN	64 44.94 N	30 01.54 W	GPS	2155			
46AF0805	VEINS-1	082	01	ROS/CTD	080605	1045	BE	64 45.11 N	29 45.06 W	GPS	2078			around 50m
46AF0805	VEINS-1	082	01	ROS/CTD	080605	1134	BO	64 45.53 N	29 45.77 W	GPS	2085	2094	?	off the bottom
46AF0805	VEINS-1	082	01	ROS/CTD	080605	1219	EN	64 45.87 N	29 45.77 W	GPS	2084			
46AF0805	VEINS-1	083	01	ROS/CTD	080605	1301	BE	64 45.14 N	29 29.41 W	GPS	1830			

46AF0805	VEINS-1	083	01	ROS/CTD	080605	1334	BO	64 45.65 N	29 29.42 W	GPS	1843	1866	12
46AF0805	VEINS-1	083	01	ROS/CTD	080605	1414	EN	64 46.33 N	29 29.05 W	GPS	1814		
46AF0805	VEINS-1	084	01	ROS/CTD	080605	1454	BE	64 45.13 N	29 14.72 W	GPS	1290		
46AF0805	VEINS-1	084	01	ROS/CTD	080605	1518	BO	64 45.43 N	29 14.68 W	GPS	1338	1343	15
46AF0805	VEINS-1	084	01	ROS/CTD	080605	1551	EN	64 44.89 N	29 14.42 W	GPS	1331		
46AF0805	VEINS-1	085	01	ROS/CTD	080605	1631	BE	64 45.51 N	28 59.66 W	GPS	1073		
46AF0805	VEINS-1	085	01	ROS/CTD	080605	1651	BO	64 45.71 N	28 59.49 W	GPS	1078	1084	10
46AF0805	VEINS-1	085	01	ROS/CTD	080605	1716	EN	64 45.90 N	28 59.20 W	GPS	1078		