RRS Discovery

Cruise D379

Southampton to Reykjavik

Extended Ellett Line

31st July 2012 > 17th August 2012

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Summary

This report describes the events that occurred during D379, a joint SAMS/NOCS cruise on the *RRS Discovery* that sailed from Southampton to Reykjavik during the summer of 2012. The principle objective of the cruise was to undertake the sampling of the Extended Ellett Line (EEL), an annual section of CTD and bio-chemical stations that runs from the Sound of Mull to Rockall and then onto Iceland. The Extended Ellett Line is funded by NERC. More information on the history and findings of the Extended Ellett Line can be found at http://www.noc.soton.ac.uk/obe/PROJECTS/EEL/index.php.

The principle activities undertaken were:-

1) Undertake the annual routine CTD & nutrients section along the Extended Ellett line from Scotland to Iceland via Rockall.
2) Service the ADCP mooring on the Wyville Thomson Ridge and undertake supporting CTD observations in the vicinity of the mooring.
3) Deploy four APEX floats in the Iceland Basin.
4) Undertake a CTD section across the George Bligh Bank.

Additional measurements were:-

1) Examination of the photosynthetic biomass in the upper waters of the EEL.
2) Particulate Organic Carbon measurements.
3) Near surface sampling for the determination of coccolithophore cell numbers.
4) Reactive aluminium measurements.
5) Iodine 129 sampling.

This was a very successful cruise, no time was lost either to weather or to any issues regarding the ship or any of the oceanographic instrumentation.

Eleven undergraduate students, eight from SAMS and three from NOCS. This is the largest number of undergraduate students we have ever taken on an EEL cruise.

All data from this cruise will be banked with the British Oceanographic Data Centre (BODC – http://www.bodc.ac.uk), either directly after the cruise, or when they are processed/calibrated, as appropriate.

Acknowledgements

D379 proved to be the easiest cruise that I have ever led. The weather was calm and fair throughout; such conditions are not always associated with EEL cruises. The favourable weather was not the major factor in the success of the cruise. The success of any cruise is down to the professionalism and co-operation of everyone aboard.

I would like to thank the Master, Antonio Gatti, for all his support during the trip. I would also like to thank all the ship's crew for their professionalism, patience and good humour especially given the number of undergraduate students who sailed on D379. The skill of the bridge officers, the engineers, the catering staff and the ABs was much appreciated.

Special thanks to the NMF-SS technicians who sailed on D379. The skill, support & patience of both John Wynar and Zoltan Nemeth was also much appreciated.

Thanks too to the shore side team who helped with the planning of D379, in particular I would like to thanks both John Short & Jane Thompson.

I would also like to thank all the students aboard. Due to a variety of reasons we sailed with a relatively small number of scientific staff. The help and assistance of all the students was a great help to the scientific staff aboard.

This was my final cruise aboard *RRS Discovery*, my first cruise was back in 1984. It was a sad sight to see her sail into the distance after we had disembarked in Reykjavik.

List of Contents

1 Introduction

1.1 D379 Personnel List

1	GATTI	ANTONIO	Master
2	NEWTON	PETER WILLIAM	C/O
3	McCLINTOCK	WILLIAM DAVID	2/O
4	NEWNES	RHYS GEORGE	3/O
5	MCDONALD	BERNARD JOSEPH	C/E
6	HAGAN	JOHN ANDREW	2/E
7	JORDAN	DAVID	3/E
8	GOODE	DECLAN	3/E
9	HASLING	JOHN PHILIP	ETO
10	BULLIMORE	GRAHAM	PCO
11	LEWIS	THOMAS GREGORY	CPOD
12	SPENCER	ROBERT	POD
13	SMYTH	JOHN GERARD	ERPO
14	MACDONALD	JOHN	CPOS
15	MCLENNAN	WILLIAM	SG1A
16	CRABB	GARY	SG1A
17	PENNY	STEPHEN	SG1A
18	GRIFFITHS	HEFIN	SG1A
19	PRESTON	MARK ANTHONY	H/CHEF
20	SUTTON	LLOYD	CHEF
21	ORSBORN	JEFFREY ALAN	STWD
22	BEATON	JOHN	Scientist
23	MARCINKO	CHARLOTTE LISA JENNA	Scientist
24	BRAND	TIMOTHY DAVID	Scientist
25	DUMONT	ESTELLE	Scientist
26	GRIFFITHS	COLIN RICHARD	Scientist (PSO)
27	ALLISON	KIRSTEEN BEATON	Scientist
28	DITTRICH	RIBANNA	Scientist
29	DRYSDALE	ANTHONY LEWIS	Scientist
30	GRIFFITHS	ALEX MATTHEW	Scientist
31	JOHNSON	CLARE LOUISE	Scientist
32	LEWTAS	PATRICK ROBERT TOBIN	Scientist
33	O'CONNELL	DEVIN	Scientist
34	ROBB	LINDA WINIFRED	Scientist
35	TRILL	EMILY JANE	Scientist
36	WILLMOT	OLIVER ROGER	Scientist
37	WILSON	KAREN	Scientist
38	DOBSON	JASON	Scientist
39	HOULDING	ROSIE	Scientist
40	WYNAR	JOHN BASIL	Technician
41	NEMETH	ZOLTAN	Technician

1.2 Chronology/Narrative

Date	Activity	Narrative
30/07/2013	On Passage	Sailed from Southampton.
31/07/2013	CTD	Steady progress down the English Channel. Shakedown CTD.
01/08/2013	On Passage	Steady passage up the Irish Sea helped along by a stiff southerly breeze.
02/08/2013	CTD Stations 1G > 11G.	A very fine day. We started the EEL just after breakfast. Conditions good all day. Steady progress along the shelf to Barra Head through the day.
03/08/2013	CTD Stations 12G > O.	Another fine day. We worked CTD stations along the shelf and into deeper water. A number of stations were added across the slope to resolve the slope current.
04/08/2013	CTD Stations N > H.	Another fine day. We worked CTD stations across the Anton Dohrn Seamount.
05/08/2013	CTD Stations G > IB1.	Arrived @ Rockall in the early evening. Four trawlers in close proximity to the Rock. Broke off from the EEL after IB1 and headed to the Wyville Thomson Ridge.
06/08/2013	CTD S363 > S360.	Another fine day. We started a CTD section across the gully on arrival.
07/08/2013	CTD & Mooring S359>355; S354>S353 & S352 > 349.	Worked a transect across the Gully. WTR mooring was serviced during the day. A quick turnaround was possible as we had a complete set of spare instruments aboard. Continued with CTDs in the vicinity of the mooring.
08/08/2013	CTD GB1 > GB3.	Headed back towards the EEL. We worked a transect across the George Bligh Bank en route.
09/08/2013	CTD GB4 > GB13.	Continued with the GB transect for most of the day.

10/08/2013	CTD IB2 > IB5.	Rejoined the EEL @ IB2 and continued along the line. Conditions good.
11/08/2013	CTD & APEX IB5A > IB9A.	We made good progress along the line. Conditions remained favourable. We worked all the intermediate stations across the Hatton Bank. We deployed one of the APEX floats during the day.
12/08/2013	CTD & APEX IB10 > IB12A.	Now heading into the Iceland Basin. Conditions still good, we deployed the 2nd APEX float.
13/08/2013	CTD & APEX IB13 > IB16.	Work progressing well. We deployed the last two APEX floats during the day.
14/08/2013	CTD IB16A > IB19S.	Proceeding up the 20W line towards Iceland. Work progressing well.
15/08/2013	CTD IB20S > IB23S.	Wind freshening as we approached the Icelandic coast. EEL completed just before midday.
16/08/2013	On Passage	We proceeded to Reykjavik. Conditions very calm but foggy as we made out final approach.
17/08/2013	Disembarkation	Reykjavik

1.3 Cruise Track

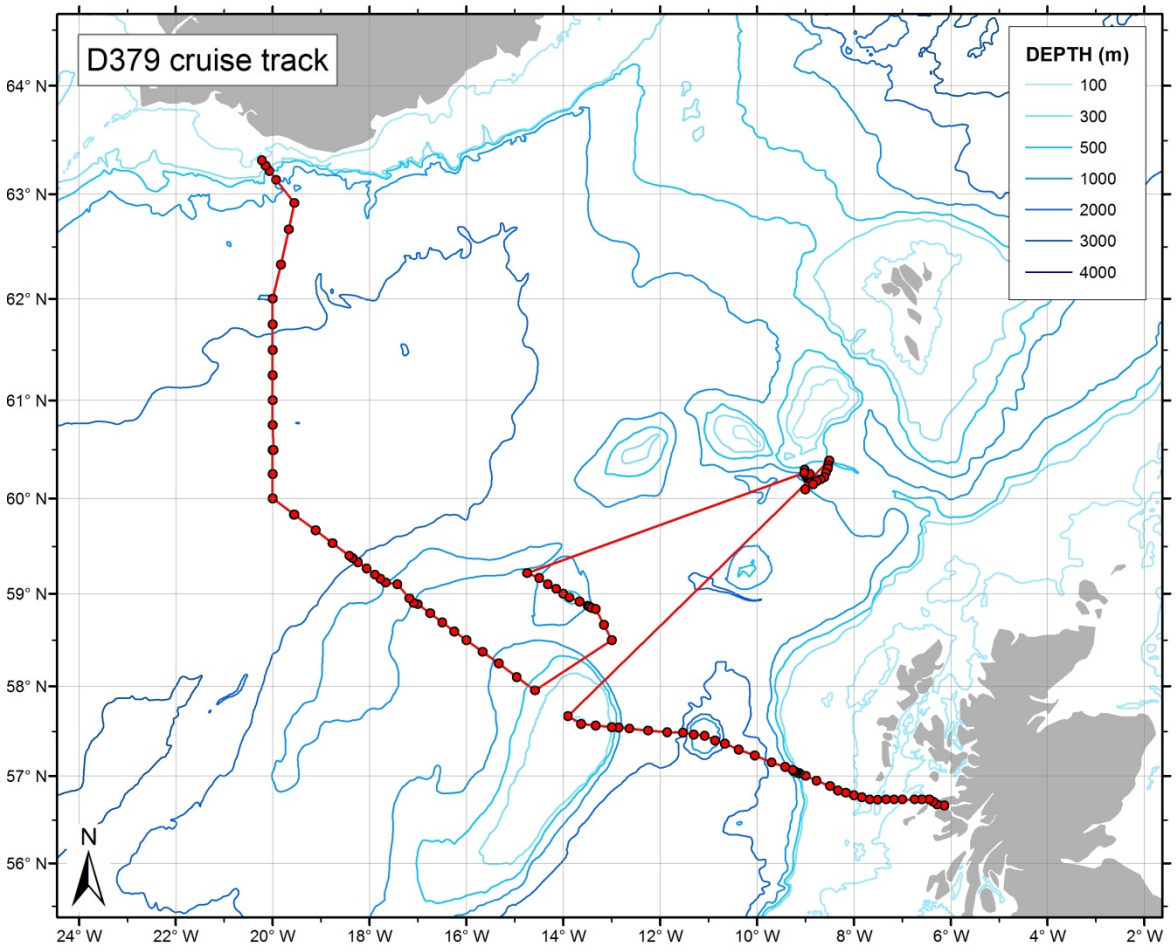

Figure 1.1 D379 Cruise Track

1.4 Underway Measurements

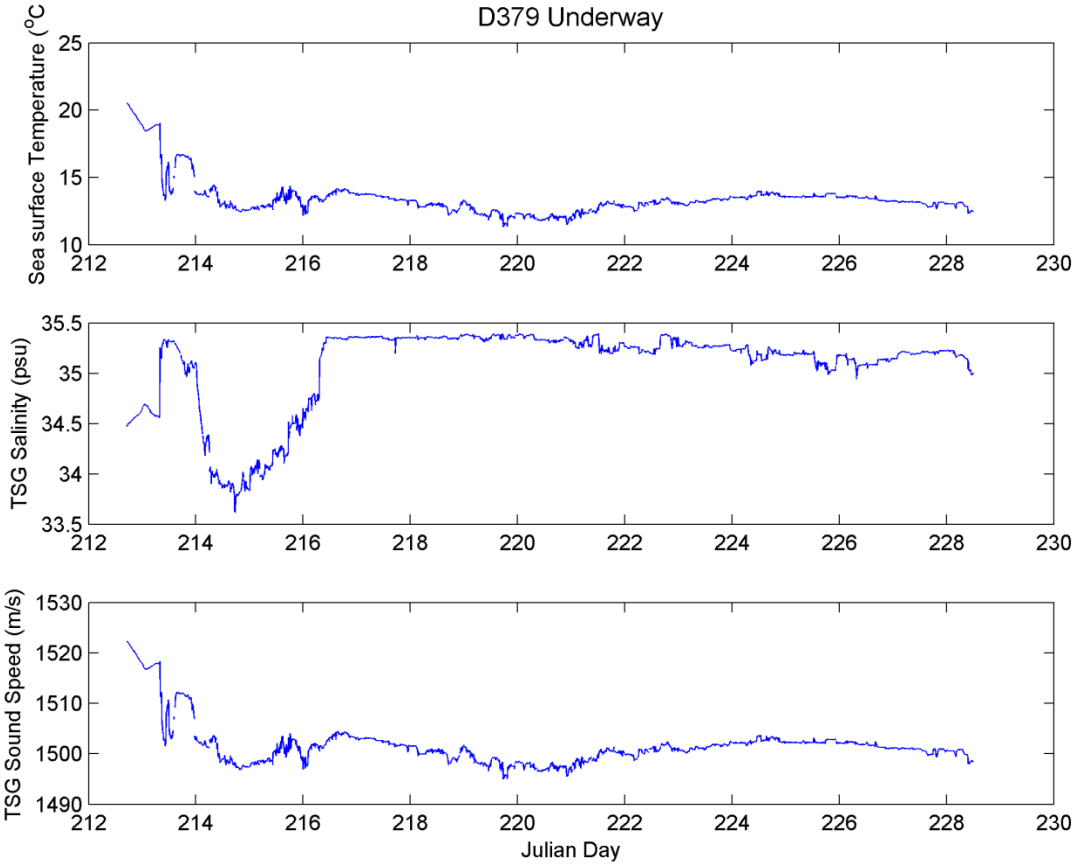

Figure 1.2 Thermosalinograph (TSG) data

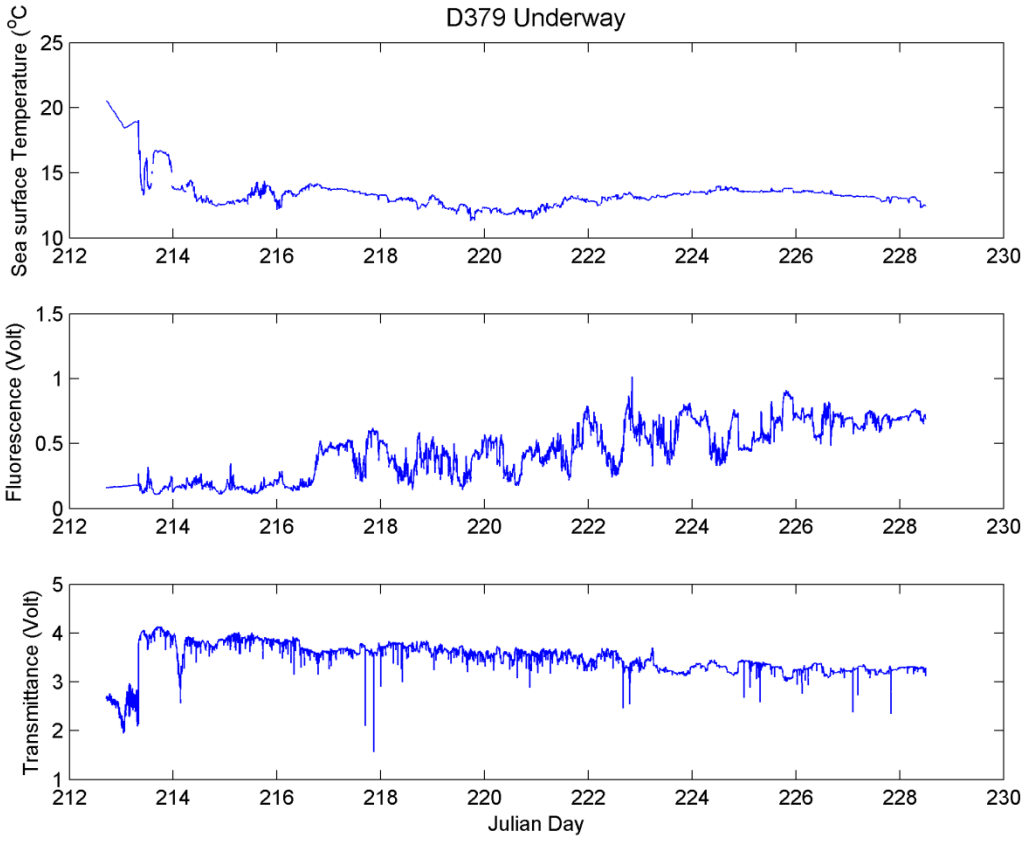

Figure 1.3 Thermosalinograph (TSG) data

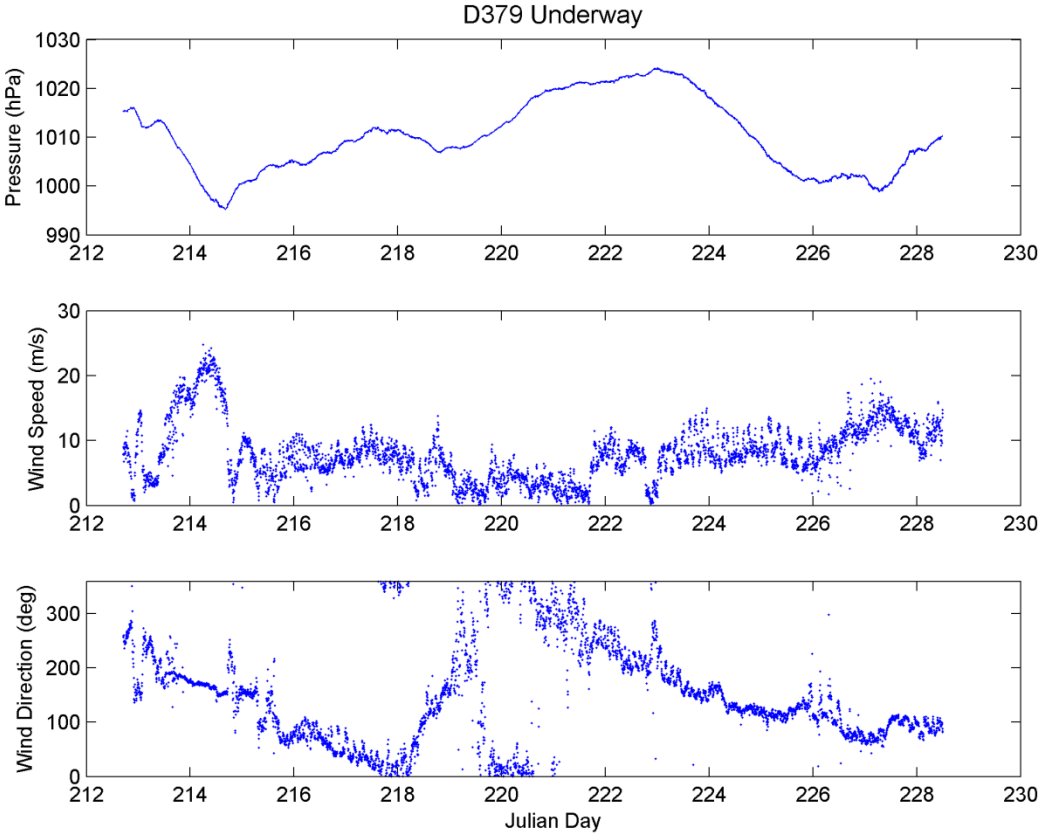

Figure 1.4 Meteorological data

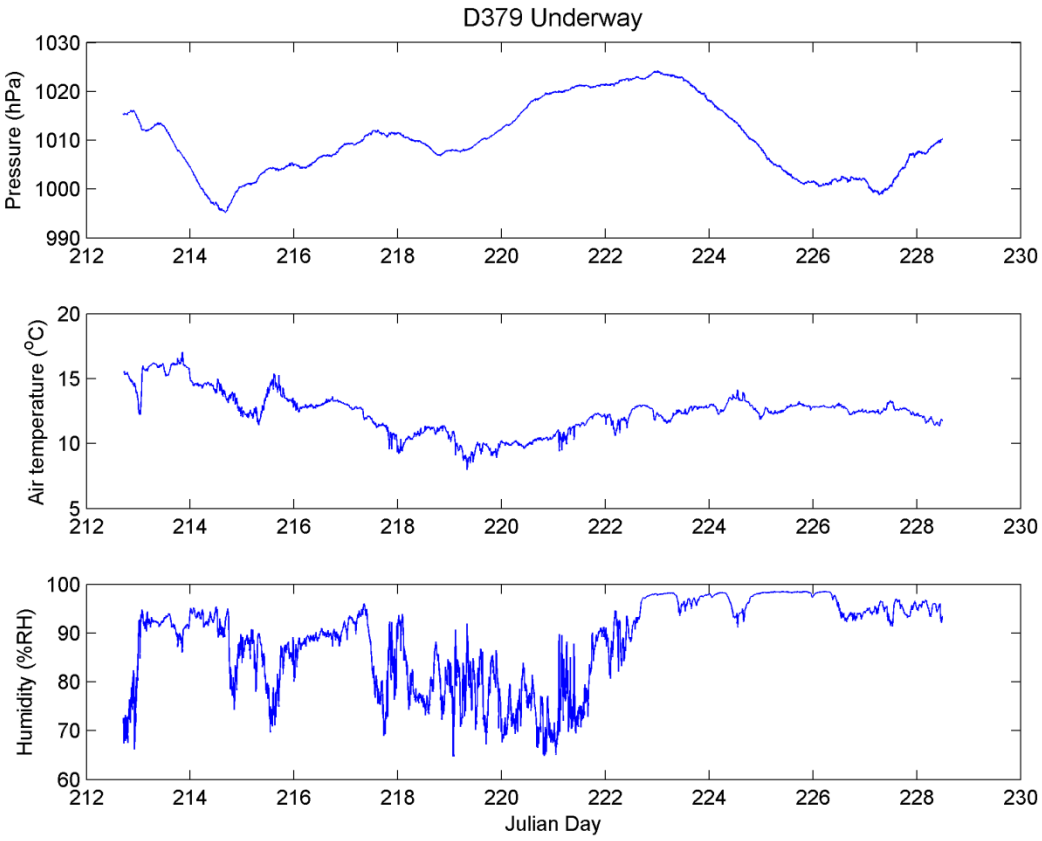

Figure 1.5 Meteorological data

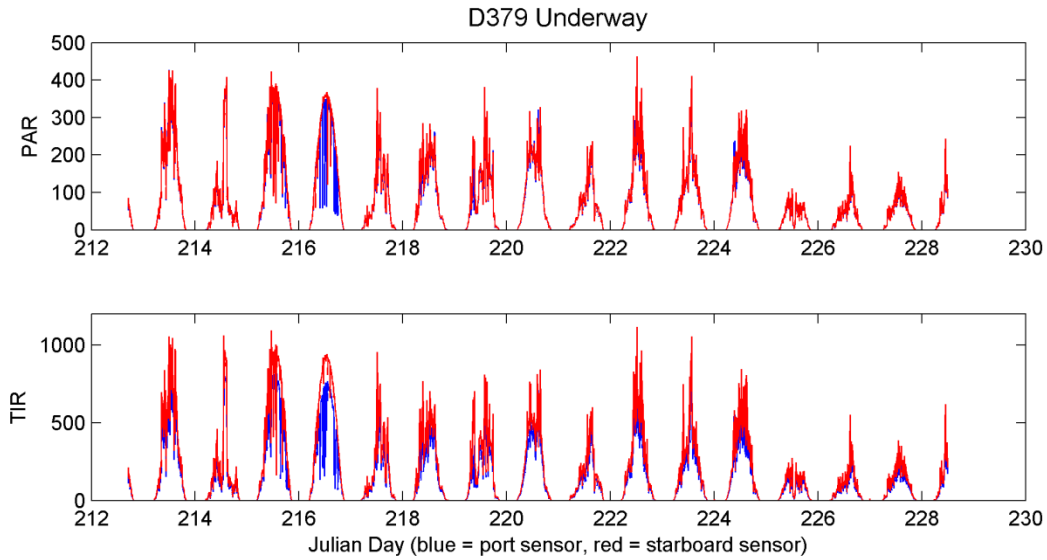

Figure 1.6 Light Measurements

2 CTD report

Estelle Dumont, SAMS & John Wynar, NMFSS.

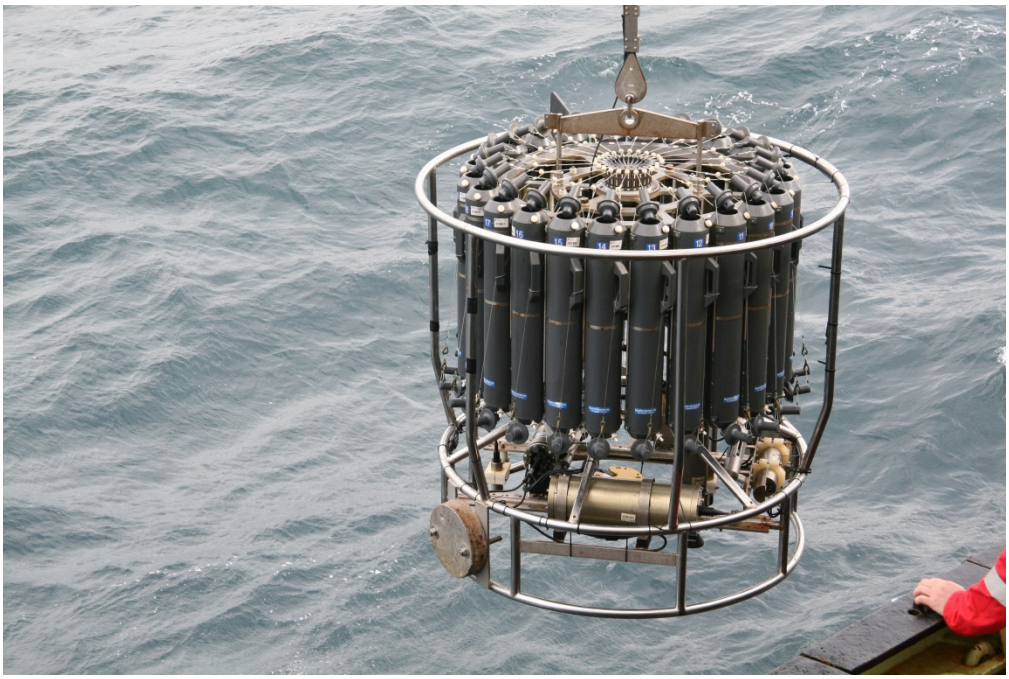

Photo credit: Lewis Drysdale, SAMS

CTD System Configuration

The initial sensor configuration for the stainless steel (s/s) system was as follows:

- Sea-Bird 9*plus* underwater unit, s/n: 09P-1082
- Frequency 0 - Sea-Bird 3 Premium temperature sensor, s/n: 03P- 4383
- Frequency 1 - Sea-Bird 4 conductivity sensor, s/n: 04C-2858
- Frequency 2 - Digiquartz temperature compensated pressure sensor, s/n: 121341
- Frequency 3 - Sea-Bird 3 Premium temperature sensor, s/n: 03P - 5660
- Frequency 4 - Sea-Bird 4 conductivity sensor, s/n: 04C-3768
- V0 - Sea-Bird 43 dissolved oxygen sensor, s/n: 43-0709
- V2 - WETLabs turbidity sensor, s/n: BBRTD-167
- V3 - Benthos PSA-916T 7Hz altimeter, s/n: 874
- V6 - Chelsea Alphatracka MKII transmissometer, s/n: 161050
- V7 - Chelsea Aquatracka MKIII fluorometer, s/n: 88-2615 (up to cast 92)
- V7 - Chelsea Aquatracka MKIII fluorometer, s/n: 09-7117-001 (from cast 93)

Ancillary instruments & components:

- Sea-Bird 11*plus* deck unit, s/n: 11P-34173-0676
- Sea-Bird 24-position Carousel, s/n: 32-37898-0518
- 24 x Ocean Test Equipment 10L water samplers, s/n: 1 through 24

For the full configuration and sensors calibration information please see the CTD technical report in annex.

CTD Operations

There were 109 CTD casts made in total.

The system was deployed from the CTD winch on the starboard side. The usual procedure was to first lower the CTD to around 10m deep for the pumps to switch on. The system was then brought back up to the surface before starting the cast. The Niskin bottles were fired on the way up, and the CTD package was stopped for at least 30 seconds before firing to allow the sensors to settle.

For the s/s system, the pressure sensor was located 30cm below the bottom and approximately 75cm below the centre of the 10L water sampling bottles.

Sensor Failures

The fluorometer appeared to give spurious data at times, the readings dropping to zero for intervals of several tens of metres. This problem only occurred at depths over 1,000m. The surface layer readings seemed normal but caution should be exercised. This issue was noticed quite late during the cruise, and the faulty fluorometer (S/N 88-2615) was replaced by a spare (S/N 09-7117-001) at cast number 93.

Data processing

The CTD data were processed according the standards described in the SAMS CTD data Processing Protocol (Dumont and Sherwin, 2008, SAMS internal report No 257), using Seabird Data Processing version 7.21f and Matlab R2012a. The processing steps were:

- Step 1(SBE Data Processing, batch processing): modules Data Conversion, Wild Edit, Align CTD, Cell Thermal Mass, Filter, Derive, Translate and Bottle Sum.
- Step 2 (Matlab): despiking of the 24Hz data
- Step 3 (SBE Data Processing, batch processing): modules Ascii In,, Bin Average (2db-bins) and Ascii Out
- Step 4 (Matlab): plot of the data
- Step 5 (Matlab): calibration of oxygen and salinity data on both 24Hz and 2db-bin averaged datasets (post-cruise).

Raw data processing (SBEDataProcessing)

Data Conversion converted raw data from engineering units to binary .cnv files and produced the .ros files. Variables exported were scan number, pump status, Julian day, latitude, longitude, pressure [db], depth [m], temperature0 [ITS-90, deg C], conductivity0 [mS/cm], temperature1 [ITS-90, deg C], conductivity1 [mS/cm], oxygen [mg/l], altimeter [m], fluorescence [µg/l], beam transmission [%],beam attenuation [1/m] and turbidity [m^{-1}/sr].

Please note:

The primary TC sensors were labelled 0, secondary 1.

The depth exported here was only for indicative purposes in the bottle files. Accurate depth calculation was performed at the Derive stage, and this first depth removed in processed files.

Wild Edit detected and removed the major spikes in the data. Wild Edit's algorithm requires two passes through the data: the first pass removed data points over 2 standard deviations of a 100 scans average, while the second pass removed the data over 20 standard deviations of a 100 scans average.

AlignCTD was then run to compensate for sensor time-lag.

Both conductivities were automatically advanced by **0.073s** by the deck unit.

The oxygen sensor response was advanced relative to pressure by **+5s**. This value was found to give the best results after testing several offsets on a subset of the data. This offset ensures that calculations of dissolved oxygen concentration are made using measurements from the same parcel of water.

In **Cell Thermal Mass**, a recursive filter was run to remove conductivity cell thermal mass effects from the measured conductivity. The constants used were the ones recommended by Seabird: thermal anomaly amplitude α=0.03 and thermal anomaly time constant $1/\beta$=7.

Filter applied a low-pass filter (value of 0.2) on the pressure and depth data, which smoothed the high frequency (rapidly changing) data. To produce zero phase (no time shift), the filter was first run forward through the data and then run backward through the data. This removed any delays caused by the filter.

At the **Derive** stage, twin salinities (psu), twin densities sigma-theta (kg/m3) and depth (m) were calculated.

The data was converted from binary to ASCII format by the module **Translate**. The data had been kept in binary format up to this stage to avoid any loss in precision that could occur when converting to Ascii.

Finally, the module **BottleSum** created the ASCII bottle files (.btl) from the .ros files, for each bottle fired during a cast. These files contain mean, standard deviation, maximum and minimum values for all variables (average of 48 scans, i.e. 2s).

Despiking (Matlab)

The pressure, oxygen, temperature (primary and secondary) and salinity (primary and secondary) data were manually despiked. Any data recorded while the pumps were not on were deleted at this stage.

Notes on the despiking:

- When a spike occurred in the pressure, primary temperature or primary salinity data, making that/those point(s) flagged as bad, the whole corresponding scan has been deleted.

- When a spike occurred in the oxygen data, making that point flagged as bad, the erroneous value was set to NaN, and other variables of the scan (i.e. temperature, salinity, etc) were kept in the dataset (if not flagged as bad themselves).

- When a spike occurred in the secondary temperature or secondary salinity data, making that/those point(s) flagged as bad, the secondary temperature, conductivity, salinity and density values were set to NaN, and other variables of the scan (i.e. primary temperature, primary salinity, etc) were kept in the dataset (if not flagged as bad themselves).

Averaging (SBEDataProcessing)

After going through Matlab, the data files needed to be re-formatted to be recognised by SBE Data Processing. **ASCII In** added a header to the input .asc file and output a .cnv file (XXX_2.cnv).

The module **Bin Average** averaged the 24Hz data into 2db-bins, using the downcast data only.

Ascii Out output the bin-averaged data files as ASCII (with a simplified header).

Datafiles

The different types of files created are (example of cast no. 01):

d3790_01_1.cnv : non-despiked, non-calibrated 24Hz data

d379_001_2.asc : despiked, non-calibrated 24Hz data

d379_001_2_2db.asc : despiked, non-calibrated 2db-bin averaged data

d379_001_3.asc : despiked 24Hz data, oxygen, primary and secondary salinities calibrated

d379_001.CTD: despiked 2db-bin averaged data (WOCE format conventions), oxygen and salinity calibrated

d379_001.btl : bottle data file, non-calibrated

d379_001.hdr : header file, detailing the data processing

Data calibration

Salinity calibration

Throughout the cruise the CTD was sampled for salinity measurements, in order to calibrate the conductivity sensors. Salinity was measured using a Guildline Autosal8400, s/n 60839 in a temperature-controlled room onboard the ship. The CTD data used for calibration comes from the .btl files (created by the Seabird software).

The Autosal was standardised at the start of every run, and a standard seawater (SSW) sample analysed at the end of every crate (each containing 24 bottles). If more than one crate was analysed during a run, a SSW was measured between the crates but the Autosal was not re-standardised. The average of the start and end SSW readings (or the offset recorded at standardisation) was used to determine the offset to apply to each crate's salinity data.

The SSW ampoules used were from batch P153, with a double conductivity ratio of 1.999580.The readings (double conductivity ratio) and derived offsets for each crate are summarised in table 1. The calculated offsets (last column in Table 1) were then applied to each crate's Autosal data.

Table 2.1: Standard Seawater (SSW) measurements at the beginning and end of each crate. Note: data includes TSG crates. Readings marked in red appeared to beoutliers and were removed from the final offset calculation (last column).

Date time	Crate	CTD / TSG	Read 1	Read 2	Read 3	Raw average	**Despiked average**	Offset (SSW - avg read)	**Avg offset for each crate**
05/08/12 07:37	Start 10	CTD	standardised - no readings recorded					0.000024	**0.000004**
05/08/12 08:41	End 10	CTD	1.999584	1.999602	1.999601	1.999596	**1.999596**	-0.000016	
05/08/12 08:47	Start 12	CTD	1.999584	1.999602	1.999601	1.999596	**1.999596**	-0.000016	**-0.000010**
05/08/12 09:49	End 12	CTD	1.999597	1.999592	1.999563	1.999584	**1.999584**	-0.000004	
06/08/12 12:58	Start 19	CTD	standardised - no readings recorded					0.000027	**0.000016**
06/08/12 15:01	End 19	CTD	no data - use next standardisation					0.000004	
06/08/12 15:09	Start X	other	standardised - no readings recorded					0.000004	**0.000005**
06/08/12 16:25	End X	other	1.999888	1.999879	1.999885	1.999884	**1.999884**	0.000006	
07/08/12 18:05	Start 22	CTD	standardised - no readings recorded					0.000008	**-0.000005**
07/08/12 20:07	End 22	CTD	1.999584	1.999610	1.999600	1.999598	**1.999598**	-0.00001	

								8	
08/08/12 09:11	Start 901	TSG	standardised - no readings recorded					0.000006	**0.000014**
08/08/12 10:44	End 901	TSG	1.999551	1.999562	1.999563	1.999559	**1.999559**	0.000021	
09/08/12 16:16	Start 19	CTD	standardised - no readings recorded					0.000025	**0.000000**
09/08/12 17:55	End 19	CTD	1.999593	1.999599	1.999620	1.999604	**1.999604**	-0.000024	
10/08/12 20:27	Start 21	CTD	standardised - no readings recorded					0.000007	**-0.000007**
10/08/12 22:01	End 21	CTD	no data - use next standardisation					-0.000021	
10/08/12 22:03	Start 12	CTD	standardised - no readings recorded					-0.000021	**-0.000021**
10/08/12 23:39	End 12	CTD	no data - use current standardisation					-0.000021	
12/08/12 10:20	Start 1	TSG	standardised - no readings recorded					0.000008	**-0.000003**
12/08/12 11:43	End 1	TSG	1.999596	1.999582	1.999605	1.999594	**1.999594**	-0.000014	
13/08/12 21:30	Start 17	CTD	standardised - no readings recorded					0.000002	**-0.000029**
13/08/12 19:49	End 17	CTD	1.999626	1.999650	1.999645	1.999640	**1.999640**	-0.000060	
14/08/12 10:05	Start 10	CTD	standardised - no readings recorded					0.000024	**-0.000016**
14/08/12 11:12	End 10	CTD	1.999637	1.999635	1.999675	1.999649	**1.999636**	-0.000056	
14/08/12 11:13	Start 18	CTD	1.999637	1.999635	1.999675	1.999649	**1.999636**	-0.000056	**-0.000052**
14/08/12 12:16	End 18	CTD	1.999618	1.999628	1.999640	1.999629	**1.999629**	-0.000049	

15/08/12 13:16	Start 11	CTD	standardised - no readings recorded					-0.000029	**-0.000018**
15/08/12 14:53	End 11	CTD	1.999581	1.999601	1.999577	1.999586	**1.999586**	-0.000006	
15/08/12 15:11	Start 49	TSG	1.999581	1.999601	1.999577	1.999586	**1.999586**	-0.000006	**-0.000017**
15/08/12 17:32	End 49	TSG	1.999597	1.999610	1.999618	1.999608	**1.999608**	-0.000028	
16/08/12 13:31	Start 22	CTD	standardised - no readings recorded					-0.000003	**-0.000026**
16/08/12 15:05	End 22	CTD	1.999636	1.999631	1.999622	1.999630	**1.999630**	-0.000050	
16/08/12 15:22	Start 97	TSG	1.999636	1.999631	1.999622	1.999630	**1.999630**	-0.000050	**-0.000043**
16/08/12 15:51	End 97	TSG	1.999613	1.999609	1.999624	1.999615	**1.999615**	-0.000035	

A total of 282 salinity samples were collected and analysed, including a few duplicate samples. Nine outliers were removed from the dataset. Eight of those appeared to be due due to an error in operating the Autosal, the last one may be attributed to a sampling or log error. The Autosal and the Seabird values were in very good agreement. Calibration equations are shown in Figure 2.2 and 2.3.

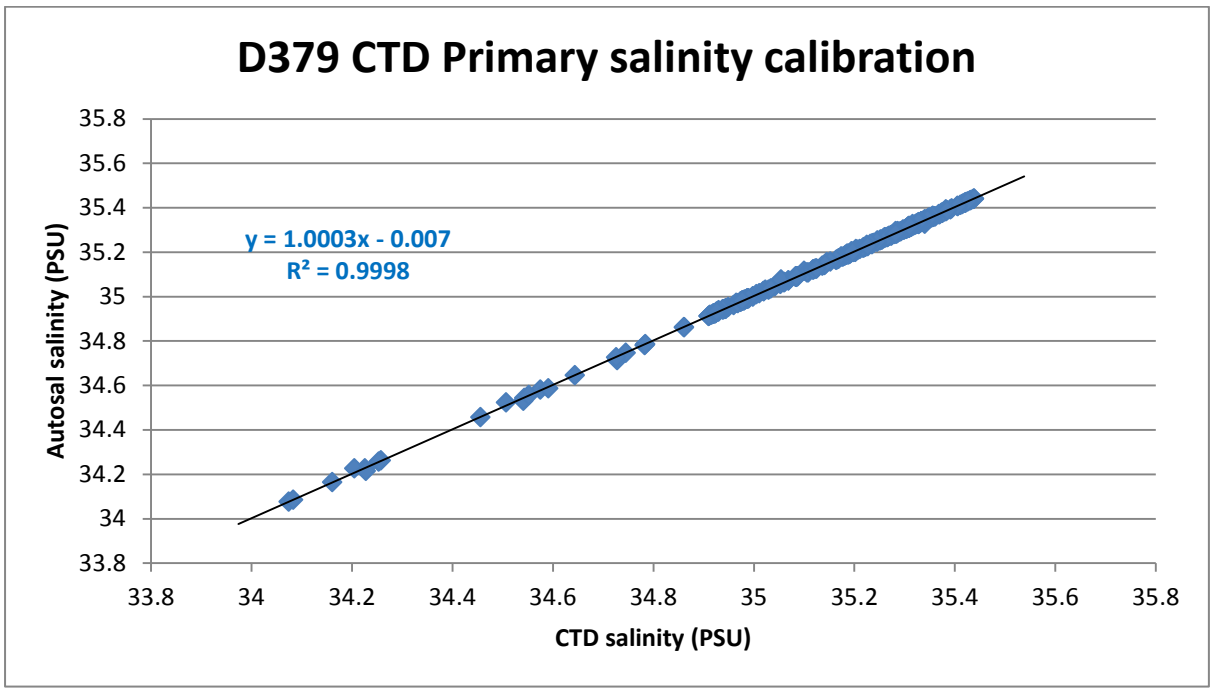

Figure 2.2: CTD primary salinity calibration data

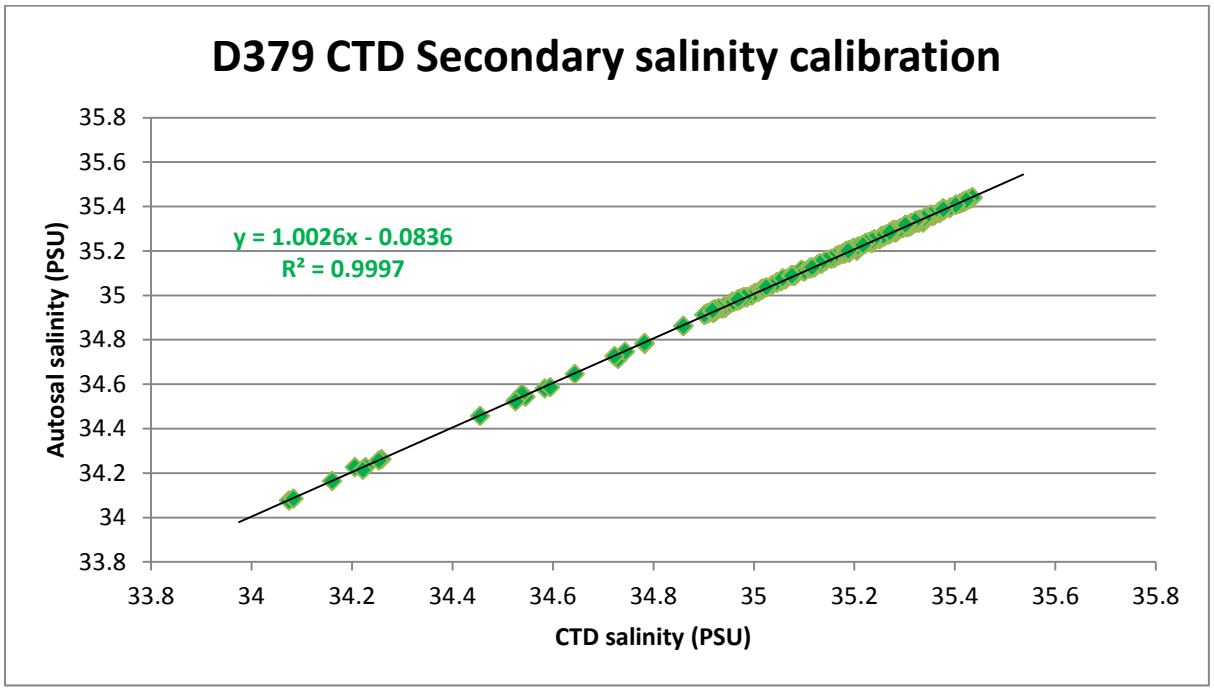

Figure 2.3: CTD secondary salinity calibration data

Dissolved Oxygen calibration

For methodology and calibration results please refer to section 5.

To follow WOCE data format conventions, the calibrated O_2 values in the final datafiles have been converted from mg/l to µmol/kg using the formula:

[µmol/Kg] = (([mg/L] / 1.42903) * 44660) / (sigma_theta + 1000)

Fluorometer calibration

Please note that the fluorescence data has not been calibrated in the final dataset. Users wishing to calibrate the data should refer to the chlorophyll discrete sampling data (see section 7)

Comments

Some large spikes were observed in the data from both CT sensors (and therefore in the salinity and density data), predominantly in the thermocline area. See example on figure 4 below. This issue has already been observed on previous cruises (e.g. CD173, D340, D352, D376). A possible explanation was described in the D352 cruise report: “The spikes appear to be associated with a decrease in the decent rate of the CTD package and are therefore likely associated with inefficient flushing of the CTD package […]. As the veer rate on the winch slows ‘old’ water is pushed back passed the sensors out the base of the rosette. As the rate of decent increases again ‘ew’ water is flushed back passed the sensors.”

The WildEdit and LoopEdit routines proved inefficient in removing those spikes, therefore they were removed manually in the Matlab despiking routine. This explains the sometimes irregular data interval observed on the 24Hz dataset. For the bin-averaged data, the Seabird software interpolates any missing values, and data users should therefore use caution when interpreting the data. For more details on the interpolating routine see SBE Data Processing manual (http://www.seabird.com/software/sbedataprocforwindowsdetails.htm).

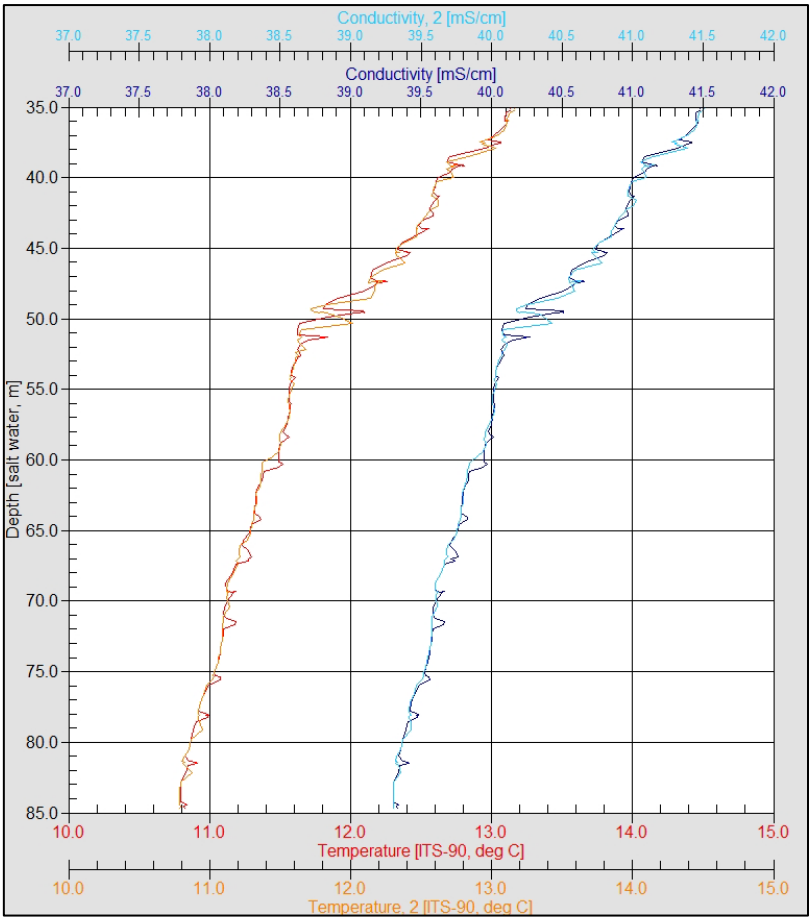

Figure 2.4: Typical spiking observed on CT sensors in the thermocline area (example from cast 25)

Additionally, the CT data on the upcast seemed particularly noisy and delayed in the thermocline and surface layers. The linear interpolation done by the Seabird bin-averaging routine, combined with the heavy data despiking described above results in some erroneous values in places. Data users are advised to use only the downcast data for CT readings and other related parameters (salinity, density, and oxygen). However, the sensors readings at the time of bottle firings should be acceptable as the CTD package was stopped in the water for at least 30 seconds before any firings, in order to allow sufficient time for the sensors to give stable readings.

3 Vessel Mounted ADCP (VM-ADCP) and navigation data

Charlotte Marcinko, NOCS

3.1 Introduction

The RRS *Discovery* is equipped with two hull mounted Ocean Survey broadband VM-ADCPs. An RDI broad band 150 kHz (Ocean Surveyor) phased array style VM-ADCP is mounted in the hull 1.75 m to port of the keel, 33 m aft of the bow at the waterline, at an approximate depth of 5.3 m. A 75 kHz VM-ADCP is also mounted in the hull, in a second well 4.15 m forward and 2.5 m to starboard of the 150 kHz well. As described in previous reports (D365 and D369) there have recently been some issues with the 75 kHz VM-ADCP and the instrument was replaced at the start of D370.

This section describes the operation and data processing paths for both VM-ADCPs. The navigation data processing is described first since it is key to the accuracy of the VM-ADCP current data. All integrated underway data were logged using the Ifremer TechSAS data logging system. Over previous cruises, the live RVS data format streams have overcome the problem of insignificant figure resolution in position data using *nclistit*. These live data streams do not convert the netcdf format to RVS data format, instead they log TechSAS broadcast messages independently.

3.2 Method

Navigation

Meaningful water velocities from the VM-ADCPs can only be obtained when the data are corrected for the ship's direction, speed and attitude; in effect removing the ship's motion from the VM-ADCP's initial estimate of water column movement. Several processing steps were preformed which combine the required navigational information prior to VM-ADCP data processing.

The ship's primary position instrument was the Fugro SeaStar 9200G2 system. The positional accuracy for the SeaStar 9200G2 system was determined previously on D369 from the data recovered whilst tied up alongside Tenerife. Standard deviation for positional accuracy was found to be ~ ±0.14 m. The backup system used was the Ashtech ADU5 3-D gps system whose positional accuracy had been determined in parallel to be ± 0.9 - 1.5 m S.D.

Both the SeaStar 9200 and the Ashtech ADU5 systems have sufficient precision to enable the calculation of ship's velocities to much better than 1 cm s^{-1} over 2 minute ensemble periods and therefore below the instrumental limits (~ 1 cm s^{-1}) of the RDI VM-ADCP systems. Using the Fugro SeaStar 9200G2 system as its primary navigation source, the NMFSS Bestnav combined (10 second) cleaned navigation process was operational on D379.

Navigation and gyro data were transferred daily from the RVS format file streams to pstar navigation files.

Scripts:

navexec0: transferred data from the RVS *bestnav* file to PSTAR, calculated the ships velocity, appended onto the absolute (master) navigation file and calculated the distance run from the start of the master file. Output: abnv3791

gyroexec0: transferred data from the RVS *gyro* stream file to Pstar, a nominal edit was made for directions between 0-360° before the file was appended to a master file. Output: gyr37901

gpCexec0: transferred data from the RVS *gps_g2* stream to Pstar, edited out pdop (position dilution of precision) greater than 7 and appended the new 24 hour file to a master file. The master file was averaged to create an additional 30 second file and distance run was calculated and added to both. Output: gpC37901, gpC37910.30sec.

Heading

The ships attitude was determined every second with the ultra short baseline 3D GPS Ashtech ADU5 navigation system. This is a four antenna GPS system that can produce attitude data from the relative positions of each antenna and is used to correct the VM-ADCP for ship motion. Two antennae are on the bridge top and two on the boat deck.

During D379 we experienced some issues with the Ashtech ADU5 navigation system. Data streams for both the ship's pitch and roll variables were not computed between 03:35 on Julian day 223 until 09:22 on Julian day 224. On discovering of the loss of variables the technician on board, Zoltan Nemeth, changed antenna four on the starboard boat deck and the system was restarted. However, the computation of pitch and roll variables continued to cut out intermittently over the next 36 hours for periods of up to one hour at a time. Data loses were confined to the calculation of the ship's pitch and roll and there appeared to be no lose of other variables computed by the Ashtech ADU5 navigation system, namely the ship's heading data.

The Ashtech heading data were used to calibrate the gyro heading information as follows:

ashexec0: transferred data from the RVS format stream *gps_ash* to pstar.

ashexec1: merged the ashtech data from ashexec0 with the gyro data from gyroexec0 and calculated the difference in headings (hdg and gyroHdg); ashtech-gyro (a-ghdg).

ashexec2: edited the data from ashexec1 using the following criteria:

heading	0 < hdg < 360 (degrees)
pitch	-5 < pitch < 5 (degrees)
roll	-7 < roll < 7 (degrees)
attitude flag	-0.5 < attf < 0.5

measurement RMS error	0.00001 < mrms < 0.01
baseline RMS error	0.00001 < brms < 0.1
ashtech-gyro heading	-7 < a-ghdg < 7 (degrees)

The heading difference (a-ghdg) was then filtered with a running mean based on 5 data cycles and a maximum difference between median and data of 1 degree. The data were then averaged to 2 minutes and further edited for

-2 < pitch <2

0 < mrms < 0.004

The 2 minute averages were merged with the gyro data files to obtain spot gyro values. The ships velocity was calculated from position and time, and converted to speed and direction. The resulting a-ghdg should be a smoothly varying trace that can be merged with VM-ADCP data to correct the gyro heading. Diagnostic plots were produced to check this. During ship manoeuvres, bad weather or around data gaps, there were spikes which were edited out manually (plxyed, **Fig 3.1**).

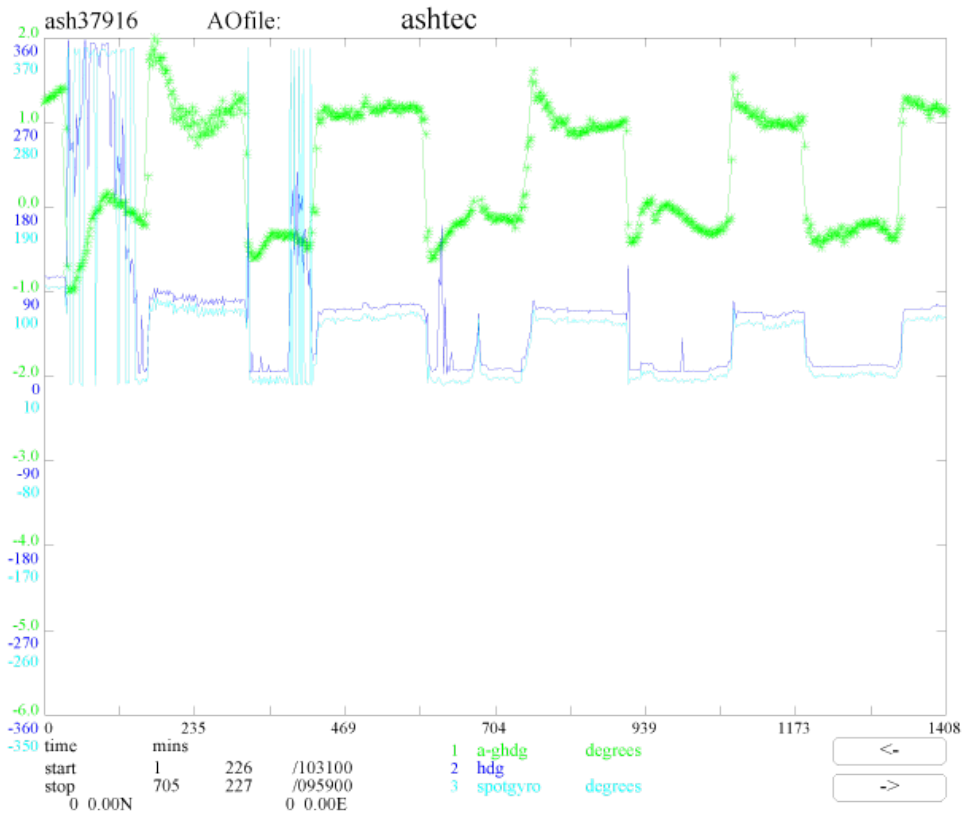

Figure 3.1. Example of the onscreen output of daily navigation hdg data generated by gyro (light blue line), ashtech ADU5 (dark blue line) and the difference between them (green line).

Throughout D379 Ashtech 3D GPS coverage was very good. Gaps over 1 minute in the data stream are listed below:

time gap : 12 212 10:31:45 to 12 212 10:35:22 (3.6 mins)

time gap : 12 212 12:25:22 to 12 212 12:34:49 (9.4 mins)

time gap : 12 215 08:40:49 to 12 215 08:50:45 (9.9 mins)

VM-ADCP data

This section describes the operation and data processing paths for the VM-ADCP, and closely follows that used on RRS *Discovery 369*.

75 kHz and 150 kHz VM-ADCP data processing

The RDI Ocean Surveyor 150 kHz Phased Array VM-ADCP was configured to sample over 120 second intervals with 96 bins of 4m depth and a blank beyond transmit of distance of 4m. The instrument is a broad-band phased array VM-ADCP with 153.6 kHz frequency and a 30° beam angle.

The RDI Ocean Surveyor 75 kHz Phased Array VM-ADCP was configured to sample over 120 second intervals with 96 bins of 8m depth and a blank beyond transmit of distance of 8m. The instrument is a broad band phased array VM-ADCP with 76.8 kHz frequency and a 30° beam angle.

The deck unit had firmware upgrades to VMDAS 23.17 following the March 2008 refit. Both PCs ran RDI software VmDAS v1.46. The following network COM ports were applicable for both VM-ADCPs (Table 3.1).

Table 3.2: Changes of COM posrts during RRS Discovery 2010 refit

COM PORT	Baud Rate	Data Stream
COM1	9600	VM-ADCP
COM2	4800	NMEA1 ($GPGGA – Position) ($HEHDT – Gyro)
COM3	9600	NMEA2 ($GPPAT – Ashtech)

Gyro heading, and GPS Ashtech heading, location and time were fed as NMEA messages into the serial ports of the controlling PC and VmDAS was configured to use the Gyro heading for co-ordinate transformation. VmDAS logs the PC clock time, stamps the data (start of each ensemble) with that time, and records the offset

of the PC clock from GPS time. This offset was applied to the data in the PSTAR processing path, see below, before merging with navigation.

The 2 minute averaged data were written to the PC hard disk in files with a .STA extension, e.g. D379os150001_000000.STA, D379os150002_000000.STA etc. for the 150 kHz data and D379_os75001_000000.STA, D379os75002_000000.STA etc. for the 75 kHz data. Sequentially numbered files were created whenever data logging was stopped and re-started. The software was set to close the file once it reached 100MB in size, though on D379 files were closed and data collection restarted daily such that the files never became that large. All files were transferred to the unix directories /D379_pstar/pstar/os150/raw and /D379_pstar/pstar/os75/raw as appropriate.

It should be highlighted that data stopped logging to the raw data file D379_os75012_000000.STA, from the 75 kHz VM-ADCP, at 16:35 GMT on Julian day 220 until the data file was cycled at 09:30 GMT on Julian day 221. This loss of data is unexplained, hourly watch checks had shown the instrument was working well throughout the period in question. An approximate 17 hour gap in 75 kHz VM-ADCP data stream thus exists during this period. A gap of approximately 24 hours also exists in both the 150 and 75 kHz VM-ADCP data between day 223 through and 224. This is due to the problem described earlier with the Ashtech ADU5 navigation system which required the starboard boat deck antenna to be replaced.

Both instruments were configured to run in ‘arrowband’ range over resolution mode. Bottom tracking was used during the steam north from Southampton, through the Irish Sea, to the start of the Ellett Line in the Sound of Mull and until water depths became deeper than 300 m; files 003 - 007 for both instruments. At the time of writing it is envisaged that bottom tracking mode will also be used over the Icelandic shelf during the steam into Reykjavik.

The VM-ADCP processing path followed an identical route to that developed in 2001 for the 75 kHz VM-ADCP (RRS *Discovery* cruise 253). In the following script descriptions, "##" indicates the daily file number.

S75exec0 and S150exec0: data read into Pstar format from RDI binary file (psurvey2). Water track velocities written into "sur" (75kHz) or "adp" (150kHz) files, bottom track into "sbt" (75kHz) or "sur" (150kHz) files if in bottom track mode. Velocities were scaled to cm/s and amplitude by 0.45 to db. The time variable was corrected to GPS time by combining the PC clock time and the PC-GPS offset. An offset depth for the depth bins was provided in the user supplied information (13 m for the 75kHz and 9 m for the 150 kHz instruments), this equated to the sum of the water depth of the transducer in the ship's hull (~5 m in RRS *Discovery*) and the blank beyond transmit distance used in the instrument setup (see earlier). Output Files: 75kHz (sur379##.raw, sbt379##.raw), 150 kHz (adp379##.raw, bot379##.raw).

S75exec1 and s150exec1: data edited according to status flags (flag of 1 indicated bad data). Velocity data replaced with absent data if variable "2+bmbad" was greater than 25% (% of pings where >1 beam bad therefore no velocity computed). Time of ensemble moved to the end of the ensemble period (120 secs added with pcalib). Output files: 75kHz (sur379##, sbt379##), 150 kHz (adp379##, bot379##).

S75exec2 and s150exec2: this merged the VM-ADCP data (both files) with the ashtech a-ghdg created by ashexec2. The VM-ADCP velocities were converted to speed and direction so that the heading correction could be applied and then returned to east and north. Note the renaming and ordering of variables. Output files: 75kHz (sur379##.true, sbt379##.true), 150 kHz (adp379##.true, bot379##.true).

S75exec3 and s150exec3: applied the misalignment angle, ø, and scaling factor, A, to both files. Variables were renamed and re-ordered to preserve the original raw data. Output Files: 75kHz (sur379##.cal, sbt379##.cal), 150 kHz (adp379##.cal, bot379##.cal).

S75exec4 and s150exec4: merged the VM-ADCP data (both files) with the bestnav (10 sec) NMFSS combined navigation imported to pstar through navexec0 (abnv3791). Ship's velocity was calculated from spot positions taken from the abnv3791 file and applied to the VM-ADCP velocities. The end product is the absolute velocity of the water. The time base of the VM-ADCP profiles was then shifted to the centre of the 2 minute ensemble by subtracting 60 seconds and new positions were taken from abnv3791. Output Files: 75kHz (sur379##.abs, sbt379##.abs), 150 kHz (adp379##.abs, bot379##.abs).

75 kHz and 150 kHz VM- ADCP calibration

A calibration of both VM-ADCPs was achieved using bottom tracking data available from our departure from Southampton travelling north through the Irish Sea. No further calibration was deemed necessary from inspection of the processed data during the cruise. Using long, straight, steady speed sections of standard two minute ensemble profiles over reasonably constant bottom depth the following calibrations for mis-alignment angle, ϕ, and necessary amplification (tilt), A, were derived by comparing GPS derived component vectors of the vessel speed and direction with processed VM-ADCP bottom track determined component vectors of the vessel speed and direction:

150 kHz:	ϕ	A
mean	-0.643418649	1.007194314
s.d	0.107562285	0.002050008

75 kHz:	ϕ	A
mean	3.409524779	0.995817247
s.d.	0.167736392	0.003402573

The calibration for the 150 kHz VM-ADCP was very similar to that obtained on D369. As the 75 kHz VM-ADCP had recently been replaced no previous calibration was available for comparison.

3.3 Results and Discussion

Initial data inspection included absolute velocity vectors at selected depths, **105 m** (75 kHz), and **35 m** (150 kHz) were averaged in 4 km regular grid and plotted along the ship track. Visual comparison of these plots allowed rough assessment of the data consistency. An example of such plot is shown in **Figure 3.2**.

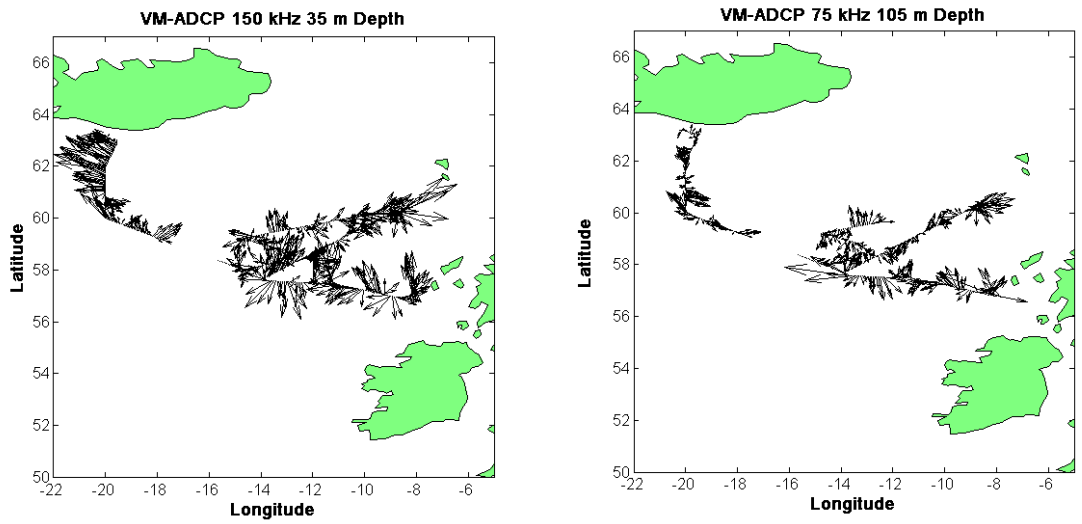

Figure 3.2 Absolute velocity vectors for 2 minutes ensemble average

Preliminary analysis of the depth profile of the 4 km averaged data from the 150 kHz VM-ADCP, taken during the steam from Rockall to the Wyville Thomson Ridge, indicated some curious sloping lines in absolute northerly and easterly velocities (**Figure 3.3**). Such lines were not found to be present in the 75 kHz data (**Figure 3.4**). The cause of these slopping lines is currently not clear and requires further

investigation. At a guess they could potentially signify that some interference between the two VM-ADCPs which is only manifesting itself in the 150 kHz data.

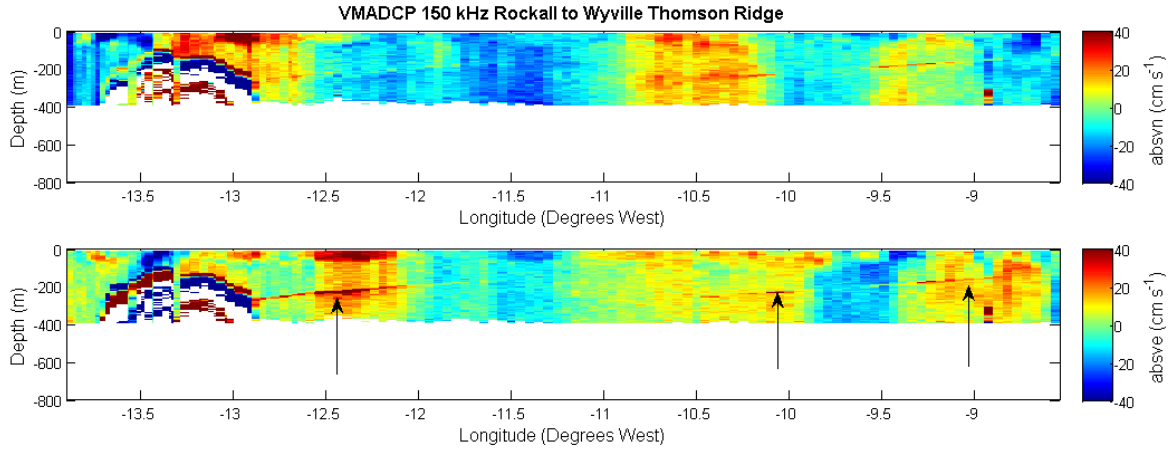

Figure 3.3: Example of 4 km averaged 150 kHz VM-ADCP data from Rockall to the Wyville Thomson Ridge. Positive velocities indicate northward currents (top plot) and eastward currents (bottom plot), negative velocities indicate southward currents (top plot) and westward currents (bottom plot). Arrows indicate the position of slopping lines in 150 kHz data. The velocity scale has been limited to 40 cm s^{-1} to present maximum detail within the data.

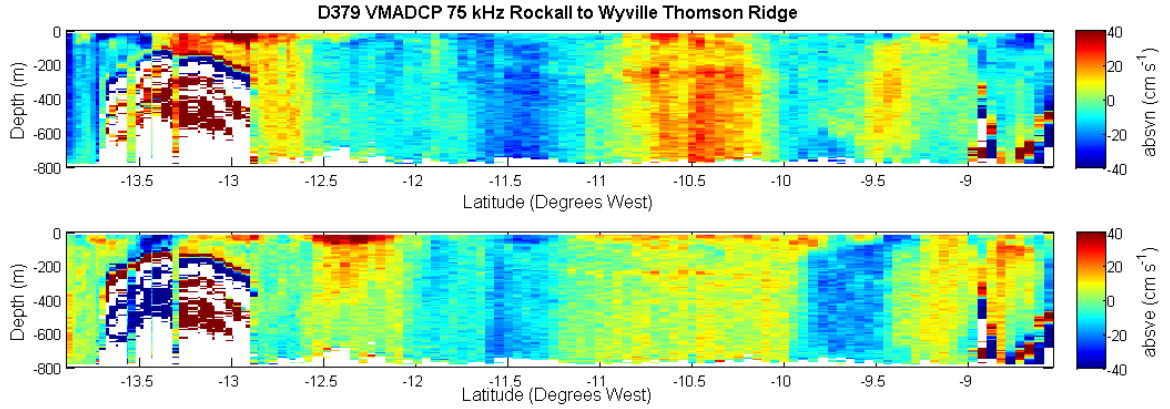

Figure 3.4: Example of 4 km averaged 75 kHz VM-ADCP data from Rockall to the Wyville Thomson Ridge. Positive velocities indicate northward currents (top plot) and eastward currents (bottom plot), negative velocities indicate southward currents (top plot) and westward currents (bottom plot). The velocity scale has been limited to 40 cm s^{-1} to present maximum detail within the data.

4 Dissolved Inorganic Nutrients

Tim Brand (SAMS)

4.1 Introduction

The basic water column dissolved nutrients phosphate, silicate (reactive silica) and total oxidized nitrogen (nitrate + nitrate) were analyzed from CTD casts along the extended Ellett line and from the ships non-toxic sea water supply. The phosphate line stopped working due to a faulty rotary valve fairly soon into the cruise and it was considered more important to measure phosphate rather than ammonia hence the ammonia line rotary valve was swapped for the defective phosphate one. CTD depths for the samples were chosen to correspond with those of the chlorophyll and particulate organic carbon down to 100m and 500m respectively and at depths below this coinciding with changes in water mass identified by the TS and dissolved oxygen characteristics from the CTD casts. A full list of CTD and non-toxic supply samples taken is available in the appendix.

In total 712 nutrient samples were measured in triplicate from 69 CTD stations along the Extended Ellett line, adjoining shelf G station transects and 6 stations around the Wyville Thompson Ridge, together with 49 non-toxic supply samples.

4.2 Method

Samples were collected in 125mls acid cleaned polythene bottles directly from the CTD spigots without the use of a tube. Samples were always analyzed within 24 hours of collection and stored in a fridge prior to analysis. Measurement was conducted using a Lachat *QuikChem 8500* flow injection autoanalyser using the manufacturers recommended methods: Ammonia, 31-107-06-1-B; Orthophosphate, 31-115-01-1-G; Silicate, 31-114-27-1-A and Nitrate/Nitrite, 31-107-04-1-A.

Samples were measured in triplicate to identify instrument precision. A stock mixed standard was prepared in deionized water with subsequent dilutions made in OSIL Low Nutrient Sea Water using the instruments auto-dilutor facility. This is a departure from the previous technique of using deionized water for the dilutions since it was found this technique resulting in nitrate values 10-20% too high. Using standards prepared in LNSW removes the need to do a separate salt correction. Five standard concentrations and a blank were run in all cases and new standards were prepared every 48hrs. Using standards prepared in LNSW removes the need to do a separate salt correction Three standard concentration ranges were prepared for the non-toxic supply samples and CTD transect samples depending upon expected sample nutrient concentration, *vis*

	Ammonia (□M)	Phosphate (□M)	Silicate (□M)	Total Oxid. N (□M)
Non-toxic	No used	0.0 – 2.5	0.0 – 2.5	0.0 – 2.5
G transect	0.0 – 2.5	0.0 – 2.5	0.0 – 15.0	0.0 – 15.0
Ellett Line	No used	0.0 – 2.5	0.0 – 20.0	0.0 – 25.0
Iceland Basin	No used	0.0 – 2.5	0.0 – 20.0	0.0 – 25.0
W.T. Ridge	No used	0.0 – 2.5	0.0 – 20.0	0.0 – 25.0

A standard reference solution prepared from nutrient standard solutions supplied by OSIL containing 1 □M NH_4Cl, 1 □M KH_2PO_4, 10 □M $NaSiO_3$ and 10 □M KNO_3 was run at the start and end of each sample batch to determine analytical accuracy and to adjust for calibration drift during the course of a sample batch analysis.

4.3 Data quality

Lachat instrument *precision*, determined from analysing each sample in triplicate, routinely yielded a coefficient of variation (SD/mean x 100%) of less than 2% for nutrient concentrations greater than 10 □M and g
concentrations for concentrations less than 10 □M. Analytical *accuracy*, determined from analysis of the standard reference solution was consistently equal to or than better than 95%

Underway sample #	Date	Time (GMT)		Lat (N)	Long (W)	Phosphate (uM)	Error (uM)	Silicate (uM)	Error (uM)	Nitrate (uM)	Error (uM)
U1	04/08	16:59:20	57.463	11.265	0.20	0.01	0.29	0.04	2.42	0.01	
U2	04/08	19:29:09	57.479	11.446	0.18	0.01	0.29	0.02	1.96	0.03	
U3	04/08	23:10:56	57.488	11.710	0.20	0.01	0.11	0.03	2.53	0.02	
U4	05/08	03:38:38	57.507	12.200	0.23	0.00	0.24	0.01	2.92	0.01	
U5	05/08	06:44:48	57.518	12.412	0.21	0.02	0.14	0.02	2.65	0.01	
U6	05/08	10:17:50	57.538	12.803	0.22	0.02	0.22	0.02	2.65	0.02	
U7	05/08	14:50:40	57.560	13.208	0.25	0.01	0.00	0.04	4.23	0.03	
U8	05/08	16:23:17	57.569	13.399	0.22	0.01	BD	0.04	3.83	0.05	
U9	05/08	18:09:58	57.590	13.716	0.26	0.01	0.01	0.02	4.41	0.04	
U10	05/08	20:04:00	57.712	13.823	0.25	0.00	0.00	0.03	4.51	0.04	
U11	05/08	21:58:00	57.954	13.355	0.20	0.00	0.09	0.02	3.23	0.01	
U12	05/08	23:59:00	58.213	12.852	0.19	0.00	0.15	0.01	2.03	0.00	
U13	06/08	02:02:00	58.481	12.333	0.23	0.01	0.16	0.02	2.78	0.01	
U14	06/08	04:06:00	58.735	11.836	0.18	0.01	0.22	0.04	2.20	0.01	
U15	06/08	06:03:00	58.967	11.380	0.23	0.01	0.18	0.06	3.40	0.03	
U16	06/08	08:01:00	59.209	10.901	0.22	0.01	0.11	0.02	3.44	0.02	
U17	06/08	10:03:00	59.474	10.371	0.24	0.04	0.15	0.01	3.40	0.01	
U18	06/08	12:02:00	59.720	9.872	0.20	0.01	0.23	0.08	2.73	0.00	
U19	06/08	14:00:00	59.956	9.398	0.16	0.01	0.36	0.02	1.70	0.02	
U20	06/08	16:02:00	60.204	8.892	0.21	0.01	0.30	0.02	2.77	0.01	
U21	06/08	18:05:00	60.388	8.513	0.34	0.02	0.81	0.02	3.94	0.01	
U22	08/08	00:00:00	60.245	9.384	0.21	0.00	0.19	0.01	2.68	0.00	
U23	08/08	02:00:00	60.126	10.010	0.21	0.01	0.15	0.01	2.14	0.02	
U24	08/08	04:00:00	60.006	10.641	0.19	0.01	0.10	0.02	2.19	0.01	
U25	08/08	06:00:00	59.888	11.264	0.19	0.01	0.10	0.02	2.01	0.02	
U26	08/08	08:03:00	59.760	11.934	0.20	0.01	0.13	0.02	1.93	0.04	
U27	08/08	10:02:00	59.639	12.564	0.15	0.01	0.13	0.02	1.53	0.02	
U28	08/08	12:04:00	59.515	13.210	0.14	0.01	0.20	0.02	1.28	0.01	
U29	08/08	14:00:00	59.402	13.795	0.20	0.01	0.18	0.02	1.45	0.02	
U30	08/08	16:00:00	59.281	14.416	0.19	0.01	0.17	0.02	1.19	0.01	
U31	09/08	20:22:00	58.34	13.465	0.17	0.00	0.05	0.04	1.84	0.04	
U32	09/08	21:57:00	58.18	13.914	0.18	0.01	0.23	0.01	2.09	0.01	
U33	10/08	04:15:37	58.10	14.959	0.16	0.00	0.08	0.01	1.41	0.01	
U34	10/08	08:07:33	58.31	15.473	0.19	0.01	0.24	0.03	2.58	0.02	
U35	10/08	16:01:17	58.59	16.250	0.15	0.00	0.17	0.02	1.13	0.01	
U36	11/08	03:11:30	58.90	17.091	0.23	0.00	0.07	0.02	0.88	0.01	
U37	11/08	07:10:00	59.10	17.424	0.16	0.01	0.07	0.03	0.82	0.02	
U38	11/08	12:49:15	59.16	17.782	0.15	0.00	0.09	0.02	0.25	0.03	
U39	11/08	16:10:23	59.26	18.044	0.13	0.01	0.11	0.04	1.39	0.01	
U40	11/08	21:51:30	59.37	18.340	0.22	0.01	0.12	0.04	1.42	0.02	
U41	12/08	05:00:20	59.53	18.768	0.21	0.01	0.08	0.03	1.42	0.03	
U42	13/08	01:46:08	60.25	20.000	0.20	0.01	0.27	0.05	1.64	0.04	
U43	13/08	17:36:50	61.25	20.004	0.13	0.00	0.49	0.02	0.66	0.00	
U44	13/08	22:58:13	61.49	20.004	0.17	0.01	0.33	0.06	0.76	0.01	

U45	14/08	04:50:42	61.75	19.997	0.16	0.02	0.54	0.02	0.90	0.01
U46	14/08	14:14:28	62.19	19.904	0.12	0.00	0.71	0.02	0.67	0.01
U47	14/08	19:42:57	62.57	19.714	0.19	0.00	0.73	0.07	1.81	0.01
U48	15/08	00:46:55	62.89	19.560	0.16	0.00	0.87	0.03	1.51	0.02
U49	15/08	04:32:45	63.05	19.776	0.16	0.00	0.79	0.04	1.59	0.00

Nutrient concentrations across the Ellett Line transect

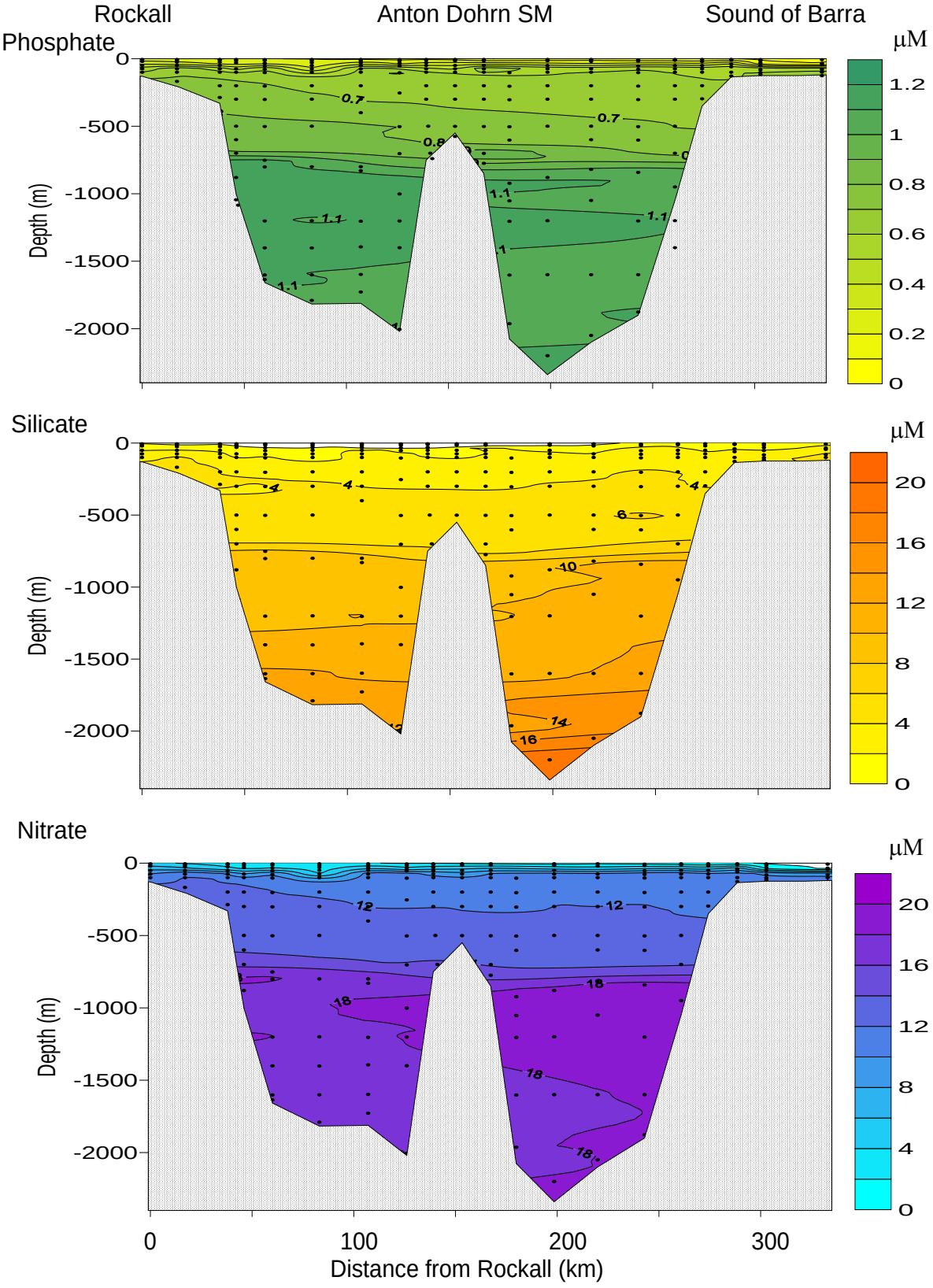

Figure 4.1 Nutrient concentrations across the Ellett Line Section

5 Dissolved Oxygen

Tim Brand, Patrick Lewtas (SAMS)

5.1 Introduction

Water column dissolved oxygen was determined from selected CTD samples collected throughout the cruise to determine the calibration of the CTD '*Sea Bird*' oxygen probe.

5.2 Method

Triplicate oxygen samples were collected from up to 3 selected depths on 16 CTD casts taken throughout the cruise. One hundred and 18 samples were collected and analysed in total.

The Winkler chemistry methodology of Carrit and Carpenter (1966) was used to fix and titrate the sample. A *Copenhagen Radiometer* auto-titrator was used for the titrations and the end point was determined spectrophotometrically.

5.3 Results

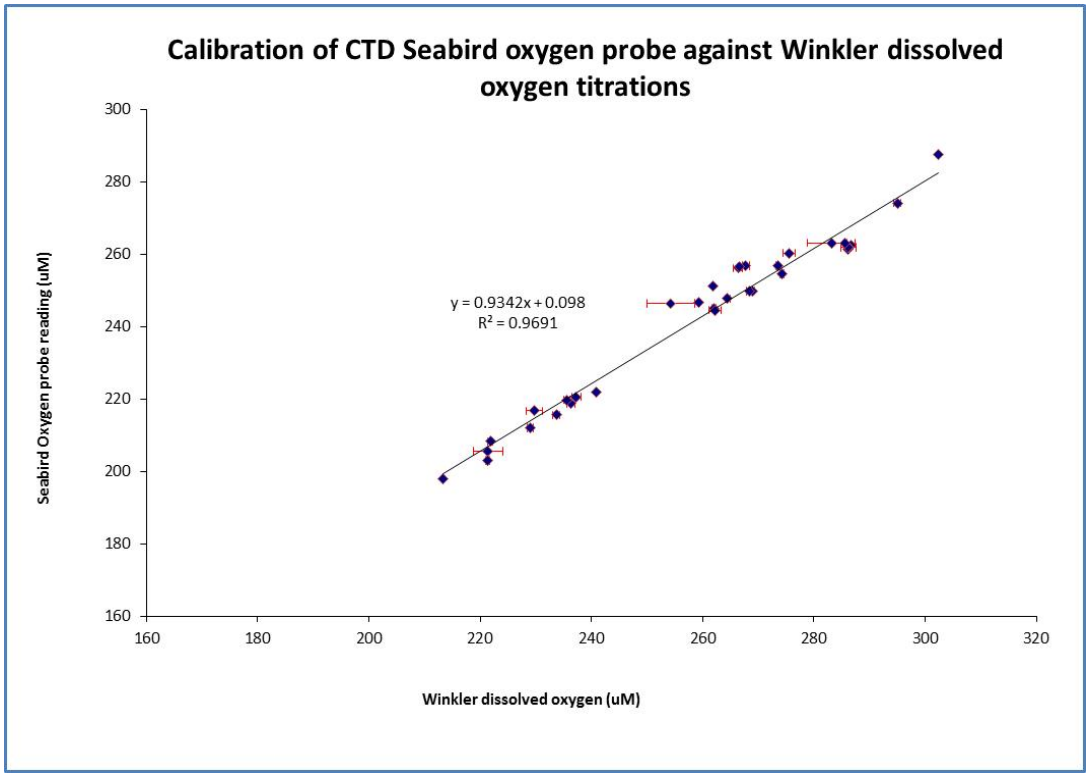

Figure 5 - CTD Oxygen Calibrations

6 Particulate Organic Carbon

Tim Brand, Linda Robb, Lewis Drysdale Devin O' Connel, Karen Wilson, Jason Dobson (SAMS)

6.1 Introduction

To determine the transfer of organic carbon from the chlorophyll maxima to mid water depths along the extended Ellett line transect (500m water depth) water samples were collected from the CTD and filtered. Samples were taken from the chlorophyll maxima depth, 50m, 100m 200m and 500m. All stations and respective depths chosen are shown in the CTD logs in the appendices.

6.2 Method

Samples were collected from the CTD in 2l polythene bottles and between 0.5 and 2l of each sample were filtered through pre-combusted (500C, 3hrs) 13mm diameter Gelman A/D glass fiber filters. The filtration rig used is an in-house design that uses 13mm filter holders and vacuum filtration. Normally 0.5 l of sample was filtered if from the chlorophyll maxima and 2l was filtered for samples taken below this depth. A maximum of five depths were sampled from 44 casts along the transect. Samples, once collected and filtered, were stored in plastic 30mm diameter petri dishes in the -20C freezer. Analysis will take place at SAMS using a Costech Elemental Analyser. Prior to analysis the samples will undergo 24hrs of hydrochloric acid fuming to removing inorganic carbon (calcium carbonate).

7 Chlorophyll

Tim Brand and Rosie Houlding (SAMS)

7.1 Introduction

To determine the photosynthetic biomass of the upper waters of the extended Ellett Line transect. Samples were collected from the CTD and filtered. Samples were taken from from 5m depth, chlorophyll maxima, 50m, 75m and 100mm depth. All stations and respective depths chosen are shown in the CTD logs in the appendices. 23 underway samples were also taken from the non-toxic supply

7.2 Method

Samples were collected from the CTD in 2l polythene bottles and between 1 and 2l of each sample were filtered through Whatman 25mm GF/F diameter glass fiber filters. The filtration rig used is an in-house design that uses 25mm filter holders and vacuum filtration. Normally 1 l of sample was filtered if from the chlorophyll maxima and 2l was filtered for samples taken below this depth. A maximum of five depths were sampled from 54 casts along the transect. Samples, once collected and filtered, were stored in plastic 15mm diameter centrifuge tubes in a -20C freezer. Whilst on board extraction using 5mls of 90% buffered (magnesium carbonate) acetone was injected into the tube and the sample was sonicated for 1 minute. An aliquot of the extract was then taken and measured on a Turner bench top fluorometer using a chlorophyll calibrated program.

D379
Extended Ellett Line

Underway sample #	Date	Time (GMT)	Lat N	Long W	Chlorophyll (ug/l)
U10	05/08	20:04:00	57.712	13.823	1.13
U11	05/08	21:58:00	57.954	13.355	1.59
U12	05/08	23:59:00	58.213	12.852	1.16
U13	06/08	02:02:00	58.481	12.333	0.99
U14	06/08	04:06:00	58.735	11.836	0.98
U15	06/08	06:03:00	58.967	11.380	1.18
U16	06/08	08:01:00	59.209	10.901	1.07
U17	06/08	10:03:00	59.474	10.371	1.33
U18	06/08	12:02:00	59.720	9.872	1.15
U19	06/08	14:00:00	59.956	9.398	1.36
U20	06/08	16:02:00	60.388	8.513	1.41
U22	08/08	00:00:00	60.245	9.384	1.40
U23	08/08	02:00:00	60.126	10.010	0.94
U24	08/08	04:00:00	60.006	10.641	0.01
U25	08/08	06:00:00	59.888	11.264	0.10
U26	08/08	08:03:00	59.760	11.934	1.82
U27	08/08	10:02:00	59.639	12.564	1.82
U28	08/08	12:04:00	59.515	13.210	2.17
U29	08/08	14:00:00	59.402	13.795	1.81
U30	08/08	16:00:00	59.281	14.416	1.26
U31	09/08	20:22:00	58.34	13.465	1.55
U32	09/08	21:57:00	58.18	13.914	0.00
U33	10/08	04:15:37	58.10	14.959	2.32

Table 7.1 Underway Chlorophyll Samples

8 Reactive aluminium measurements

Clare Johnson, Ribanna, Dittrich (SAMS)

A total of 176 water samples were collected for the determination of reactive aluminium (defined as dissolved aluminium plus that adsorbed to particles) during D379 (Table 8.1). Samples were taken only from deep water stations (> 1000 m) with the exception of S359 (~ 890 m) near the Wyville Thomson Ridge. Sample depths were chosen to try and sample all water masses within each cast.

Station name	**Sample depths (dbar)**
P	100, 200, 400, 600, 700, 800, 950, 1100, 1200, 1400
N	100, 200, 400, 600, 800, 820, 1050, 1200, 1400, 1600, 1800, 1900, 2050
L	100, 200, 400, 600, 800, 920, 1050, 1200, 1400, 1600, 1800, 1900, 1960
G	100, 200, 400, 600, 700, 830, 900, 1200, 1390, 1600, 1740
E	100, 200, 400, 600, 750, 800, 900, 1200, 1400, 1600, 1640
D	100, 200, 400, 500, 600, 700, 800, 880, 1045
S359	175, 250, 325, 450, 525, 650, 725, 885
WTM	250, 400, 600, 700, 800, 900, 1000, 1090, 1195
S353	400, 700, 900, 1000, 1100, 1200, 1310
IB4	100, 200, 400, 500, 600, 700, 800, 900, 1000, 1140
IB12	100, 200, 400, 645, 800, 1000, 1200, 1500, 1795, 2000, 2200, 2400, 2550, 2660
IB14	100, 200, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2300
IB16	100, 200, 400, 800, 1000, 1200, 1400, 1600, 1800
IB17	100, 200, 400, 800, 850, 1000, 1200, 1400, 1500, 1600, 1700
IB19S	100, 200, 400, 600, 750, 1000, 1200, 1300, 1450 1600
IB20S	100, 200, 400, 600, 900, 1000, 1200, 1300, 1350

Table 8.1 Station and depths at which water samples for the determination of reactive aluminium were taken

Due to the risk of contamination a dedicated person was allocated on each watch to collect the aluminium samples. Pre-cleaned 60 ml LDPE sample bottles were rinsed in the seawater of interest three times before being filled approximately to the shoulder. Care was taken not to leave lids off sample bottles any longer than necessary and smoking was not allowed in the rosette area. When possible an extra rosette bottle was fired enabling water for aluminium determination to be collected first. When this was not possible water for aluminium determination was withdrawn second after that for oxygen or dissolved inorganic carbon determination.

All samples, except those from the last two stations (IB19S and IB20S), were analysed onboard. The preparation took place in a laminar flow hood to minimise contamination risk. Samples from IB19S and IB20S could not be prepared or analysed onboard due to time constraints. Samples from these stations were frozen and will be analysed in a clean room at SAMS using identical procedures. Samples were split into to aliquots of 10 ml within 48 hours of collection and prepared according to Hydes and Liss (1976) with two modifications. Instead of a sodium acetate – acetic acid buffer solution, an ammonium acetate – acetic acid buffer (4 M wrt ammonium acetate, pH 5) was used. Additionally, samples were left for 24 hours in order for the aluminium-lumogallion complex to form instead of heating in a water bath.

Samples were analysed using a Turner Triology Fluorometer with a custom module (excitation wavelength 490 nm, emission 570 nm). Due to time constraints it was not possible to analyse samples in triplicate. Instead a selection of samples (covering a variety of depths and therefore aluminium concentrations) were analysed three times to get an estimate of precision. Both intra-bottle and inter-bottle precisions ranged from 2-10 % over a range of aluminium concentrations (3-40 nM).

During each analysis run a calibration was carried out. Incremental amounts of a standard aluminium solution (prepared by diluting an ICP-MS standard) were added to seawater enabling a graph of aluminium concentration against fluorescence to be plotted. R^2 values of greater than 0.96 were achieved throughout the cruise. As an additional check a secondary standard was measured during each analysis run.

To ensure that the reagents added to the samples were clean reagent blanks were carried out. These were prepared according to Hydes and Liss (1976) and were negligible.

Although some initial problems with the fluorometer lead to reduced quality of samples from the Rockall Trough section of the Ellett Line, other data appears to be of a high standard. Quality checking of the aluminium data will continue at SAMS and a final dataset will be banked with BODC.

Hydes, D., and P. Liss, 1976, Fluorimetric method for the determination of low concentrations of dissolved aluminium in natural waters, *Analyst*, **101**, 922-931.

9 Filtration for Coccolithophore counts during subsequent scanning electron microscopy (SEM)

Oliver Willmot (University of Southampton), Emily Trill (University of Southampton) and Alex Griffiths (University of Southampton), Charlotte Marcinko (NOCS).

Near surface water samples were collected and filtered for the determination of coccolithophore cell numbers, species identification and the determination of coccolithophore cell calcite by SEM analysis.

Approximately 2 litre water samples were collected from the CTD rosette using blacked out carboys. The water samples were then filtered through polycarbonate filters of 0.8µm thickness using a filtering rig and vacuum pump. The original protocol was to filter one litre of water per sample when time permitted, however this was reduced to 0.5 litres at some stations due to time constraints between CTDs .

Some of the early samples between stations have traces of dust and clothing fluff on the filters. Once this problem was identified the protocol was adjusted to reduce the likelihood of contamination. Cling film was used to cover the filtration rig whilst in use and the funnels where rinsed with Milli. Q water after filtration. Contamination by dust and fluff was immediately reduced as samples thereafter were noticeably cleaner.

Once filtered, the polycarbonate filters were placed in petri slides labelled with sample number, station number and depth and dried in a drying oven at approximately 40°C for 6 -8 hours.

Table: 9.1 Overview of stations, Niskin bottles and sampling depths for scanning electron microscopy

Date	Time CTD on deck (GMT)	Sample no.	Station no.	Niskin no.	Depth (m)	Sample vol. (litres)
02/08	08:44	1	1G	24	5	1
02/08	10:00	2	2G	3	5	1
02/08	12:32	3	4G	7	5.5	0.942
02/08	14:58	4	6G	5	5.5	1
02/08	18:35	5	8G	5	5	1
02/08	22:10	6	10G	14	5	0.5
03/08	00:43	7	12G	3	4.5	0.949
03/08	03:15	8	14G	5	5	0.477
03/08	06:04	9	15G	10	7	0.5
03/08	09:58	10	R	14	7	0.5
03/08	19:48	11	P	23	5	0.5
04/08	03:28	12	N	23	5	0.755
04/08	11:08	13	L	24	6	0.5
04/08	06:08	14	I	22	5	0.5
05/08	02:22	15	G	23	5	0.81
05/08	09:34	16	E	24	5	1
05/08	13:57	17	C	15	5	0.5
05/08	17:44	18	A	10	7	0.5
10/08	01:45	19	IB2	16	5	0.5
10/08	07:16	20	IB4	23	5	0.5
11/08	05:48	21	IB6	19	5	0.5
11/08	10:27	22	IB7	24	5	0.5
11/08	15:18	23	IB8	24	5	0.5
11/08	20:55	24	IB9	24	5	0.5
12/08	03:03	25	IB10	24	5	0.5
12/08	11:58	26	IB11	24	9	0.5
12/08	21:56	27	IB12	24	8	0.5
13/08	06:33	28	IB13	23	2	0.5
13/08	14:13	29	IB14	24	5	0.5
13/08	20:25	30	IB15	23	5	0.5
14/08	01:32	31	IB16	23	5	0.5
14/08	11:12	32	IB17	24	5	0.5
14/08	17:46	33	IB18S	22	21	0.5
14/08	18:34	34	IB18-18A	Underway	5	0.5
14/08	22:39	35	IB19S	24	5	0.5
15/08	02:50	36	IB20	23	5	0.5
15/08	07:00	37	IB21	24	8	0.5
15/08	09:15	38	IB22S	22	7	0.5
15/08	11:35	39	IB23S	12	7	0.5

10 - Iodine129 Sampling

Emily Trill (University of Southampton), Oliver Willmot (University of Southampton), Alex Griffiths (University of Southampton), Charlotte Marcinko (NOCS)

Water samples for analysis of iodine 129 were collected on behalf of Maria Villa Alfageme of the Universidad de Sevilla. Samples were collected in 250 ml polyethylene bottles and stored in the walk in fridge in darkness after collection. Depth profiles between the surface and 2000 m were taken at stations F and IB16 whilst surface water samples were taken at a further 10 stations along the Extended Ellett Line transect (**Table 10.1**). Water samples will be shipped to the Universidad de Sevilla on return to shore for analysis.

Station	Latitude	Longitude	Date	Time of Sample (GMT)	Sample Number	Niskin Number	Depth (m)
F	57°30.552°N	12°14.762°W	05/08	06:00	1	3	1600
F	57°30.552°N	12°14.762°W	05/08	06:00	2	5	1200
F	57°30.552°N	12°14.762°W	05/08	06:00	3	7	800
F	57°30.552°N	12°14.762°W	05/08	06:00	4	7	800
F	57°30.552°N	12°14.762°W	05/08	06:00	5	10	500
F	57°30.552°N	12°14.762°W	05/08	06:00	6	11	300
F	57°30.552°N	12°14.762°W	05/08	06:00	7	14	100
F	57°30.552°N	12°14.762°W	05/08	06:00	8	17	50
F	57°30.552°N	12°14.762°W	05/08	06:00	9	21	16
F	57°30.552°N	12°14.762°W	05/08	06:00	10	23	8
C	57°32.873°N	12°59.791°W	05/08	13:57	11	15	5
A	57°34.992°N	13°37.955°W	05/08	17:44	12	10	7
IB2	57°57.122°N	14°35.186°W	10/08	01:41	13	15	5
IB4	58°29.999°N	15°59.935°W	10/08	14:23	14	23	5
IB6	58°57.029°N	17°10.917°W	11/08	05:48	15	19	5
IB8	59°12.030°N	17°52.822°W	11/08	15:18	16	23	5
IB10	59°23.998°N	18°25.015°W	12/08	03:03	17	23	5
IB12	60°00.186°N	20°00.017°W	12/08	21:56	18	23	8
IB14	61°15.034°N	20°00.016°W	13/08	15:41	19	24	5
IB16	61°29.953°N	20°00.065°W	14/08	01:35	20	1	2206
IB16	61°29.953°N	20°00.065°W	14/08	01:35	21	3	1600
IB16	61°29.953°N	20°00.065°W	14/08	01:35	22	5	1200
IB16	61°29.953°N	20°00.065°W	14/08	01:35	23	7	1000
IB16	61°29.953°N	20°00.065°W	14/08	01:35	24	9	800
IB16	61°29.953°N	20°00.065°W	14/08	01:35	25	11	500
IB16	61°29.953°N	20°00.065°W	14/08	01:35	26	13	200
IB16	61°29.953°N	20°00.065°W	14/08	01:35	27	15	100
IB16	61°29.953°N	20°00.065°W	14/08	01:35	28	19	50
IB16	61°29.953°N	20°00.065°W	14/08	01:35	29	23	5
IB18	62°19.973°N	19°50.034°W	14/08	17:44	30	23	5

11 Mooring Report – Wyville Thomson Ridge

John Beaton & Colin Griffiths (SAMS)

The WTR was deployed on the 12th May 2011 from RV Scotia in the centre of the gully. The target position was N60.25 & W008.91 in 1200m of water. The Acoustic Release S/N 034 belonged to Marine Scotland.

Codes as follows:-

Arm/Range – 0428

Diagnostic – 0449

Release – 0455

The mooring comprised of a 75kHz LR-ADCP moored 20m above the seabed in a 49” syntactic sphere.

The ADCP setup:-

First bin – 16.67m

Bin size – 8m

Pings/Ens – 10

Time/Ping - 01:30:00

Ensemble Interval – 15 minutes

The mooring was retrieved on the 7th August 2012. All instruments were recovered in good condition. The ADCPs had stopped on recovery but had recorded good data to the end of June 2012. The mooring had been exposed to very high currents in excess of 2 knots. There was evidence of six overflow events (Figure 11.1). A spare set of instruments had already been prepared prior to the recovery. The mooring was redeployed later in the day. All went well, conditions were good. Full details of the mooring deployment are given below (Figure 11.2).

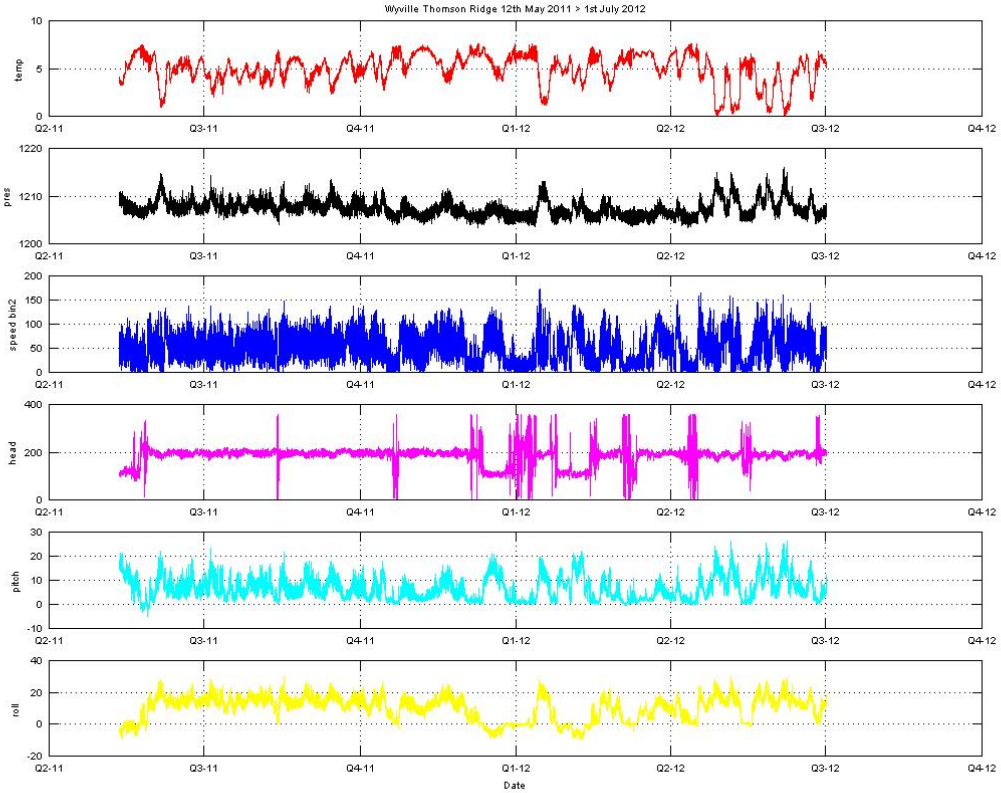

Figure 11.1 – Plot of ancillary data including speed (cm/s) from Bin No 2

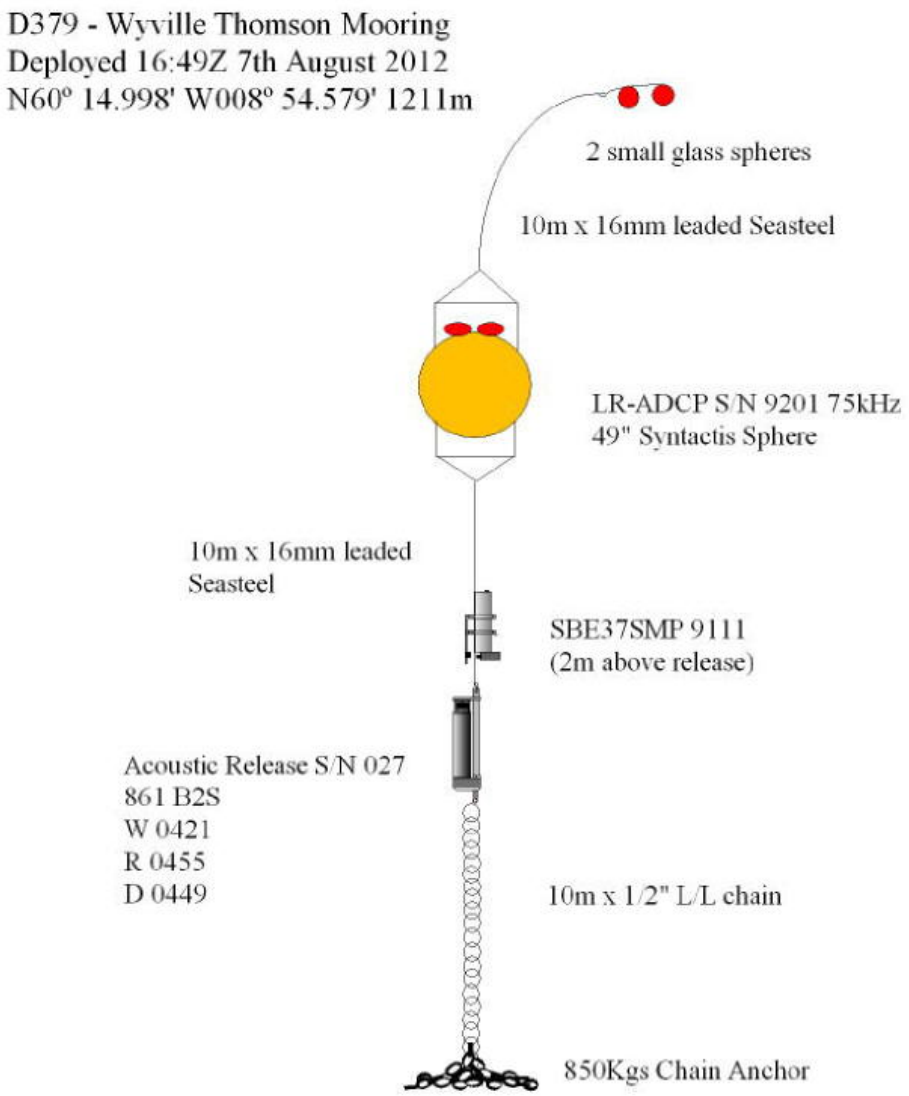

Figure 11.2 - Deployed WTR Mooring

Appendix 1

NMFSS Sensors and Moorings Technical CTD Report

JOHN WYNAR
Sensors & Moorings Group
National Marine Facilities Division
National Oceanography Centre, Southampton

CTD System Configuration

The initial sensor configuration for the stainless steel (s/s) system was as follows:

- Sea-Bird 9*plus* underwater unit, s/n: 09P-1082
- Frequency 0 - Sea-Bird 3 Premium temperature sensor, s/n: 03P- 4383
- Frequency 1 - Sea-Bird 4 conductivity sensor, s/n: 04C-2858
- Frequency 2 - Digiquartz temperature compensated pressure sensor, s/n: 121341
- Frequency 3 - Sea-Bird 3 Premium temperature sensor, s/n: 03P - 5660
- Frequency 4 - Sea-Bird 4 conductivity sensor, s/n: 04C-3768
- V0 - Sea-Bird 43 dissolved oxygen sensor, s/n: 43-0709
- V2 - WETLabs turbidity sensor, s/n: BBRTD-167
- V3 - Benthos PSA-916T 7Hz altimeter, s/n: 874
- V6 - Chelsea Alphatracka MKII transmissometer, s/n: 161050
- V7 - Chelsea Aquatracka MKIII fluorometer, s/n: 088-2615

Ancillary instruments & components:

- Sea-Bird 11*plus* deck unit, s/n: 11P-34173-0676
- Sea-Bird 24-position Carousel, s/n: 32- 0518
- 24 x Ocean Test Equipment 10L water samplers, s/n: 1 through 24

CTD Operations

There were 109 CTD casts made in total. Log sheets were scanned and included with the data from this cruise.

For the s/s system, the pressure sensor was located 30cm below the bottom and approximately 75cm below the centre of the 10L water sampling bottles. The configuration file used was D379_NMEA.xmlcon (see Appendix 1) for casts 1 to 92 inclusive and, after the failure of the fluorimeter, D379_NMEA_1.xmlcon for casts 93 – 109.

Sensor Failures

The only instrument failure was that of the CTG Aquatracka (fluorimeter) s/n: 88-2615 during casts 91 and 92. A null reading for fluorescence was displayed intermittently on the CTD monitor at depths greater than 1000m, failing completely deeper than approximately 1500m. It was replaced with fluorimeter s/n: 09-7117-001 for casts 93 onwards and this eliminated the problem.

Data Processing

CTD cast data was post-processed routinely by a member of the scientific personnel in accordance with the guidelines produced in association with the BODC .

Salinity measurement

A Guildline Autosal 8400B salinometer, s/n: 60839, was used for salinity measurements. The salinometer was situated in the Constant Temperature Lab, with the bath temperature set at 24°C, the ambient temperature being approximately 22°C. A bespoke program written in Labview called “Autosal” was used as the data recording program for salinity values.

In general, a student was given the responsibility of taking a salinity sample from the appropriate water sampler and running the salinometer. Hence detailed results on salinity are given elsewhere in the cruise report.

TRDI LADCP Configuration

The TRDI WHM 300kHz LADCP deployed was unit s/n: 12919 and installed in a downward-looking orientation on the s/s CTD frame.

Battery voltage could not be monitored as the cable was diode protected. The instrument was configured to ping as fast as possible, use 27 bins, a blanking distance of 1.76m and a bin size of 4m thus yielding a range of approximately 108m after the blanking distance. The ambiguity velocity was set to 175 cms^{-1} and pings per ensemble to 1.

Built-in pre-deployment tests *(PA, PC2 and PT200)* were run before each cast, and then the following command file sent *(F2)*:

Master command file:

>CR1
>CF11101
>EA00000
>EB00000
>ED00000
>ES35
>EX11111
>EZ0111111
>TE00:00:05.00
>TP00:00.00
>WM15
>LD111100000
>LF176
>LN27
>LP1
>LS400
>LV175
>LJ1
>LW1
>LZ30,220
>SM1
>SA001
>SI0
>SW0
>CK
>CS

Deployment Comments

Each deployment BBtalk terminal session was logged to a file (*F3)* of the form: *D379_XXX.txt*, where *XXX* was the CTD cast number. Downloaded data files were re-named to be of the form: *D379_XXXm.000*.

The real-time clock of the LADCP was checked prior to deployment *(TS?)* and re-synchronised with the ship's GPS clock if it was more than a few seconds in error. The time difference (if any) was written on the log sheet.

Paper log sheets were used for all casts (and scanned for electronic storage), the LADCP file number being defined by the CTD cast number.

Initially, the configuration file used for the s/s CTD was the following:

Instrument configuration file: C:\Program Files\Sea-Bird\SeasaveV7\d379\D379_NMEA.xmlcon

Configuration report for SBE 911plus/917plus CTD

Frequency channels suppressed : 0
Voltage words suppressed : 0
Computer interface : RS-232C
Deck unit : SBE11plus Firmware Version >= 5.0
Scans to average : 1
NMEA position data added : Yes
NMEA depth data added : No
NMEA time added : No
NMEA device connected to : deck unit
Surface PAR voltage added : No
Scan time added : Yes

1) Frequency 0, Temperature

Serial number : 03P-4383
Calibrated on : 7 March 2012
G : 4.39871761e-003
H : 6.55476268e-004
I : 2.42620278e-005
J : 2.01638497e-006
F0 : 1000.000

Slope : 1.00000000
Offset : 0.0000

2) Frequency 1, Conductivity

Serial number : 04C-2858
Calibrated on : 7 March 2012
G : -1.02382796e+001
H : 1.44011457e+000
I : 5.76728892e-005
J : 6.96280286e-005
CTcor : 3.2500e-006
CPcor : -9.57000000e-008
Slope : 1.00000000
Offset : 0.00000

3) Frequency 2, Pressure, Digiquartz with TC

Serial number : 121341
Calibrated on : 6 March 2012
C1 : -4.817191e+004
C2 : -2.790175e-001
C3 : 1.471600e-002
D1 : 3.995300e-002
D2 : 0.000000e+000
T1 : 3.031710e+001
T2 : -3.320637e-004
T3 : 3.758500e-006
T4 : 4.062020e-009
T5 : 0.000000e+000
Slope : 1.00000000
Offset : 0.00000
AD590M : 1.282700e-002
AD590B : -9.212862e+000

4) Frequency 3, Temperature, 2

Serial number : 03P-5660
Calibrated on : 31 Jan 2012
G : 4.33157799e-003
H : 6.25696593e-004
I : 1.93452146e-005
J : 1.45767340e-006
F0 : 1000.000
Slope : 1.00000000
Offset : 0.0000

5) Frequency 4, Conductivity, 2

Serial number : 04C-3768
Calibrated on : 7 March 2012
G : -1.02261746e+001
H : 1.49901293e+000
I : -1.63702674e-003
J : 2.10934013e-004
CTcor : 3.2500e-006
CPcor : -9.57000000e-008
Slope : 1.00000000
Offset : 0.00000

6) A/D voltage 0, Oxygen, SBE 43

Serial number : 43-0709
Calibrated on : 29 April 2011
Equation : Sea-Bird
Soc : 4.76900e-001
Offset : -4.92400e-001
A : -1.28560e-003
B : 2.50580e-005
C : -6.17210e-007

E : 3.60000e-002
Tau20 : 1.26000e+000
D1 : 1.92634e-004
D2 : -4.64803e-002
H1 : -3.30000e-002
H2 : 5.00000e+003
H3 : 1.45000e+003

7) A/D voltage 1, Free

8) A/D voltage 2, Turbidity Meter, WET Labs, ECO-BB

Serial number : 167
Calibrated on : 6 July 2011
ScaleFactor : 1.000000
Dark output : 0.000000

9) A/D voltage 3, Altimeter

Serial number : 874
Calibrated on : 10 Mar 2010
Scale factor : 15.000
Offset : 0.000

10) A/D voltage 4, Free

11) A/D voltage 5, Free

12) A/D voltage 6, Transmissometer, Chelsea/Seatech

Serial number : 161-050
Calibrated on : 29 Feb 2012
M : 23.8318
B : -0.5171
Path length : 0.250

13) A/D voltage 7, Fluorometer, Chelsea Aqua 3

Serial number : 088-2615-124
Calibrated on : 23 Mar 2011
VB : 0.398200
V1 : 2.146300
Vacetone : 0.439900
Scale factor : 1.000000
Slope : 1.000000
Offset : 0.000000

Scan length : 41

From cast 93 onwards D379_NMEA_1.xmlcon was used:

Instrument configuration file: C:\Program Files\Sea-Bird\SeasaveV7\D379\D379_NMEA_1.xmlcon

Configuration report for SBE 911plus/917plus CTD

Frequency channels suppressed : 0
Voltage words suppressed : 0
Computer interface : RS-232C
Deck unit : SBE11plus Firmware Version >= 5.0
Scans to average : 1
NMEA position data added : Yes
NMEA depth data added : No
NMEA time added : No
NMEA device connected to : deck unit
Surface PAR voltage added : No
Scan time added : Yes

1) Frequency 0, Temperature

Serial number : 03P-4383
Calibrated on : 7 March 2012
G : 4.39871761e-003
H : 6.55476268e-004
I : 2.42620278e-005
J : 2.01638497e-006
F0 : 1000.000
Slope : 1.00000000
Offset : 0.0000

2) Frequency 1, Conductivity

Serial number : 04C-2858
Calibrated on : 7 March 2012
G : -1.02382796e+001
H : 1.44011457e+000
I : 5.76728892e-005
J : 6.96280286e-005
CTcor : 3.2500e-006
CPcor : -9.57000000e-008
Slope : 1.00000000
Offset : 0.00000

3) Frequency 2, Pressure, Digiquartz with TC

Serial number : 121341
Calibrated on : 6 March 2012
C1 : -4.817191e+004
C2 : -2.790175e-001
C3 : 1.471600e-002
D1 : 3.995300e-002
D2 : 0.000000e+000
T1 : 3.031710e+001

T2 : -3.320637e-004
T3 : 3.758500e-006
T4 : 4.062020e-009
T5 : 0.000000e+000
Slope : 1.00000000
Offset : 0.00000
AD590M : 1.282700e-002
AD590B : -9.212862e+000

4) Frequency 3, Temperature, 2

Serial number : 03P-5660
Calibrated on : 31 Jan 2012
G : 4.33157799e-003
H : 6.25696593e-004
I : 1.93452146e-005
J : 1.45767340e-006
F0 : 1000.000
Slope : 1.00000000
Offset : 0.0000

5) Frequency 4, Conductivity, 2

Serial number : 04C-3768
Calibrated on : 7 March 2012
G : -1.02261746e+001
H : 1.49901293e+000
I : -1.63702674e-003
J : 2.10934013e-004
CTcor : 3.2500e-006
CPcor : -9.57000000e-008
Slope : 1.00000000
Offset : 0.00000

6) A/D voltage 0, Oxygen, SBE 43

Serial number : 43-0709
Calibrated on : 29 April 2011
Equation : Sea-Bird
Soc : 4.76900e-001
Offset : -4.92400e-001
A : -1.28560e-003
B : 2.50580e-005
C : -6.17210e-007
E : 3.60000e-002
Tau20 : 1.26000e+000
D1 : 1.92634e-004
D2 : -4.64803e-002
H1 : -3.30000e-002
H2 : 5.00000e+003
H3 : 1.45000e+003

7) A/D voltage 1, Free

8) A/D voltage 2, Turbidity Meter, WET Labs, ECO-BB

Serial number : 167
Calibrated on : 6 July 2011
ScaleFactor : 1.000000
Dark output : 0.000000

9) A/D voltage 3, Altimeter

Serial number : 874
Calibrated on : 10 Mar 2010
Scale factor : 15.000
Offset : 0.000

10) A/D voltage 4, Free

11) A/D voltage 5, Free

12) A/D voltage 6, Transmissometer, Chelsea/Seatech

Serial number : 161-050
Calibrated on : 29 Feb 2012
M : 23.8318
B : -0.5171
Path length : 0.250

13) A/D voltage 7, Fluorometer, Chelsea Aqua 3

Serial number : 09-7117-001
Calibrated on : 20th June 2011
VB : 0.217800
V1 : 2.096300
Vacetone : 0.393000
Scale factor : 1.000000
Slope : 1.000000
Offset : 0.000000

Scan length : 41

Appendix 2 – Event Log (All times GMT, 2012)

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
1	31/07	Shakey	48º 54.670’	005º 19.280’	67	10:03	10:10	10:26	CTD	Shakedown CTD
2	02/08	1G	56º 40.114’	006º 40.114’	113	08:19	08:24	08:44	CTD	CTD002
3	02/08	2G	56º 40.879’	006º 17.054’	21	09:50	09:54	10:00	CTD	CTD003
4	02/08	3G	56º 42.430’	006º 21.912	75	10:48	10:54	11:09	CTD	CTD004
5	02/08	4G	56º 44.055’	006º 26.826	82	12:11	12:20	12:37	CTD	CTD005
6	02/08	5G	56º 43.980’	006º 36.000	76	13:21	13:31	13:56	CTD	CTD006
7	02/08	6G	56º 43.970’	006º 44.980	42	14:59	14:59	15:03	CTD	CTD007
8	02/08	7G	56º 43.980’	006º 59.995	136	16:16	16:27	16:52	CTD	CTD008
9	02/08	8G	56º 44.040’	006º 10.060	178	18:02	18:19	18:36	CTD	CTD009
10	02/08	9G	56º 43.940’	007º 19.943	155	19:46	20:03	20:24	CTD	CTD010
11	02/08	10G	56º 43.690’	007º 30.626	235	21:27	21:41	22:10	CTD	CTD011
12	02/08	11G	56º 44.051’	007º 40.342	60	23:04	23:12	23:21	CTD	CTD012
13	03/08	12G	56º 45.660’	007º 50.070	54	00:23	00:34	00:43	CTD	CTD013
14	03/08	13G	56º 46.943’	007º 59.966	117	01:31	01:41	12:01	CTD	CTD014
15	03/08	14G	56º 48.463’	008º 09.984	128	02:55	03:06	03:18	CTD	CTD015
16	03/08	T	56º 50.194’	008º 19.997	129	04:16	04:24	04:40	CTD	CTD016
17	03/08	15G	56º 53.010’	008º 29.920	125	05:46	05:56	06:11	CTD	CTD017
18	03/08	S	56º 56.879’	008º 46.471	124	07:48	07:57	08:16	CTD	CTD018
19	03/08	R	56º 59.939’	009º 00.107	129	09:33	09:43	09:58	CTD	CTD019
20	03/08	R1	57º 01.926’	009º 07.880	153	10:57	11:08	11:13	CTD	CTD020

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
21	03/08	R2	57º 02.239’	009º 09.985	211	11:48	12:06	12:14	CTD	CTD021
22	03/08	R3	57º 02.758’	009º 11.454	244	12:34	12:50	13:01	CTD	CTD022
23	03/08	Q	57º 03.041’	009º 13.006	307	13:27	13:45	14:19	CTD	CTD023
24	03/08	Q1	57º 03.384’	009º 14.758	401	15:11	15:31	15:44	CTD	CTD024
25	03/08	Q2	57º 04.114’	009º 16.243	484	16:15	16:39	16:54	CTD	CTD025
26	03/08	P	57º 06.079’	009º 25.558	1462	17:46	18:28	19:48	CTD	CTD026
27	03/08	O	57º 09.176’	009º 42.080	1930	21:10	22:05	23:23	CTD	CTD027
28	04/08	N	57º 13.874’	010º 02.830	2107	01:03	01:56	03:28	CTD	CTD028
29	04/08	M	57º 17.909’	010º 23.104	2214	05:05	06:00	07:20	CTD	CTD029
30	04/08	L	57º 21.917’	010º 39.818	2130	08:44	09:35	11:10	CTD	CTD030
31	04/08	K	57º 24.001’	10º 52.042’	783	12:23	12:49	13:46	CTD	CTD031
32	04/08	J	57º 26.996’	11º 04.835’	586	14:59	15:25	16:09	CTD	CTD032
33	04/08	I	57º 27.962’	11º 18.715’	743	17:29	18:06	18:52	CTD	CTD033
34	04/08	H	57º 29.116’	11º 31.797’	2020	20:13	21:06	22:23	CTD	CTD034
35	05/08	G	57 º29.490’	11º 50.959’	1789	00:05	00:50	02:22	CTD	CTD035
36	05/08	F	57º 30.500’	12º 14.885’	1806	04:01	04:47	06:03	CTD	CTD036
37	05/08	E	57º 31.906’	12º 37.800’	1649	07:39	08:21	09:34	CTD	CTD037
38	05/08	D	57º 32.477’	12º 51.784’	1094	10:53	11:21	12:28	CTD	CTD038
39	05/08	C	57º 32.924’	12º 59.916’	297	13:18	13:31	13:59	CTD	CTD039
40	05/08	B	57º 33.995’	13º 19.979’	178	15:24	15:36	16:01	CTD	CTD040
41	05/08	A	57º 34.982’	13º 37.939’	107	17:22	17:32	17:45	CTD	CTD041
42	05/08	IB1	57º 40.052’	13º 54.202’	146	19:07	19:18	19:35	CTD	CTD042
43	06/08	S363	60º 23.285’	08º 30.752’	526	18:18	18:37	19:07	CTD	CTD043

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
44	06/08	S362	60º 20.461’	08º 32.318’	268	19:59	20:21	20:45	CTD	CTD044
45	06/08	S361	60º 18.554’	08º 32.837’	726	21:42	22:05	22:27	CTD	CTD045
46	06/08	S360	60º 15.820’	08º 34.717’	819	23:36	23:59	00:26	CTD	CTD046
47	07/08	S359	60º 13.243’	08º 36.579’	895	01:02	01:28	02:16	CTD	CTD047
48	07/08	S358	60º 11.788’	08º 41.605’	773	03:03	03:24	03:52	CTD	CTD048
49	07/08	S357	60º 10.669’	08º 45.718’	617	04:39	04:57	05:21	CTD	CTD049
50	07/08	S356	60º 08.741’	08º 50.760’	400	06:05	06:22	06:47	CTD	CTD050
51	07/08	S355	60º 12.472’	08º 57.656’	558	07:43	08:03	08:28	CTD	CTD051
52	07/08	WTM	60º 15.040’	08º 54.570’	1211	09:21	09:51	10:52	CTD	CTD052
53	07/08	WTMR	60º 14.820’	08º 55.760’	1231	RELEASED		11:59	Mooring Recovery	
54	07/08	S354	60º 13.794’	08º 59.395’	1015	12:28	13:07	13:40	CTD	CTD053
55	07/08	S353	60º 14.855’	08º 00.367’	1310	14:08	14:43	15:10	CTD	CTD054
56	07/08	WTRM	60º 14.998’	08º 54.579’	1211	16:31	-	16:49	Mooring Deployment	
57	07/08	S352	60º 15.682’	09º 00.481’	1080	17:35	18:05	18:40	CTD	CTD055
58	07/08	S351	60º 16.643’	09º 00.757’	792	19:24	19:49	20:15	CTD	CTD056
59	07/08	S350	60º 17.675’	09º 00.973’	567	20:47	21:06	21:31	CTD	CTD057
60	07/08	S349	60º 15.710’	09º 01.522’	515	22:06	22:25	22:43	CTD	CTD058
61	08/08	GB1	59º 12.988’	14º 44.906’	1059	17:19	17:50	18:35	CTD	CTD059
62	08/08	GB2	59º 10.000’	14º 29.875’	991	19:55	20:23	20:53	CTD	CTD060
63	08/08	GB3	59º 05.994’	14º 18.888’	749	22:09	22:32	22:57	CTD	CTD061
64	09/08	GB4	59º 03.041’	14º 08.942’	610	00:01	00:21	00:48	CTD	CTD062
65	09/08	GB5	59º 00.002’	14º 00.001’	579	01:42	02:00	02:17	CTD	CTD063
66	09/08	GB6	58º 57.454’	13º 52.003’	449	03:07	02:23	03:40	CTD	CTD064

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
67	09/08	GB7	58º 54.937’	13º 39.919’	488	04:54	05:09	05:34	CTD	CTD065
68	09/08	GB8	58º 52.025’	13º 29.845’	887	06:35	07:00	07:24	CTD	CTD066
69	09/08	GB9	58º 51.510’	13º 27.979’	961	07:57	08:22	08:52	CTD	CTD067
70	09/08	GB10	58º 51.002’	13º 24.949’	1036	09:24	09:50	10:31	CTD	CTD068
71	09/08	GB11	58º 50.020’	13º 19.988’	1553	11:20	11:57	12:37	CTD	CTD069
72	09/08	GB12	58º 39.995’	13º 09.985’	1676	14:08	14:45	15:28	CTD	CTD070
73	09/08	GB13	58º 30.067’	13º 00.021’	1644	17:02	17:46	18:30	CTD	CTD071
74	10/08	IB2	57º 57.119’	14º 35.099’	446	00:57	01:13	01:45	CTD	CTD072
75	10/08	IB2A	58º 05.960’	14º 57.409’	558	03:42	04:01	05:05	CTD	CTD073
76	10/08	IB3	58º 14.940’	15º 19.817’	655	06:23	06:46	07:17	CTD	CTD074
77	10/08	IIB3A	58º 22.463’	15º 39.970’	1154	10:04	10:32	11:01	CTD	CTD075
78	10/08	IB4	58º 29.989’	15º 59.954’	1187	12:43	13:18	14:24	CTD	CTD076
79	10/08	IB4S	58º 35.700’	16º 14.998’	1217	15:46	16:24	16:52	CTD	CTD077
80	10/08	IB4A	58º 41.536’	16º 29.944’	1192	18:19	18:56	19:53	CTD	CTD078
81	10/08	IB4B	58º 47.231’	16º 44.980’	1162	21:23	21:58	22:25	CTD	CTD079
82	10/08	IB5	58º 53.036’	17º 00.001’	1153	23:55	00:28	01:26	CTD	CTD080
83	11/08	IB5A	58º 53.998’	17º 05.408’	1092	02:35	03:08	03:33	CTD	CTD081
84	11/08	IB6	58º 57.029’	17º 10.919’	887	04:26	05:05	05:49	CTD	CTD082
85	11/08	IB6A	59º 05.995’	17º 25.517’	656	07:20	07:40	07:56	CTD	CTD083
86	11/08	IB7	59º 07.013’	17º 40.026’	957	09:14	09:43	10:27	CTD	CTD084
87	11/08	IB7A	59º 09.469’	17º 46.505’	1270	11:41	12:11	12:38	CTD	CTD085
88	11/08	IB8	59º 11.998’	17º 52.998’	1526	13:27	14:08	15:29	CTD	CTD086
89	11/08	IB8A	59º 16.036’	18º 03.461’	1698	16:27	17:09	17:45	CTD	CTD087

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
90	11/08	IB9	59º 20.041’	18º 14.080’	1856	18:53	19:40	20:55	CTD	CTD088
91	11/08	IB9A	59º 22.403’	18º 20.510’	2214	22:06	22:57	23:45	CTD	CTD089
92	11/08	IB9A	59º 22.472’	18º 20.767’	2218	23:59			Apex float deployment	SN6244
93	12/08	IB10	59º 23.998’	18º 25.015’	2400	00:41	01:36	03:04	CTD	CTD090
94	12/08	IB10A	59º 32.044’	18º 46.063’	2725	05:02	06:05	07:24	CTD	CTD091
95	12/08	IB11	59º 40.010’	19º 06.977’	2680	09:20	10:21	11:59	CTD	CTD092
96	12/08	IB11A	59º 50.012’	19º 33.518’	2705	14:14	15:19	16:49	CTD	CTD093
97	12/08	IB11A	59º 49.981’	19º 33.387’	2713	17:02			Apex float deployment	SN5538
98	12/08	IB12	60º 00.068’	20º 00.032’	2727	19:17	20:20	21:57	CTD	CTD094
99	12/08	IB12A	60º 15.004’	20º 00.030’	2643	23:55	00:54	02:17	CTD	CTD095
100	13/08	IB13	60º 29.920’	19º 59.920’	2535	04:15	05:15	06:35	CTD	CTD096
101	13/08	IB13	60º 29.852’	19º 59.021’	2534	06:53			Apex float deployment	SN5539
102	13/08	IB13A	60º 45.026’	20º 00.016’	2376	08:56	09:52	11:01	CTD	CTD097
103	13/08	IB14	61º 00.010’	20º 00.028’	2397	13:22	14:11	15:42	CTD	CTD098
104	13/08	IB15	61º 15.034’	20º 00.161’	2385	17:46	18:49	20:25	CTD	CTD099
105	13/08	IB16	61º 29.953’	20º 00.065’	2226	23:20	00:14	01:32	CTD	CTD100
106	13/08	IB16	61º 29.969’	19º 59.968’	2226	01:39			Apex float deployment	SN5543
107	14/08	IB16A	61º 45.061’	19º 59.916’	1803	04:48	05:35	06:13	CTD	CTD101
108	14/08	IB17	61º 59.978’	20º 00.046’	1810	09:04	09:57	11:12	CTD	CTD102
109	14/08	IB18S	62º 19.973’	19º 50.034’	1804	15:54	16:40	17:46	CTD	CTD103
110	14/08	IB19S	62º 40.048’	19º 39.994’	1607	20:42	21:27	22:41	CTD	CTD104
111	15/08	IB20S	62º 54.989’	19º 33.019’	1400	01:18	01:54	02:59	CTD	CTD105
112	15/08	IB21S	63º 08.008’	19º 55.517’	1046	05:44	06:16	07:03	CTD	CTD106

Event No	Date	Station	Latitude (N)	Longitude (W)	Depth(m)	Time I/W	Time Bottom	Time O/W	Activity	Comments
113	15/08	IB22S	63º 12.982’	20º 04.104’	670	08:17	08:38	09:16	CTD	CTD107
114	15/08	IB22X	63º 16.002’	20º 08.636’	143	10:07	10:17	10:24	CTD	CTD108
115	15/08	IB23S	63º 19.072’	20º 12.996’	122	11:11	11:20	11:35	CTD	CTD109

Appendix 3 CTD Bottle Summary Logs

Lat & lon at bottom

Station	Shakedown	CTD No	001	Date	31/07/2012
Lat	48º 54.80'N	Event No	001	Time I/W (GMT)	10:03
Lon	005º 19.68'W	Depth (m)	63m	Time bottom (GMT)	10:10
Filename	D379_001	Cast Depth (m)	51m	Time O/W (GMT)	10:26
Weather	Grey, wind force 4				
Comments	1, 2, 11 leaking				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		51	10:11	LEAK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	2		151	10:11	LEAK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
3	3		151	10:11																	
4	4		151	10:12																	
5	5		151	10:12																	
6	6		151	10:12														√			
7	7		151	10:12																	
8	8		251	10:15														√			
9	9		32	10:16																	
10	10		32	10:16														√			
11	11		32	10:16	LEAK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12	12		32	10:16														√			
13	13		32	10:17																	
14	14		32	10:17																	
15	15		32	10:17																	
16	16		7	10:17																	
17	17		7	10:22																	
18	18		7	10:22														√			
19	19		7	10:23																	
20	20		7	10:23																	
21	21		7	10:23																	
22	22		7	10:23																	
23	23		7	10:24																	
24	24		7	10:24																	

Lat & lon at bottom

Station	1G	CTD No	002	Date	02/08/2012
Lat	56º 40.114'N	Event No	2	Time I/W (GMT)	08:19
Lon	006º 8.002'W	Depth (m)	113	Time bottom (GMT)	08:24
Filename	D379_002	Cast Depth (m)	110	Time O/W (GMT)	08:44
Weather	Fine sunny				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		101.9	08:27						√				√	√						
2	2		101.9	08:28		√		√													
3	3		101.9	08:28														√			
4	4		101.9	08:28																	
5	5		76.9	08:31						√					√						
6	6		76.7	08:31		√		√													
7	7		76.8	08:31																	
8	8		76.9	08:31																	
9	9		79.8	08:32																	
10	10		52	08:34						√				√	√						
11	11		51.9	08:34			√√														
12	12		52	08:34		√		√													
13	13		52	08:35																	
14	14		52	08:35																	
15	15		21.9	08:39						√				√	√						
16	16		21.9	08:39		√		√													
17	17		21.9	08:39																	
18	18		21.9	08:39																	
19	19		21.9	08:40												√					
20	20		6.9	08:42						√					√						
21	21		6.9	08:42		√		√													
22	22		7	08:42																	
23	23		6.9	08:42														√			
24	24		7	08:43							√						√				

Lat & lon at bottom

Station	2G	CTD No	003	Date	02/08/2012
Lat	56º 40.8792'N	Event No	3	Time I/W (GMT)	09:50
Lon	006º 17.054'W	Depth (m)	21	Time bottom (GMT)	09:54
Filename	D379_003	Cast Depth (m)	15	Time O/W (GMT)	10:00
Weather	Fine, sunny				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		13.0													√					
2	2		13.0																		
3	3		7.5								√						√	√			
4	4		7.5																		
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
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21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	3G	CTD No	004	Date	02/08/2012
Lat	56º 42.42992'N	Event No	4	Time I/W (GMT)	10:48
Lon	006º 21.91176'W	Depth (m)	75	Time bottom (GMT)	10:54
Filename	D379_004	Cast Depth (m)	74	Time O/W (GMT)	11:09
Weather	Fine, sunny				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		73.6	10:56						√				√	√						
2	2		73.7	10:56		√		√													
3	3		73.6	10:56																	
4	4		73.8	10:57																	
5	5		73.5	10:57																	
6	6		51.2	11:00						√				√	√						
7	7		52.2	11:00			√														
8	8		52.2	11:00		√		√													
9	9		52.2	11:00																	
10	10		52.2	11:00																	
11	11		17.1	11:04						√				√	√						
12	12		17.3	11:04			√														
13	13		17.2	11:04		√		√								√					
14	14		17.2	11:05														√			
15	15		17.2	11:05																	
16	16		6.8	11:07						√					√						
17	17		6.9	11:07		√		√													
18	18		6.9	11:07																	
19	19		6.8	11:07																	
20	20		6.7	11:08																	
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	4G	CTD No	005	Date	02/08/2012
Lat	56º 44.045'N	Event No	5	Time I/W (GMT)	12:11
Lon	006º 26.801'W	Depth (m)	82	Time bottom (GMT)	12:20
Filename	D379_005	Cast Depth (m)	73	Time O/W (GMT)	12:35
Weather	Fair, F2, light swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		73															√			
2	2		73																		
3	3		57															√			
4	4		57																		
5	5		21															√			
6	6		21													√					
7	7		5.5								√										
8	8		5.5																		
9																					
10																					
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Lat & lon at bottom

Station	5G	CTD No	006	Date	02/08/2012
Lat	56º 43.99'N	Event No	6	Time I/W (GMT)	13:21
Lon	006º 36.00'W	Depth (m)	76	Time bottom (GMT)	13:31
Filename	D379_006	Cast Depth (m)	70	Time O/W (GMT)	13:56
Weather	Fair, F3, light swell				
Comments	15 leaking				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1		1	70	13:33						√				√	√						
2		2	70	13:33		√															
3		3	70	13:34														√			
4		4	70	13:34																	
5		5	70	13:34				√													
6		6	50	13:38						√				√	√						
7		7	50	13:38			√														
8		8	50	13:39		√		√													
9		9	50	13:39														√			
10		10	50	13:40																	
11		11	35	13:43						√				√	√	√					
12		12	35	13:44																	
13		13	35	13:44		√		√													
14		14	35	13:45																	
15		15	35	13:45	**Leaking**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16		16	5	13:49						√					√						
17		17	5	13:50			√														
18		18	5	13:50																	
19		19	5	13:50		√		√													
20		20	5	13:51														√			
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	6G	CTD No	007	Date	02/08/2012
Lat	56º 43.98'N	Event No	7	Time I/W (GMT)	14:41
Lon	006º 45.00'W	Depth (m)	46	Time bottom (GMT)	14:49
Filename	D379_007	Cast Depth (m)	36	Time O/W (GMT)	15:03
Weather	Calm, wind force 1				
Comments					

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1	1		36	14:50														√			
2	2		36	14:50																	
3	3		31	14:54												√					
4	4		31	14:55																	
5	5		5.5	14:58							√										
6	6		5.5	14:59														√			
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Lat & lon at bottom

Station	7G	CTD No	008	Date	02/08/2012
Lat	56º 43.98'N	Event No	8	Time I/W (GMT)	16:16
Lon	006º 59.983'W	Depth (m)	136	Time bottom (GMT)	16:27
Filename	D379_008	Cast Depth (m)	131	Time O/W (GMT)	16:52
Weather	Sunny, gentle swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		131	16:29						√				√							
2	2		131	16:29		√		√													
3	3		131	16:30														√			
4	4		131	16:30																	
5	5		101	16:34						√				√	√						
6	6		101	16:34			√														
7	7		101	16:34		√		√													
8	8		101	16:34																	
9	9		75	16:38						√					√						
10	10		75	16:38		√		√													
11	11		75	16:38																	
12	12		75	16:38																	
13	13		50	16:43						√				√	√						
14	14		50	16:43		√		√													
15	15		50	16:43																	
16	16		50	16:43																	
17	17		16	16:48						√				√	√	√					
18	18		16	16:48		√		√													
19	19		16	16:48														√			
20	20		16	16:48																	
21	21		6	16:50						√					√						
22	22		6	16:50		√	√	√													
23	23		6	16:50																	
24	24		6	16:50																	

Lat & lon at bottom

Station	8G	CTD No	009	Date	02/08/2012
Lat	56º 44.065'N	Event No	9	Time I/W (GMT)	18
Lon	007º 10.073'W	Depth (m)	178	Time bottom (GMT)	
Filename	D379_009	Cast Depth (m)	168	Time O/W (GMT)	
Weather	Clear, calm				
Comments					

18:19
18:36

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		168	18:20														√			
2	2		168	18:20																	
3	3		71	18:27												√					
4	4		71	18:27																	
5	5		5	18:35							√										
6	6		5	18:35														√			
7																					
8																					
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20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	9G	CTD No	010	Date	02/08/2012
Lat	56º 43.943'N	Event No	10	Time I/W (GMT)	19:46
Lon	007º 19.943'W	Depth (m)	155	Time bottom (GMT)	20:03
Filename	D379_010	Cast Depth (m)	152	Time O/W (GMT)	20:24
Weather	Fine and sunny				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		152	20.02						√				√							
2	2		152	20.02		√	√														
3	3		152	20.02														√			
4	4		152	20.02																	
5	5		102	20.06						√				√	√						
6	6		102	20.06		√	√														
7	7		102	20.06																	
8	8		102	20.07																	
9	9		82.5	20.10						√				√	√						
10	10		82.5	20.10		√	√														
11	11		82.5	20.10																	
12	12		82.5	20.10																	
13	13		57.4	20.14						√				√	√	√					
14	14		57.9	20.14		√	√														
15	15		56.7	20.15	**Leaking**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	16		57.1	20.15																	
17	17		32.5	20.18						√				√	√						
18	18		32.5	20.18		√	√														
19	19		32.5	20.18																	
20	20		32.5	20.18																	
21	21		7.1	20.22						√					√						
22	22		7.5	20.22		√	√														
23	23		7.5	20.22																	
24	24		7.2	20.22														√			

Lat & lon at bottom

Station	10G	CTD No	011	Date	02/08/2012
Lat	56º 43.6967'N	Event No	11	Time I/W (GMT)	21:27
Lon	007º 30.626'W	Depth (m)	217	Time bottom (GMT)	21:41
Filename	D379_011	Cast Depth (m)	235	Time O/W (GMT)	22:10
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		201	21:46		√															
2	2		201	21:46						√								√			
3	3		150.8	21:50		√															
4	4		150.6	21:50						√											
5	5		101.5	21:54		√															
6	6		100.7	21:54						√											
7	7		61.6	21:58		√															
8	8		61.0	21:58						√											
9	9		41.0	22:00		√															
10	10		41.0	22:00						√											
11	11		11.1	22:06		√															
12	12		11.0	22:06						√						√					
13	13		6.3	22:08																	
14	14		6.3	22:08							√							√			
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	11G	CTD No	012	Date	02/08/2012
Lat	56º 44.1498'N	Event No	12	Time I/W (GMT)	23:04
Lon	007º 40.73'W	Depth (m)	58	Time bottom (GMT)	23:12
Filename	D379_012	Cast Depth (m)	56	Time O/W (GMT)	23:21
Weather	Calm, flat				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		47.1							√								√			
2	2		47.1											√	√						
3	3		51.9							√											
4	4		32											√	√						
5	5		7							√								√			
6	6		6.8											√	√	√					
7																					
8																					
9																					
10																					
11																					
12																					
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Lat & lon at bottom

Station	12G	CTD No	013	Date	03/08/2012
Lat	56º 45.66038'N	Event No	13	Time I/W (GMT)	00:23
Lon	007º 50.07083'W	Depth (m)	54	Time bottom (GMT)	00:34
Filename	D379_013	Cast Depth (m)	37	Time O/W (GMT)	00:43
Weather	Moderate breeze, strong current, F3, moderate swell				
Comments	Strong current, big angle on wire at start, rapidly changing depth, 17m AB at start, 8m AB at start				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		37	00:35																	
2	2		37	00:36														√			
3	3		4.5	00:41							√										
4	4		4.5	00:41												√					
5																					
6																					
7																					
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9																					
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Lat & lon at bottom

Station	13G	CTD No	014	Date	03/08/2012
Lat	56º 47.3491'N	Event No	14	Time I/W (GMT)	01:31
Lon	008º 0.0161'W	Depth (m)	121	Time bottom (GMT)	01:42
Filename	D379_014	Cast Depth (m)	110	Time O/W (GMT)	02:01
Weather	Light breeze, F3, light swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		110	01:42						√				√							
2	2		111	01:42		√		√										√			
3	3		100	01:45						√				√	√						
4	4		100	01:45		√		√													
5	5		80	01:48						√				√	√						
6	6		80	01:49		√		√													
7	7		30	01:53						√				√	√						
8	8		30	01:54		√		√													
9	9		18	01:57						√				√	√	√					
10	10		18	01:57		√		√										√			
11	11		5	01:59						√					√						
12	12		5	02:00		√		√													
13																					
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22																					
23																					
24																					

Lat & lon at bottom

Station	14G	CTD No	015	Date	03/08/2012
Lat	56º 48.49911'N	Event No	15	Time I/W (GMT)	02:55
Lon	008º 9.95661'W	Depth (m)	128	Time bottom (GMT)	03:06
Filename	D379_015	Cast Depth (m)	119	Time O/W (GMT)	03:18
Weather	Moderate swell, breezy, F4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		119	03:07														√			
2	2		119	03:07																	
3	3		28	03:12												√					
4	4		28	03:12																	
5	5		5	03:15							√										
6	6		5	03:16														√			
7																					
8																					
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Lat & lon at bottom

Station	15G	CTD No	016	Date	03/08/2012
Lat	56º 53.610'N	Event No	16	Time I/W (GMT)	05:46
Lon	008º 29.920'W	Depth (m)	125	Time bottom (GMT)	05:56
Filename	D379_016	Cast Depth (m)	122	Time O/W (GMT)	06:11
Weather	Clear, light swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		122	05:56						√				√	√			√			
2	2		122	05:56		√		√													
3	3		100	05:59						√				√	√						
4	4		100	05:59		√															
5	5		82	06:01						√				√	√						
6	6		82	06:01		√															
7	7		37	06:04						√						√					
8	8		37	06:04		√								√	√						
9	9		7	06:08						√								√			
10	10		7	06:08		√					√										
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Lat & lon at bottom

Station	T	CTD No	017	Date	03/08/2012
Lat	56º 50.1940'N	Event No	17	Time I/W (GMT)	04:16
Lon	008º 19.997'W	Depth (m)	129	Time bottom (GMT)	04:24
Filename	D379_017	Cast Depth (m)	123	Time O/W (GMT)	04:40
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		126	04:25						√				√			√				
2	2		126	04:25		√		√													
3	3		100	04:27						√				√	√						
4	4		100	04:27		√															
5	5		80	04:30						√				√	√						
6	6		80	04:30		√															
7	7		44	04:33						√					√						
8	8		44	04:33		√		√						√							
9	9		35	04:34						√				√	√	√ *					
10	10		35	04:34		√		√													
11	11		7	04:37						√					√		√				
12	12		7	04:37		√		√													
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Lat & lon at bottom

Station	S	CTD No	018	Date	03/08/2012
Lat	56º 56.879'N	Event No	18	Time I/W (GMT)	07:48
Lon	008º 46.471'W	Depth (m)	124	Time bottom (GMT)	07:57
Filename	D379_018	Cast Depth (m)	117	Time O/W (GMT)	08:15
Weather	Fine, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		117	07:57		√		√													
2	2		117	07:57						√				√				√			
3	3		102	08:00						√				√	√						
4	4		102	08:00																	
5	5		82.2	08:03						√				√							
6	6		82	08:03																	
7	7		52	08:06						√				√	√						
8	8		52	08:06																	
9	9		32	08:08		√		√													
10	10		32	08:08						√					√						
11	11		14.9	08:12		√		√													
12	12		14.9	08:12						√				√	√	√					
13	13		7	08:14														√			
14	14		6	08:14						√					√						
15																					
16																					
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Lat & lon at bottom

Station	R	CTD No	019	Date	03/08/2012
Lat	56º 59.93921'N	Event No	19	Time I/W (GMT)	09:33
Lon	009º 00.107'W	Depth (m)	129	Time bottom (GMT)	09:43
Filename	D379_019	Cast Depth (m)	128	Time O/W (GMT)	09:58
Weather	Fine, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		128	09:45		√		√													
2	2		128	09:45						√				√				√			
3	3		102	09:48		√		√													
4	4		102	09:48						√				√	√						
5	5		102	09:48			√														
6	6		62.4	09:50		√		√													
7	7		62.5	09:50						√				√	√						
8	8		42.1	09:52		√		√													
9	9		42	09:52						√				√	√						
10	10		12.2	09:55		√		√													
11	11		12.3	09:55						√				√	√						
12	12		12.5	09:55			√									√		√			
13	13		7.3	09:57		√		√													
14	14		7.3	09:57						√	√				√						
15																					
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Lat & lon at bottom

Station	R1	CTD No	020	Date	03/08/2012
Lat	57º 01.931'N	Event No	20	Time I/W (GMT)	10:57
Lon	009º 07.201237'W	Depth (m)	151	Time bottom (GMT)	11:08
Filename	D379_020	Cast Depth (m)	153	Time O/W (GMT)	11:13
Weather	Fine, calm				
Comments	Physics only				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
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Lat & lon at bottom

Station	R2	CTD No	021	Date	03/08/2012
Lat	57º 02.269'N	Event No	21	Time I/W (GMT)	11:45
Lon	009º 09.974'W	Depth (m)	211	Time bottom (GMT)	12:06
Filename	D379_021	Cast Depth (m)	203	Time O/W (GMT)	12:14
Weather	Wind force 4, calm, sunny				
Comments	Physics only				

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1																					
2																					
3																					
4																					
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Lat & lon at bottom

Station	R3	CTD No	022	Date	03/08/2012
Lat	57º 02.269'N	Event No	22	Time I/W (GMT)	12:34
Lon	009º 09.974'W	Depth (m)	244	Time bottom (GMT)	12:50
Filename	D379_021	Cast Depth (m)	235	Time O/W (GMT)	13:01
Weather	Light swell, sunny, force 4				
Comments	Physics only				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
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Lat & lon at bottom

Station	Q	CTD No	023	Date	03/08/2012
Lat	57º 03.104'N	Event No	23	Time I/W (GMT)	13:27
Lon	009º 12.966'W	Depth (m)	307	Time bottom (GMT)	13:45
Filename	D379_023	Cast Depth (m)	298	Time O/W (GMT)	14:19
Weather	Sunny, light swell, force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		298	13:45		√		√													
2	2		298	13:46						√				√				√			
3	3		201	13:51		√		√													
4	4		201	13:51						√				√							
5	5		201	13:52			√														
6	6		100	13:57		√		√													
7	7		100	13:58						√				√	√						
8	8		100	13:58														√			
9	9		75	14:02		√		√													
10	10		75	14:03						√					√						
11	11		75	14:04																	
12	12		50	14:07		√		√													
13	13		50	14:08						√				√	√						
14	14		50	14:08																	
15	15		20	14:12		√		√													
16	16		20	14:12						√				√	√	√					
17	17		20	14:13																	
18	18		5	14:16		√		√													
19	19		5	14:17						√					√						
20	20		5	14:18			√											√			
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	Q1	CTD No	024	Date	03/08/2012
Lat	57º 03.499'N	Event No	24	Time I/W (GMT)	15:11
Lon	009º 14.737'W	Depth (m)	401	Time bottom (GMT)	15:31
Filename	D379_024	Cast Depth (m)	391	Time O/W (GMT)	15:44
Weather	Sunny, light swell, wind force 3				
Comments	Physics only				

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1																					
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Lat & lon at bottom

Station	Q2	CTD No	025	Date	
Lat	57º	Event No	25	Time I/W (GMT)	
Lon	009º	Depth (m)		Time bottom (GMT)	
Filename	D379_025	Cast Depth (m)		Time O/W (GMT)	
Weather					
Comments	No lat lon given – physics only				

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1																					
2																					
3																					
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Lat & lon at bottom

Station	P	CTD No	026	Date	03/08/2012
Lat	57º 06.079'N	Event No	26	Time I/W (GMT)	17:46
Lon	009º 25.558'W	Depth (m)	1462	Time bottom (GMT)	18:28
Filename	D379_026	Cast Depth (m)	1440	Time O/W (GMT)	19:48
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1399	18:31		√		√	√	√								√			
2	2		1199	18:40					√	√											
3	3		1099	18:44					√												
4	4		950	18:50			√			√											
5	5		950	18:50		√		√	√												
6	6		800	18:58					√												
7	7		700	19:03		√		√	√	√											
8	8		600	19:08					√												
9	9		500	19:14						√				√							
10	10		400	19:18					√												
11	11		300	19:25		√		√	√												
12	12		300	19:25			√			√											
13	13		200	19:30					√									√			
14	14		200	19:30						√				√							
15	15		100	19:35		√		√	√												
16	16		100	19:35						√				√	√						
17	17		75	19:38																	
18	18		75	19:38						√					√						
19	19		50	19:42		√		√													
20	20		50	19:42						√				√	√						
21	21		12	19:45		√		√													
22	22		12	19:45						√				√	√						
23	23		5	19:47		√		√			√										
24	24		5	19:47`						√					√						

Lat & lon at bottom

Station	O	CTD No	027	Date	03/08/2012
Lat	57º 09.17649'N	Event No	27	Time I/W (GMT)	21:10
Lon	009º 42.08'W	Depth (m)	1930.5	Time bottom (GMT)	22:05
Filename	D379_027	Cast Depth (m)	1915	Time O/W (GMT)	23:23
Weather	Wind force 4, swell 2m				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1876	22:09		√		√													
2	2		1877	22:09						√								√			
3	3		1600	22:18						√								√			
4	4		1202	22:28		√		√													
5	5		1202	22:28						√											
6	6		842	22:37		√		√													
7	7		842	22:38						√											
8	8		802	22:41														√			
9	9		603	22:47						√											
10	10		503	22:52						√				√							
11	11		303	22:58						√								√			
12	12		203	23:03		√															
13	13		203	23:03						√				√							
14	14		103	23:08						√				√	√						
15	15		78	23:11		√		√													
16	16		78	23:11						√					√						
17	17		53	23:14						√				√	√						
18	18		17	23:18		√		√													
19	19		17	23:18						√				√	√						
20	20		8	23:20		√		√													
21	21		8	23:20						√					√			√			
22																					
23																					
24																					

Lat & lon at bottom

Station	N	CTD No	028	Date	04/08/2012
Lat	57º 13.966'N	Event No	28	Time I/W (GMT)	01:03
Lon	010º 02.992'W	Depth (m)	2099	Time bottom (GMT)	01:56
Filename	D379_028	Cast Depth (m)	2088	Time O/W (GMT)	03:28
Weather	Wind force 4, light swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2050	01:59		√		√													
2	2		2050	02:00					√	√								√			
3	3		1901	02:05					√												
4	4		1801	02:09					√									√			
5	5		1600	02:17		√			√	√	Opened	before	DIC								
6	6		1400	02:23					√												
7	7		1200	02:29		√			√	√	Opened	before	DIC								
8	8		1051	02:35					√												
9	9	O2 min	820	02:43		√		√													
10	10		820	02:43					√	√											
11	11		800	02:46					√									√			
12	12		600	02:52					√	√											
13	13		500	02:56		√		√		√				√							
14	14		400	03:00					√												
15	15		301	03:04						√								√			
16	16		200	03:09					√	√				√							
17	17		100	03:13		√		√													
18	18		100	03:14					√	√				√	√						
19	19		75	03:16		√		√		√					√						
20	20		50	03:19		√		√						√	√						
21	21	Max	20	03:22		√		√													
22	22	chl	20	03:23						√				√	√						
23	23		5.5	03:25		√		√			√										
24	24		5.5	03:26						√					√			√			

Lat & lon at bottom

Station	M	CTD No	029	Date	04/08/2012
Lat	57º 17.932'N	Event No	29	Time I/W (GMT)	05:05
Lon	010º 23.184'W	Depth (m)	2216	Time bottom (GMT)	06:00
Filename	D379_029	Cast Depth (m)	2200	Time O/W (GMT)	07:20
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2200	06:01	√	√		√		√								√			
2	2		1600	06:17	√					√								√			
3	3		1600	06:17		√		√													
4	4		1200	06:28						√											
5	5		1200	06:28		√															
6	6		880	06:37	√					√								√			
7	7		880	06:38		√		√													
8	8		500	06:50	√					√								√			
9	9		500	06:50		√		√													
10	10		300	06:56						√								√			
11	11		200	07:01						√											
12	12		200	07:01										√							
13	13		100	07:06	√					√											
14	14		100	07:06										√	√						
15	15		100	07:06		√		√													
16	16		75	07:08	√					√											
17	17		75	07:08		√									√						
18	18		50	07:11						√				√	√						
19	19		50	07:11		√															
20	20		15	07:16						√				√	√						
21	21		15	07:16		√		√													
22	22		5	07:17	√													√			
23	23		5	07:18						√				√	√						
24	24		5	07:18		√		√													

Lat & lon at bottom

Station	L	CTD No	030	Date	04/08/2012
Lat	57º 21.98'N	Event No	30	Time I/W (GMT)	08:44
Lon	010º 39.935'W	Depth (m)	2128	Time bottom (GMT)	09:35
Filename	D379_030	Cast Depth (m)	2112	Time O/W (GMT)	11:08
Weather	Overcast, wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1963	09:41		√		√										√			
2	2		1963	09:41					√	√											
3	3		1902	09:47					√												
4	4		1803	09:51					√												
5	5		1603	09:57		√		√										√			
6	6		1603	09:57					√	√											
7	7		1403	10:03					√												
8	8		1203	10:10		√		√	√	√											
9	9		1053	10:14					√	√											
10	10	OMZ	923	10:19		√		√													
11	11	OMZ	923	10:19			√		√	√											
12	12		803	10:25					√									√			
13	13		603	10:31					√	√											
14	14		504	10:38		√		√		√				√							
15	15		404	10:43					√												
16	16		304	10:47			√			√								√			
17	17		204	10:52					√	√				√							
18	18		104	10:56		√		√	√	√				√	√						
19	19		79	10:59		√		√		√					√						
20	20		54	11:01						√				√	√						
21	21		14	11:04		√		√													
22	22		14	11:04						√				√	√						
23	23		6	11:07		√		√													
24	24		6	11:07						√	√				√			√			

Lat & lon at bottom

Station	K	CTD No	031	Date	04/08/2012
Lat	57º 23.995'N	Event No	31	Time I/W (GMT)	12:23
Lon	010º 52.092'W	Depth (m)	783	Time bottom (GMT)	12:49
Filename	D379_03	Cast Depth (m)	775	Time O/W (GMT)	13:46
Weather	Greyish, light swell, wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		775	12:50																	
2	2		775	12:51						√								√			
3	3	OMZ	749	12:55		√		√													
4	4	OMZ	749	12:55			√														
5	5		701	13:00																	
6	6		701	13:01						√											
7	7		502	13:03		√		√													
8	8		502	13:09						√				√				√			
9	9		301	13:16		√		√													
10	10		301	13:16			√			√											
11	11		199	13:22																	
12	12		199	13:22						√				√							
13	13		101	13:28		√		√													
14	14		101	13:29						√				√	√						
15	15		75	13:32																	
16	16		75	13:33						√					√						
17	17		51	13:36		√		√													
18	18		51	13:37						√				√	√						
19	19		15	13:40		√		√													
20	20		15	13:41						√				√	√						
21	21		5	13:44		√		√			√										
22	22		5	13:44						√					√			√			
23																					
24																					

Lat & lon at bottom

Station	J	CTD No	032	Date	04/08/2012
Lat	57º 27.010'N	Event No	32	Time I/W (GMT)	14:59
Lon	011º 05.116'W	Depth (m)	586	Time bottom (GMT)	15:25
Filename	D379_032	Cast Depth (m)	576	Time O/W (GMT)	16:09
Weather	Grey, light swell, wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		576	15:26		√															
2	2		576	15:26						√								√			
3	3		576	15:27	√																
4	4		501	15:32						√				√							
5	5		501	15:32																	
6	6		300	15:39						√								√			
7	7		300	15:40		√															
8	8		201	15:45						√				√							
9	9		201	15:45																	
10	10		101	15:50						√				√	√						
11	11		101	15:51		√															
12	12		101	15:52																	
13	13		74	15:55																	
14	14		74	15:56						√					√						
15	15		50	15:59		√															
16	16		50	16:00						√				√	√						
17	17		50	16:00	√																
18	18		15	16:04						√				√	√						
19	19		15	16:04		√															
20	20		15	16:04														√			
21	21		6	16:07		√															
22	22		6	16:07						√					√						
23	23		6	16:07																	
24																					

Lat & lon at bottom

Station	I	CTD No	033	Date	04/08/2012
Lat	57º 28.252'N	Event No	33	Time I/W (GMT)	17:29
Lon	011º 18.344'W	Depth (m)	744	Time bottom (GMT)	18:06
Filename	D379_033	Cast Depth (m)	737	Time O/W (GMT)	18:52
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		737	18:06						√								√			
2	2		737	18:06		√		√													
3	3		700	18:10						√											
4	4		700	18:10																	
5	5		500	18:17						√				√				√			
6	6		500	18:17		√		√													
7	7		300	18:23						√											
8	8		200	18:28										√							
9	9		200	18:28						√								√			
10	10		100	18:32						√				√	√						
11	11		75	18:37																	
12	12		75	18:37		√		√													
13	13		75	18:37						√											
14	14		50	18:41										√	√						
15	15		50	18:41						√											
16	16		30	18:44											√						
17	17		30	18:44						√											
18	18		10	18:47		√		√													
19	19		10	18:47						√				√	√						
20	20		10	18:47																	
21	21		5	18:49						√					√						
22	22		5	18:49		√		√			√										
23																					
24																					

Lat & lon at bottom

Station	H	CTD No	CTD034	Date	04/08 (217)
Lat	57º 29.11691'N	Event No	34	Time I/W (GMT)	20:13
Lon	011º 31.79792'W	Depth (m)	2020	Time bottom (GMT)	21:06
Filename	D37	Cast Depth (m)	2005	Time O/W (GMT)	22:23
Weather	Wind force 3, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2005	21:06	√	√		√													1
2	2		2005	21:06						√								√			2
3	3		1602	21:17		√															3
4	4		1602	21:17						√											4
5	5		1400	21:24						√											5
6	6		1202	21:31		√															6
7	7		1202	21:31						√								√			7
8	8		1002	21:37	√	√		√													8
9	9		1002	21:37						√											9
10	10		703	21:46																	10
11	11		703	21:46						√								√			11
12	12		503	21:53	√	√		√													12
13	13		503	21:53						√				√							13
14	14		204	22:01						√				√				√			14
15	15		104	22:06	√	√		√													15
16	16		104	22:06						√				√	√						16
17	17		53	22:10		√															17
18	18		53	22:10						√				√	√						18
19	19		34	22:13																	19
20	20		34	22:13						√					√						20
21	21		15.7	22:16		√		√													21
22	22		16	22:16						√				√	√						22
23	23		6	22:19		√		√													23
24	24		6	22:19						√					√			√			24

Lat & lon at bottom

Station	G	CTD No	035	Date	05/08/12
Lat	57º 29.609'N	Event No	35	Time I/W (GMT)	00:05
Lon	011º 51.097'W	Depth (m)	1789	Time bottom (GMT)	00:50
Filename	D379_035	Cast Depth (m)	1777	Time O/W (GMT)	02:22
Weather	Calm, wind force 4, **raining** a bit when sampling				
Comments					

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1			1728	00:53														√			
2			1738	00:56		√		√	√	√											
3			1599	01:02					√	√											
4			1394	01:09					√	√								√			
5			1204	01:16		√		√													
6			1204	01:16					√	√											
7			896	01:25					√												
8		O_2	831	01:30					√	√											
9		Min	831	01:31		√		√													
10			802	01:34					√	√								√			
11			603	01:41					√												
12			503	01:46						√				√							
13			400	01:50					√												
14			300	01:55						√											
15			200	02:00	**LEAK**																
16			200	02:01		√		√	√	√				√				√			
17			100	02:05					√	√				√	√						
18			75	02:07		√		√		√											
19			50	02:10						√				√	√						
20			30	02:13						√					√						
21		Chl	15	02:17		√		√													
22		max	15	02:17						√				√	√						
23			5	02:19		√		√			√										
24			5	02:20						√					√			√			

Lat & lon at bottom

Station	F	CTD No	036	Date	05/08/2012
Lat	57º 30.552'N	Event No	36	Time I/W (GMT)	04:01
Lon	011º 14.762'W	Depth (m)	1806	Time bottom (GMT)	04:47
Filename	D379_036	Cast Depth (m)	1790	Time O/W (GMT)	06:03
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1790	04:46		√		√										√			
2	2		1790	04:47						√											
3	3		1600	04:55						√		√									
4	4		1400	05:01						√											
5	5		1200	05:07		√		√				√									
6	6		1200	05:07						√											
7	7		800	05:19		√		√				√									
8	8		800	05:19						√											
9	9		500	05:27						√				√				√			
10	10		500	05:28								√									
11	11		300	05:34						√		√									
12	12		300	05:35																	
13	13		200	05:40		√		√		√				√				√			
14	14		100	05:44		√		√		√		√		√	√						
15	15		100	05:44	**Leaking**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
16	16		75	05:47						√											
17	17		50	05:50						√		√									
18	18		50	05:50										√	√						
19	19		30	05:54						√											
20	20		30	05:54											√						
21	21		16	05:57		√		√				√									
22	22		16	05:58						√				√	√						
23	23		8	06:00		√		√				√									
24	24		8	06:01						√					√			√			

Lat & lon at bottom

Station	E	CTD No	037	Date	05/08/2012
Lat	57º 31.891'N	Event No	37	Time I/W (GMT)	07:39
Lon	012º 37.800'W	Depth (m)	1649	Time bottom (GMT)	08:22
Filename	D379_037	Cast Depth (m)	1645	Time O/W (GMT)	09:34
Weather	Clear, calm, dry, wind force 1				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1636	08:22		√		√										√			
2	2		1636	08:22						√											
3	3		1602	08:25					√	√											
4	4		1401	08:31					√	√											
5	5		1202	08:37		√		√													
6	6		1202	08:37					√	√											
7	7		902	08:45					√												
8	8		802	08:50					√	√											
9	9		752	08:53		√		√													
10	10		752	08:53			√		√	√											
11	11		602	08:58					√									√			
12	12		502	09:02		√		√		√				√							
13	13		402	09:06					√												
14	14		302	09:10						√											
15	15		203	09:14					√	√				√							
16	16		103	09:18		√		√													
17	17		103	09:18					√	√				√	√						
18	18		78	09:20						√											
19	19		53	09:23						√				√	√						
20	20		33	09:26						√					√						
21	21		13	09:29		√		√													
22	22		13	09:29						√				√	√						
23	23		6	09:31		√		√													
24	24		6	09:31						√	√				√			√			

Lat & lon at bottom

Station	D	CTD No	038	Date	05/08/2012
Lat	57º 32.384'N	Event No	38	Time I/W (GMT)	10:54
Lon	012º 51.728'W	Depth (m)	1094	Time bottom (GMT)	11:22
Filename	D379_038	Cast Depth (m)	1085	Time O/W (GMT)	12:28
Weather	Dry, calm, wind force 3				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1085	11:23		√				√											
2	2		1085	11:23			√	√										√			
3	3		1046	11:28					√	√											
4	4		880	11:34		√		√													
5	5		880	11:34			√		√	√								√			
6	6		802	11:38					√												
7	7		701	11:42					√	√											
8	8		602	11:49					√	√											
9	9		502	11:53		√		√													
10	10		502	11:53			√		√	√				√				√			
11	11		402	11:59					√												
12	12		302	12:02						√											
13	13		202	12:07					√	√				√							
14	14		100	12:12		√		√													
15	15		100	12:12					√	√				√	√						
16	16		75	12:15						√											
17	17		50	12:18						√				√	√						
18	18		30	12:21						√					√						
19	19		15	12:23		√		√													
20	20		15	12:23						√				√	√						
21	21		5	12:26		√		√													
22	22		5	12:27						√					√			√			
23																					
24																					

Lat & lon at bottom

Station	C	CTD No	039	Date	05/08/2012
Lat	57º 32.873'N	Event No	39	Time I/W (GMT)	13:18
Lon	012º 59.791'W	Depth (m)	297	Time bottom (GMT)	13:31
Filename	D379_039	Cast Depth (m)	287	Time O/W (GMT)	13:59
Weather	Calm, wind force 2				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		287	13:32		√		√													
2	2		287	13:32						√				√				√			
3	3		200	13:32																	
4	4		200	13:32						√				√							
5	5		100	13:32		√		√													
6	6		100	13:32						√				√	√			√			
7	7		75	13:32																	
8	8		75	13:32						√											
9	9		50	13:32		√		√													
10	10		50	13:32						√				√	√						
11	11		25	13:32		√		√													
12	12		25	13:32						√				√	√						
13	13		10	13:32																	
14	14		10	13:32						√					√			√			
15	15		5	13:32		√		√			√	√									
16	16		5	13:32						√					√						
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	B	CTD No	040	Date	05/08/2012
Lat	57º 34.019'N	Event No	40	Time I/W (GMT)	15:24
Lon	013º 19.945'W	Depth (m)	178	Time bottom (GMT)	15:36
Filename	D379_040	Cast Depth (m)	168	Time O/W (GMT)	16:01
Weather	Calm, wind force 3				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		168	15:37		√		√													
2	2		168	15:37						√				√				√			
3	3		100	15:42		√		√													
4	4		100	15:42						√				√	√						
5	5		75	15:45																	
6	6		75	15:46						√											
7	7		50	15:49		√		√													
8	8		50	15:49						√				√	√						
9	9		25	15:52																	
10	10		25	15:53						√				√	√						
11	11		12.5	15:56		√		√													
12	12		12.5	15:56						√					√						
13	13		5	15:58		√		√			√										
14	14		5	15:59						√					√			√			
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	A	CTD No	041	Date	05/08/2012
Lat	57º 34.292'N	Event No	41	Time I/W (GMT)	17:22
Lon	013º 37.995'W	Depth (m)	109	Time bottom (GMT)	17:32
Filename	D379_041	Cast Depth (m)	100	Time O/W (GMT)	17:45
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		100	17:32														√			
2	2		100	17:32						√				√	√						
3	3		75	17:34																	
4	4		75	17:34						√					√						
5	5		50	17:37																	
6	6		50	17:37	√					√				√	√						
7	7		-																		
8	8		20	17:41						√					√						
9	9		20	17:41																	
10	10		5	17:44														√			
11	11		5	17:44						√					√						
12	12		5	17:44																	
13																					
14																					
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB1	CTD No	042	Date	05/08/2012
Lat	57º 40.039'N	Event No	42	Time I/W (GMT)	19:07
Lon	013º 54.180'W	Depth (m)	145	Time bottom (GMT)	19:18
Filename	D379_042	Cast Depth (m)	140	Time O/W (GMT)	19:35
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		140	17:32						√				√				√			
2	2		140	17:32																	
3	3		100	17:34						√				√	√						
4	4		100	17:34																	
5	5		75	17:37						√					√						
6	6		75	17:37																	
7	7		50							√				√	√						
8	8		50	17:41																	
9	9		30	17:41						√				√	√						
10	10		30	17:44																	
11	11		5	17:44						√					√			√			
12	12		5	17:44																	
13																					
14																					
15																					
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17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	S363	CTD No	043	Date	06/08/2012
Lat	60º 23.297'N	Event No	043	Time I/W (GMT)	18:18
Lon	008º 30.726'W	Depth (m)	525	Time bottom (GMT)	18:37
Filename	D379_043.hex	Cast Depth (m)	520	Time O/W (GMT)	19:07
Weather	Calm, clear, dry				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		520	18:37			√											√			
2	2		520	18:37						√											
3	3		450	18:42																	
4	4		450	18:42						√											
5	5		400	18:46																	
6	6		400	18:46						√											
7	7		200	18:53			√														
8	8		200	18:53						√											
9	9		100	18:58																	
10	10		100	18:58						√											
11	11		50	19:02														√			
12	12		50	19:02						√											
13	13		5	19:05																	
14	14		5	19:05						√					√						
15																					
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22																					
23																					
24																					

Lat & lon at bottom

Station	S362	CTD No	044	Date	06/08/2012 (219)
Lat	60º 20.461'N	Event No	044	Time I/W (GMT)	19:59
Lon	008º 32.318'W	Depth (m)	568	Time bottom (GMT)	20:21
Filename	D379_044.hex	Cast Depth (m)	563	Time O/W (GMT)	20:45
Weather	Wind force 3, calm, flat				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		563	20:23														√			
2	2		301	20:30																	
3	3		301	20:31														√			
4	4		52	20:40																	
5	5		52	20:40														√			
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Lat & lon at bottom

Station	S361	CTD No	045	Date	06/08/2012 (219)
Lat	60º 18.554'N	Event No	45	Time I/W (GMT)	21:42
Lon	008º 32.837'W	Depth (m)	728	Time bottom (GMT)	22:05
Filename	D379_045.hex	Cast Depth (m)	686	Time O/W (GMT)	22:27
Weather	Wind force 3, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		686	22:05														√			
2	2		684	22:06																	
3	3		299	22:16														√			
4	4		300	22:16																	
5	5		7	22:25														√			
6	6		7	22:26																	
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Lat & lon at bottom

Station	S360	CTD No	046	Date	06/08/2012 (219)
Lat	60º 15.868'N	Event No	046	Time I/W (GMT)	23:36
Lon	008º 34.210'W	Depth (m)	826	Time bottom (GMT)	23:59
Filename	D379_046.hex	Cast Depth (m)	819	Time O/W (GMT)	00:26
Weather	Wind force 2, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		802	00:00																	
2	2		802	00:00														√			
3	3		502	00:08																	
4	4		502	00:09														√			
5	5		103	00:19																	
6	6		103	00:19														√			
7	7		5	00:24																	
8	8		5	00:24														√			
9																					
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Lat & lon at bottom

Station	S359	CTD No	047	Date	07/08/12
Lat	60º 13.096'N	Event No	047	Time I/W (GMT)	01:02
Lon	008º 36.474'W	Depth (m)	895	Time bottom (GMT)	01:28
Filename	D379_047	Cast Depth (m)	884	Time O/W (GMT)	02:16
Weather	Calm, wind force 2				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			884	01:29																	
2			884	01:29					√	√								√			
3			725	01:36																	
4			725	01:37					√	√											
5			650	01:40																	
6			650	01:41					√	√								√			
7			522	01:46																	
8			523	01:47					√	√											
9			452	01:50																	
10			452	01:51					√	√											
11			327	01:55																	
12			327	01:56					√	√								√			
13			252	01:59																	
14			252	02:00					√	√											
15			177	01:03																	
16			177	01:03					√	√								√			
17			100	02:07																	
18			100	02:07						√											
19			50	02:11																	
20			50	02:11						√											
21			5	02:14																	
22			5	02:15						√					√			√			
23																					
24																					

Lat & lon at bottom

Station	S358	CTD No	048	Date	07/08/2012
Lat	60º 11.525'N	Event No	048	Time I/W (GMT)	03:03
Lon	008º 41.555'W	Depth (m)	773	Time bottom (GMT)	03:24
Filename	D379_048	Cast Depth (m)	758	Time O/W (GMT)	03:52
Weather	Calm, wind force 2				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			758	03:25																	
2			758	03:25														√			
3			402	03:35																	
4			402	03:36														√			
5			242	03:41																	
6			242	03:41														√			
7			53	03:48																	
8			53	03:48														√			
9																					
10																					
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Lat & lon at bottom

Station	S357	CTD No	049	Date	07/08/2012
Lat	60º 10.669'N	Event No	049	Time I/W (GMT)	04:39
Lon	008º 45.718'W	Depth (m)	617	Time bottom (GMT)	04:57
Filename	D379_049	Cast Depth (m)	610	Time O/W (GMT)	05:21
Weather					
Comments					

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1			610	04:59														√			
2			610	04:59																	
3			250	05:09														√			
4			250	05:09																	
5			25	05:17														√			
6			25	05:17																	
7																					
8																					
9																					
10																					
11																					
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Lat & lon at bottom

Station	S356	CTD No	050	Date	07/08/12
Lat	60º 8.741'N	Event No	050	Time I/W (GMT)	06:05
Lon	008º 50.764'W	Depth (m)	400	Time bottom (GMT)	06:22
Filename	D379_050.hex	Cast Depth (m)	395	Time O/W (GMT)	06:47
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			395	06:22						√											
2			395	06:22																	
3			350	06:26						√								√			
4			350	06:26																	
5			250	06:30						√											
6			250	06:30																	
7			175	06:33						√											
8			175	06:33																	
9			100	06:37						√											
10			100	06:37																	
11			50	06:41						√											
12			50	06:41																	
13			5	06:43						√								√			
14			5	06:43											√						
15																					
16																					
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19																					
20																					
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22																					
23																					
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Lat & lon at bottom

Station	S355	CTD No	051	Date	07/08/2012
Lat	60º 12.514'N	Event No	051	Time I/W (GMT)	07:43
Lon	008º 57.701'W	Depth (m)	559	Time bottom (GMT)	08:03
Filename	D379_051.hex	Cast Depth (m)	552	Time O/W (GMT)	08:28
Weather	Wind force 3				
Comments					

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Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		552	08:02														√			
2	2		551	08:02						√											
3	3		349	08:08																	
4	4		349	08:08						√											
5	5		250	08:13																	
6	6		250	08:13						√											
7	7		177	08:16														√			
8	8		177	08:16						√											
9	9		102	08:19																	
10	10		102	08:19						√											
11	11		52	08:22																	
12	12		52	08:22						√											
13	13		7	08:25														√			
14	14		7	08:25						√					√						
15																					
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22																					
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Lat & lon at bottom

Station	WTM	CTD No	052	Date	07/08/2012 (220)
Lat	60º 15.047'N	Event No	052	Time I/W (GMT)	09:21
Lon	008º 54.563'W	Depth (m)	1211	Time bottom (GMT)	09:51
Filename	D379_052.hex	Cast Depth (m)	1196	Time O/W (GMT)	10:52
Weather	Wind force 3, calm				
Comments	Release test at 1092m				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1196	09:52					√									√			
2	2		1196	09:52						√											
3	3		1092	09:57					√												
4	4		1092	09:57						√											
5	5		1005	10:09					√												
6	6		1005	10:09						√											
7	7		904	10:13					√												
8	8		905	10:14						√											
9	9		800	10:19					√												
10	10		800	10:19						√											
11	11		700	10:23					√	√											
12	12		699	10:23	**LEAKY**																
13	13		599	10:27					√												
14	14		599	10:27			√			√								√			
15	15		402	10:33	**LEAKY**																
16	16		402	10:33					√	√											
17	17		248	10:38					√												
18	18		248	10:38			√			√											
19	19		103	10:43																	
20	20		103	10:44						√											
21	21		53	10:47																	
22	22		53	10:47						√											
23	23		8	10:49														√			
24	24		8	10:50						√					√						

Lat & lon at bottom

Station	S354	CTD No	053	Date	07/08/2012
Lat	60º 13.788'N	Event No	054	Time I/W (GMT)	12:28
Lon	008º 59.041'W	Depth (m)	1015	Time bottom (GMT)	13:07
Filename	D379_053	Cast Depth (m)	1010	Time O/W (GMT)	13:40
Weather	Calm, wind force 2				
Comments	Shoaling very quickly, didn't fire at bottom, ship echo sounder wrong (numbers too shallow, actual bottom= 65m below echo sounder reading)				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			899	13:11																	
2			899	13:12														√			
3			497	13:22																	
4			498	13:23														√			
5			12	13:37																	
6			12	13:38														√			
7																					
8																					
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Lat & lon at bottom

Station	S353	CTD No	054	Date	07/08/2012
Lat	60º 14.597'N	Event No	055	Time I/W (GMT)	14:08
Lon	009º 00.282'W	Depth (m)	1310	Time bottom (GMT)	14:43
Filename	D379_054	Cast Depth (m)	1285	Time O/W (GMT)	15:50
Weather	Calm, wind force 2				
Comments	Very strong bottom current, extra 70m wire out, ~ 25m above bottom				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			1283	14:44	√																
2			1280	14:45			√		√	√								√			
3			1198	14:49	√																
4			1198	14:50					√	√											
5			1113	14:56																	
6			1116	14:56					√	√											
7			1007	15:03	√																
8			1009	15:04					√	√								√			
9			899	15:09	√																
10			900	15:10					√	√											
11			700	15:16																	
12			700	15:16					√	√								√			
13			599	15:20	√																
14			599	15:21						√											
15			401	15:27																	
16			401	15:28					√	√											
17			252	15:33			√														
18			252	15:34						√											
19			101	15:39	√																
20			101	15:40						√								√			
21			50	15:44																	
22			50	15:44						√											
23			5	15:48																	
24			5	15:49						√					√	√					

Lat & lon at bottom

Station	S352	CTD No	055	Date	07/08/2012
Lat	60º 15.6673'N	Event No	057	Time I/W (GMT)	17:35
Lon	009º 0.5971'W	Depth (m)	1080	Time bottom (GMT)	18:05
Filename	D379_055.hex	Cast Depth (m)	1070	Time O/W (GMT)	18:48
Weather					
Comments	**O_2 jump at 630m**				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			1067	18:06						√											
2			1000	18:10						√											
3			900	18:15						√											
4			700	18:21						√											
5			500	18:27						√											
6			200	18:35						√											
7			100	18:40						√											
8			50	18:44						√											
9			5	18:47						√											
10																					
11																					
12																					
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Lat & lon at bottom

Station	S351	CTD No	056	Date	07/08/2012
Lat	60º 16.643'N	Event No	058	Time I/W (GMT)	19:24
Lon	009º 0.757'W	Depth (m)	795	Time bottom (GMT)	19:49
Filename	D379_056.hex	Cast Depth (m)	785	Time O/W (GMT)	20:18
Weather	Wind force 2, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			785	19:48														√			
2			300	20:02														√			
3			301	20:02																	
4			5	20:13														√			
5			5	20:13																	
6																					
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Lat & lon at bottom

Station	S350	CTD No	057	Date	07/08/2012 (220)
Lat	60º 17.675'N	Event No	059	Time I/W (GMT)	20:47
Lon	009º 0.973'W	Depth (m)	564	Time bottom (GMT)	21:06
Filename	D379_057.hex	Cast Depth (m)	558	Time O/W (GMT)	21:31
Weather	Wind force 2, calm flat				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			558	21:06						√								√			
2			502	21:10						√											
3			300	21:16						√								√			
4			202	21:20						√											
5			102	21:24						√											
6			52	21:27						√											
7			7	21:30						√								√			
8																					
9																					
10																					
11																					
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22																					
23																					
24																					

Lat & lon at bottom

Station	S349	CTD No	058	Date	07/08/2012 (220)
Lat	60º 18.710'N	Event No	60	Time I/W (GMT)	22:06
Lon	009º 1.522'W	Depth (m)	515	Time bottom (GMT)	22:25
Filename	D379_058.hex	Cast Depth (m)	506	Time O/W (GMT)	22:43
Weather	Calm, flat, wind force 3				
Comments					

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1	1		506	22:26														√			
2	2		201	22:34														√			
3	3		7	22:42														√			
4																					
5																					
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Lat & lon at bottom

Station	GB1	CTD No	059	Date	08/08/2012
Lat	59º 12.988'N	Event No	61	Time I/W (GMT)	17:19
Lon	14º 44.906'W	Depth (m)	1059	Time bottom (GMT)	17:50
Filename	D379_059.hex	Cast Depth (m)	1050	Time O/W (GMT)	18:35
Weather	Calm, grey, wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1			1050	17:51						√								√			
2			1050	17:51																	
3			1000	17:55						√											
4			1000	17:55																	
5			900	17:59						√											
6			900	17:59			√														
7			700	18:06						√											
8			700	18:06														√			
9			500	18:12						√											
10			500	18:12																	
11			300	18:19						√											
12			300	18:19			√														
13			100	18:26						√											
14			100	18:26														√			
15			50	18:30						√											
16			50	18:30																	
17			7	18:33						√					√						
18			7	18:33																	
19																					
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Lat & lon at bottom

Station	GB2	CTD No	60	Date	08/08/12
Lat	59º 10.00'N	Event No	62	Time I/W (GMT)	19:55
Lon	14º 29.875'W	Depth (m)	991	Time bottom (GMT)	20:23
Filename	D379_60.hex	Cast Depth (m)	991	Time O/W (GMT)	20:53
Weather	Wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	10		982	20:24														√			
2	11		982	20:25																	
3	12		602	20:34	LEAKY																
4	13		602	20:35														√			
5	14		153	20:46														√			
6	15		153	20:46																	
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Lat & lon at bottom

Station	GB3	CTD No	61	Date	08/08/12
Lat	59º 5.994'N	Event No	63	Time I/W (GMT)	22:09
Lon	14º 18.888'W	Depth (m)	749	Time bottom (GMT)	22:32
Filename	D379_061.hex	Cast Depth (m)	741	Time O/W (GMT)	22:57
Weather	Wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		741	22:33														√			
2	2		502	22:41														√			
3	3		7	22:54														√			
4																					
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Lat & lon at bottom

Station	GB4	CTD No	62	Date	09/08/2012
Lat	59º 3.019'N	Event No	64	Time I/W (GMT)	00:01
Lon	14º 9.034'W	Depth (m)	610	Time bottom (GMT)	00:21
Filename	D379_062.hex	Cast Depth (m)	600	Time O/W (GMT)	00:48
Weather	Calm, wind force 5				
Comments					

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Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		600	00:22																	
2	2		600	00:22						√								√			
3	3		402	00:28																	
4	4		402	00:29						√											
5	5		203	00:35																	
6	6		203	00:35						√								√			
7	7		103	00:39																	
8	8		103	00:40						√											
9	9		50	00:43																	
10	10		50	00:43						√											
11	11		5	00:46																	
12	12		5	00:47						√					√			√			
13																					
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21																					
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Lat & lon at bottom

Station	GB5	CTD No	63	Date	09/08/2012
Lat	59º 59.994'N	Event No	65	Time I/W (GMT)	01:42
Lon	14º 0.031'W	Depth (m)	519	Time bottom (GMT)	02:00
Filename	D379_063.hex	Cast Depth (m)	509	Time O/W (GMT)	02:17
Weather	Calm wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		509	02:01														√			
2	2		252	02:08														√			
3	3		8	02:16														√			
4																					
5																					
6																					
7																					
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Lat & lon at bottom

Station	GB6	CTD No	64	Date	09/08/2012
Lat	58º 57.491'N	Event No	66	Time I/W (GMT)	03:07
Lon	13º 52.031'W	Depth (m)	449	Time bottom (GMT)	03:23
Filename	D379_064.hex	Cast Depth (m)	439	Time O/W (GMT)	03:40
Weather	Calm wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		439	03:24														√			
2	2		387	03:27														√			
3	3		7	03:38														√			
4																					
5																					
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Station	GB7	CTD No	65	Date	09/08/2012
Lat	58º 54.950'N	Event No	67	Time I/W (GMT)	04:54
Lon	13º 39.924'W	Depth (m)	488	Time bottom (GMT)	05:09
Filename	D379_065.hex	Cast Depth (m)	475	Time O/W (GMT)	05:34
Weather					
Comments	Bottles 1-4 triggered twice, 2nd time at different depths but no water collected. Depth 50m samples not collected (used deck unit 'fire' button which reset firing sequence.				

Lat & lon at bottom

Fire Seq	Bot. No.	Rosette pos.	Depth (m)	Time (GMT)	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			Bot. No.
1	1		475	05:09						√								√			
2	2		400	05:15						√											
3	3		200	05:18						√								√			
4	4		100	05:23						√											
5	5		5	05:30						√					√			√			
6																					
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Lat & lon at bottom

Station	GB8	CTD No	66	Date	09/08/2012
Lat	58º 52.054'N	Event No	68	Time I/W (GMT)	06:35
Lon	13º 29.916'W	Depth (m)	886	Time bottom (GMT)	07:00
Filename	D379_066.hex	Cast Depth (m)	875	Time O/W (GMT)	07:24
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		875	07:00														√			
2	2		450	07:11														√			
3	3		150	07:19														√			
4																					
5																					
6																					
7																					
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9																					
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Lat & lon at bottom

Station	GB9	CTD No	67	Date	09/08/2012
Lat	58º 51.510'N	Event No	69	Time I/W (GMT)	07:57
Lon	13º 27.474'W	Depth (m)	961	Time bottom (GMT)	08:22
Filename	D379_067.hex	Cast Depth (m)	952	Time O/W (GMT)	08:52
Weather	Wind force 4, overcast, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		802	08:29														√			
2	2		802	08:29																	
3	3		203	08:44														√			
4	4		203	08:44																	
5	5		23	08:50														√			
6	6		23	08:50																	
7																					
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Lat & lon at bottom

Station	GB10	CTD No	68	Date	09/08/2012
Lat	58º 51.002'N	Event No	70	Time I/W (GMT)	09:24
Lon	13º 24.944'W	Depth (m)	1036	Time bottom (GMT)	09:50
Filename	D379_068.hex	Cast Depth (m)	1022	Time O/W (GMT)	10:31
Weather	Wind force 4, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1022	09:51						√											
2	2		952	09:54			√														
3	3		952	09:55						√											
4	4		802	10:00														√			
5	5		802	10:01						√											
6	6		602	10:06																	
7	7		602	10:07						√											
8	8		403	10:13																	
9	9		402	10:13						√											
10	10		202	10:18			√											√			
11	11		203	10:19						√											
12	12		103	10:22																	
13	13		103	10:23						√											
14	14		53	10:26																	
15	15		53	10:026						√											
16	16		6	10:29														√			
17	17		6	10:29						√					√						
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	GB11	CTD No	69	Date	09/08/2012
Lat	58º 01.012'N	Event No	71	Time I/W (GMT)	11:20
Lon	13º 20.053'W	Depth (m)	1553	Time bottom (GMT)	11:57
Filename	D379_069.hex	Cast Depth (m)	1540	Time O/W (GMT)	12:37
Weather	Calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1540	11:58														√			
2	2		703	12:17														√			
3	3		304	12:27														√			
4	4		9	12:37														√			
5																					
6																					
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Lat & lon at bottom

Station	GB12	CTD No	70	Date	09/08/2012
Lat	58º 39.992'N	Event No	72	Time I/W (GMT)	14:08
Lon	13º 09.997'W	Depth (m)	1671	Time bottom (GMT)	14:45
Filename	D379_070.hex	Cast Depth (m)	1660	Time O/W (GMT)	15:28
Weather	Calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1660	14:45														√			
2	2		1104	14:58														√			
3	3		804	15:06														√			
4	4		205	15:19														√			
5	5		9	15:26														√			
6																					
7																					
8																					
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Lat & lon at bottom

Station	GB13	CTD No	71	Date	09/08/2012
Lat	58º 30.092'N	Event No	73	Time I/W (GMT)	17:02
Lon	13º 00.006'W	Depth (m)	1644	Time bottom (GMT)	17:46
Filename	D379_071.hex	Cast Depth (m)	1630	Time O/W (GMT)	18:30
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1630	17:46														√			
2	2		1350	17:54														√			
3	3		550	18:13					√									√			
4	4		5	18:28														√			
5																					
6																					
7																					
8																					
9																					
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21																					
22																					
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24																					

Lat & lon at bottom

Station	IB2	CTD No	72	Date	10/08/2012
Lat	57º 57.122'N	Event No	74	Time I/W (GMT)	00:57
Lon	14º 35.186'W	Depth (m)	446	Time bottom (GMT)	01:13
Filename	D379_072.hex	Cast Depth (m)	436	Time O/W (GMT)	01:45
Weather	Calm wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		436	01:14		√		√													
2	2		436	01:14	√					√				√				√			
3	3		402	01:17		√															
4	4		402	01:18						√											
5	5		202	01:24		√															
6	6		202	01:25						√				√				√			
7	7		100	01:29		√		√													
8	8		100	01:29	√					√				√	√						
9	9		75	01:32		√															
10	10		75	01:33						√					√						
11	11		50	01:35		√		√													
12	12		50	01:36						√				√	√						
13	13		12	01:41		√		√													
14	14		12	01:41						√				√	√						
15	15		5	01:43		√		√			√	√									
16	16		5	01:43						√					√			√			
17	17		5	01:44																	
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB2A	CTD No	73	Date	10/08/2012
Lat	58º 05.960'N	Event No	75	Time I/W (GMT)	03:42
Lon	14º 57.409'W	Depth (m)	558	Time bottom (GMT)	04:01
Filename	D379_073.hex	Cast Depth (m)		Time O/W (GMT)	04:15
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
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23																					
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Lat & lon at bottom

Station	IB3	CTD No	74	Date	10/08/2012
Lat	58º 14.990'N	Event No	76	Time I/W (GMT)	06:23
Lon	15º 19.788'W	Depth (m)	653	Time bottom (GMT)	06:46
Filename	D379_074.hex	Cast Depth (m)	640	Time O/W (GMT)	07:17
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		640			√		√		√											
2	2		600																		
3	3		600							√											
4	4		500			√															
5	5		500							√				√							
6	6		200			√															
7	7		200							√				√							
8	8		100			√		√													
9	9		100							√				√	√			√			
10	10		75			√															
11	11		75							√					√						
12	12		50			√		√													
13	13		50							√				√	√						
14	14		10			√		√													
15	15		10							√				√	√						
16	16		5			√		√													
17	17		5							√					√			√			
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB3A	CTD No	75	Date	10/08/2012
Lat	58º 22.453'N	Event No	77	Time I/W (GMT)	10:04
Lon	15º 39.931'W	Depth (m)	1154	Time bottom (GMT)	10:32
Filename	D379_075.hex	Cast Depth (m)	1147	Time O/W (GMT)	11:01
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
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Lat & lon at bottom

Station	IB4	CTD No	76	Date	10/08/2012
Lat	58º 29.999'N	Event No	78	Time I/W (GMT)	12:43
Lon	15º 59.935'W	Depth (m)	1187	Time bottom (GMT)	13:18
Filename	D379_076.hex	Cast Depth (m)	1177	Time O/W (GMT)	14:24
Weather	Grey, light swell, wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1177	13:19		√		√													
2	2		1177	13:20	√					√								√			
3	3		1140	13:22					√	√											
4	4		1000	13:29		√															
5	5		1000	13:29					√	√											
6	6	OMZ	900	13:34		√		√													
7	7	OMZ	900	13:34			√		√	√											
8	8		801	13:40					√	√								√			
9	9		700	13:45		√			√	√											
10	10		602	13:49					√	√											
11	11		502	13:53		√		√													
12	12		502	13:54	√				√	√				√							
13	13		402	13:58			√		√	√								√			
14	14		202	14:05		√															
15	15		202	14:05					√	√				√							
16	16		100	14:10		√		√													
17	17		100	14:10	√				√	√				√	√						
18	18		75	14:13		√		√		√					√						
19	19		50	14:16		√		√													
20	20		50	14:17						√				√	√						
21	21		18	14:20		√		√													
22	22		17	14:21						√				√	√						
23	23		5	14:23		√		√			√	√									
24	24		5	14:23						√					√						

Lat & lon at bottom

Station	IB4S	CTD No	77	Date	10/08/2012
Lat	58º 35.700'N	Event No	79	Time I/W (GMT)	15:46
Lon	16º 14.998'W	Depth (m)	1216	Time bottom (GMT)	16:24
Filename	D379_077.hex	Cast Depth (m)		Time O/W (GMT)	16:52
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
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Lat & lon at bottom

Station	IB4A	CTD No	78	Date	10/08/2012
Lat	58º 41.510'N	Event No	80	Time I/W (GMT)	18:19
Lon	16º 29.922'W	Depth (m)	1192	Time bottom (GMT)	18:56
Filename	D379_078.hex	Cast Depth (m)	1180	Time O/W (GMT)	19:53
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1180	18:57														√			
2	2		1180	18:57						√											
3	3		1100	19:01						√											
4	4		1100	19:01						√											
5	5		900	19:13			√														
6	6		900	19:13						√											
7	7		750	19:18						√								√			
8	8		600	19:23						√											
9	9		500	19:27						√				√							
10	10		300	19:33						√											
11	11		200	19:37			√											√			
12	12		200	19:37						√				√							
13	13		100	19:41						√				√	√						
14	14		75	19:44						√					√						
15	15		50	19:46						√				√	√						
16	16		10	19:49						√				√	√						
17	17		5	19:52						√					√						
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Lat & lon at bottom

Station	IB4B	CTD No	79	Date	10/08/2012
Lat	58º 47.237'N	Event No	81	Time I/W (GMT)	21:23
Lon	16º 44.999'W	Depth (m)	1162	Time bottom (GMT)	21:58
Filename	D379_079.hex	Cast Depth (m)	1155	Time O/W (GMT)	22:25
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
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Lat & lon at bottom

Station	IB5	CTD No	80	Date	10/08/2012
Lat	58º 53.002'N	Event No	82	Time I/W (GMT)	23:55
Lon	16º 59.992'W	Depth (m)	1153	Time bottom (GMT)	00:28
Filename	D379_080.hex	Cast Depth (m)	1143	Time O/W (GMT)	01:26
Weather	Wind force 4, foggy, drizzle when sampling				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1143	00:29		√		√													
2	2		1143	00:29						√								√			
3	3		1042	00:34		√															
4	4		1042	00:34						√											
5	5		892	00:40		√		√													
6	6		892	00:41						√								√			
7	7		602	00:51		√															
8	8		602	00:51						√											
9	9		502	00:55						√				√				√			
10	10		302	01:02						√											
11	11		302	01:02		√		√													
12	12		202	01:06						√				√							
13	13		202	01:07		√															
14	14		100	01:11						√				√	√						
15	15		100	01:12		√		√													
16	16		75	01:14		√		√		√											
17	17		50	01:16		√		√													
18	18		50	01:17						√				√	√						
19	19		30	01:19		√		√													
20	20		30	01:19						√					√						
21	21		13	01:22		√		√													
22	22		13	01:22						√				√	√						
23	23		5	01:24		√		√													
24	24		5	01:25						√					√			√			

Lat & lon at bottom

Station	IB5A	CTD No	81	Date	11/08/2012
Lat	58º 53.998'N	Event No	83	Time I/W (GMT)	02:35
Lon	17º 05.408'W	Depth (m)	1096	Time bottom (GMT)	03:08
Filename	D379_081.hex	Cast Depth (m)		Time O/W (GMT)	03:33
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
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Lat & lon at bottom

Station	IB6	CTD No	82	Date	11/08/2012
Lat	58º 53.998'N	Event No	84	Time I/W (GMT)	04:26
Lon	17º 05.408'W	Depth (m)	887	Time bottom (GMT)	05:05
Filename	D379_082.hex	Cast Depth (m)	880	Time O/W (GMT)	05:49
Weather					
Comments	Recovered from 80 m for cap removal. One bleed screw missing				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		880	05:06		√		√													
2	2		880	05:06	√					√								√			
3	3		750	05:15		√															
4	4		750	05:15						√											
5	5		600	05:20		√		√													
6	6		600	05:20						√											
7	7		500	05:24																	
8	8		500	05:24	√					√				√							
9	9		300	05:29		√															
10	10		300	05:29						√								√			
11	11		200	05:33																	
12	12		200	05:33						√				√							
13	13		100	05:37		√		√													
14	14		100	05:37	√					√				√	√						
15	15		50	05:44		√		√													
16	16		50	05:44						√				√	√						
17	17		30	05:46		√															
18	18		30	05:46						√					√						
19	19		5	05:48		√		√			√	√									
20	20		5	05:48						√				√	√						
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB6A	CTD No	83	Date	11/08/2012
Lat	59º 05.959'N	Event No	85	Time I/W (GMT)	07:20
Lon	17º 25.517'W	Depth (m)	656	Time bottom (GMT)	07:40
Filename	D379_083.hex	Cast Depth (m)	640	Time O/W (GMT)	07:56
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
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Lat & lon at bottom

Station	IB7	CTD No	84	Date	11/08/2012
Lat	59º 07.013'N	Event No	86	Time I/W (GMT)	09:14
Lon	17º 40.026'W	Depth (m)	979	Time bottom (GMT)	09:43
Filename	D379_084.hex	Cast Depth (m)	971	Time O/W (GMT)	10:27
Weather	Wind force 4, calm				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		971	09:43		√		√													
2	2		971	09:43						√											
3	3		901	09:47														√√			
4	4		901	09:47						√											
5	5		702	09:52		√		√													
6	6		702	09:52						√											
7	7		601	09:56		√		√													
8	8		601	09:57						√											
9	9		502	10:01		√															
10	10		502	10:01						√				√							
11	11		302	10:06		√		√													
12	12		302	10:07						√											
13	13		203	10:10		√		√													
14	14		203	10:11						√				√							
15	15		102	10:14	**leaking**	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16	16		103	10:14		√				√				√	√						
17	17		78	10:17		√		√													
18	18		78	10:17						√					√						
19	19		50	10:19		√															
20	20		51	10:20						√				√	√						
21	21		13	10:23		√		√													
22	22		13	10:23						√				√	√						
23	23		8	10:24		√		√													
24	24		8	10:01						√					√			√√			

Lat & lon at bottom

Station	IB7A	CTD No	85	Date	11/08/2012
Lat	59º 09.469'N	Event No	87	Time I/W (GMT)	11:41
Lon	17º 46.411'W	Depth (m)	1273	Time bottom (GMT)	12:11
Filename	D379_085.hex	Cast Depth (m)		Time O/W (GMT)	12:38
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
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Lat & lon at bottom

Station	IB8	CTD No	86	Date	11/08/2012
Lat	59º 12.030'N	Event No	88	Time I/W (GMT)	13:27
Lon	17º 52.822'W	Depth (m)	1526	Time bottom (GMT)	14:08
Filename	D379_086.hex	Cast Depth (m)	1516	Time O/W (GMT)	15:29
Weather	Light swell, wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1516	14:09		√		√													
2	2		1516	14:10						√								√			
3	3		1501	14:13						√											
4	4		1401	14:17						√											
5	5		1202	14:24		√															
6	6		1202	14:24						√								√			
7	7		1002	14:31		√															
8	8		1002	14:31			√			√											
9	9		782	14:38		√		√													
10	10		782	14:39						√								√			
11	11		502	14:47						√				√							
12	12		302	14:53						√											
13	13		302	14:54		√		√													
14	14		202	14:58						√				√							
15	15		100	15:03		-	-	-	-	-	-	-	-	-	-	-	-	-			
16	16		100	15:04		√	√	√		√				√	√						
17	17		75	15:06		√		√													
18	18		75	15:07						√					√						
19	19		50	15:10		√		√													
20	20		50	15:10						√				√	√						
21	21		15	15:14		√		√													
22	22		15	15:15						√				√	√						
23	23		5	15:17		√		√			√	√									
24	24		5	15:18						√					√			√			

Lat & lon at bottom

Station	IB8A	CTD No	87	Date	11/08/2012
Lat	59º 12.030'N	Event No	89	Time I/W (GMT)	16:27
Lon	17º 52.822'W	Depth (m)	1699	Time bottom (GMT)	17:09
Filename	D379_087.hex	Cast Depth (m)	1680	Time O/W (GMT)	17:45
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
5																					
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Lat & lon at bottom

Station	IB9	CTD No	88	Date	11/08/2012
Lat	59º 20.041'N	Event No	90	Time I/W (GMT)	18:53
Lon	18º 14.090'W	Depth (m)	1855	Time bottom (GMT)	19:40
Filename	D379_088.hex	Cast Depth (m)	1840	Time O/W (GMT)	20:55
Weather	Wind force 4, light swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1840	19:42	√					√											
2	2		1840	19:42		√		√													
3	3		1600	19:50	√					√											
4	4		1600	19:50														√			
5	5		1400	19:57						√											
6	6		1400	19:57		√															
7	7		1203	20:03						√											
8	8		1203	20:03		√		√													
9	9		1003	20:12	√					√											
10	10		821	20:18						√											
11	11		821	20:18		√		√													
12	12		702	20:22						√											
13	13		503	20:28	√	√		√		√				√				√			
14	14		504	20:37		√				√				√							
15	15		100	20:41	**leaking**	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16	16		100	20:41	√	√		√		√					√						
17	17		75	20:44						√				√	√						
18	18		75	20:44		√															
19	19		50	20:47						√				√	√						
20	20		50	20:48		√		√													
21	21		15	20:51						√				√	√						
22	22		15	20:51		√		√													
23	23		5	20:53						√					√						
24	24		5	20:53		v		√			√							√			

Lat & lon at bottom

Station	IB9A	CTD No	89	Date	11/08/2013
Lat	59º 22.403'N	Event No	91	Time I/W (GMT)	22:06
Lon	18º 20.510'W	Depth (m)	2214	Time bottom (GMT)	22:57
Filename	D379_089.hex	Cast Depth (m)	2198	Time O/W (GMT)	23:45
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	15		2195	22:59																	
2																					
3																					
4																					
5																					
6																					
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23																					
24																					

Lat & lon at bottom

Station	IB10	CTD No	90	Date	12/08/2012
Lat	59º 23.998'N	Event No	93	Time I/W (GMT)	00:41
Lon	18º 25.015'W	Depth (m)	2400	Time bottom (GMT)	01:36
Filename	D379_090.hex	Cast Depth (m)	2389	Time O/W (GMT)	03:04
Weather	Drizzle, light swell, wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2389	01:37		√		√													
2	2		2389	01:38						√								√			
3	3		2303	01:42						√											
4	4		2103	01:48						√											
5	5		1804	01:56						√								√			
6	6		1504	02:05		√		√		√											
7	7		1204	02:13						√								√			
8	8		1004	02:19		√				√											
9	9		875	02:23		√		√													
10	10		875	02:29						√								√			
11	11		705	02:29						√											
12	12		500	02:35		√															
13	13		500	02:36						√				√							
14	14		200	02:44		√		√		√				√							
15	15		100	02:48		√		√													
16	16		100	02:48						√				√	√			√			
17	17		75	02:51		√		√		√					√						
18	18		50	02:54		√		√													
19	19		50	02:54						√				√	√						
20	20		35	02:57		√				√											
21	21		15	02:59		√		√													
22	22		15	03:00						√				√	√						
23	23		5	03:03		√		√			√	√									
24	24		5	03:05						√					√						

Lat & lon at bottom

Station	IB10A	CTD No	91	Date	12/08/2012
Lat	59º 31.973'N	Event No	94	Time I/W (GMT)	05:02
Lon	18º 46.074'W	Depth (m)	2725	Time bottom (GMT)	06:05
Filename	D379_091.hex	Cast Depth (m)	2700	Time O/W (GMT)	07:24
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2700	06:05						√											
2	2		2600	06:09						√											
3	3		2000	06:22						√											
4	4		1500	06:34						√											
5	5		1000	06:46						√											
6	6		880	06:51						√											
7	7		500	07:02						√											
8	8		200	07:09						√											
9	9		100	07:13						√											
10	10		56	07:13						√											
11	11		10	07:19						√											
12	12		5	07:22						√											
13																					
14																					
15																					
16																					
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB11	CTD No	92	Date	12/08/2012
Lat	59º 40.010'N	Event No	95	Time I/W (GMT)	09:20
Lon	19º 06.979'W	Depth (m)	2680	Time bottom (GMT)	10:21
Filename	D379_092.hex	Cast Depth (m)	2658	Time O/W (GMT)	11:59
Weather	Wind force 4, humid, raining while sampling				
Comments	Bad data from fluorimeter at times				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2658	10:22		√		√	√	√											
2	2		2553	10:26					√	√								√			
3	3		2403	10:31		√			√	√											
4	4		2203	10:38			√		√	√											
5	5		2001	10:44		√		√	√	√											
6	6		1796	10:50					√	√								√			
7	7		1503	10:58		√			√	√											
8	8		1205	11:06					√	√											
9	9		1004	11:06		√		√	√	√											
10	10		805	11:06					√	√											
11	11		645	11:06		√	√	√	√	√											
12	12		505	11:06						√				√							
13	13		406	11:06					√	√											
14	14		206	11:06		√			√	√				√							
15	15		100	11:06			√		√	√				√	√						
16	16		100	11:06		√		√													
17	17		76	11:06						√					√						
18	18		76	11:06		√		√													
19	19		51	11:06						√				√	√						
20	20		51	11:06		√		√													
21	21		13	11:06						√				√	√						
22	22		13	11:06		√		√													
23	23		9	11:06						√					√						
24	24		9	11:06		√		√			√							√			

Lat & lon at bottom

Station	IB11A	CTD No	93	Date	12/08/2012
Lat	59º 49.997'N	Event No	96	Time I/W (GMT)	14:14
Lon	19º 33.496'W	Depth (m)	2705	Time bottom (GMT)	15:19
Filename	D379_093.hex	Cast Depth (m)	2695	Time O/W (GMT)	16:49
Weather	Drizzle, light swell, wind force 4				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2695	15:20		√		√													
2	2		2695	15:20						√								√			
3	3		2501	15:27						√											
4	4		2302	15:34																	
5	5		2302	15:35			√			√								√			
6	6		2003	15:45		√															
7	7		2003	15:44						√											
8	8		1604	15:55		√															
9	9		1604	15:56						√								√			
10	10		1200	16:06																	
11	11		1200	16:06						√											
12	12		850	16:16		√		√													
13	13		850	16:15			√			√								√			
14	14		600	16:23						√											
15	15		300	16:31																	
16	16		300	16:31						√											
17	17		100	16:37		√		√													
18	18		100	16:37			√			√											
19	19		50	16:41		√		√													
20	20		50	16:41						√											
21	21		13	16:45		√		√													
22	22		13	16:45						√											
23	23		7	16:47		√		√													
24	24		7	16:47						√					√						

Lat & lon at bottom

Station	IB12	CTD No	94	Date	12/08/2012
Lat	59º 49.997'N	Event No	98	Time I/W (GMT)	19:12
Lon	19º 33.496'W	Depth (m)	2727	Time bottom (GMT)	20:20
Filename	D379_094.hex	Cast Depth (m)	2703	Time O/W (GMT)	21:57
Weather	Wind force 4, light swell, overcasr, foggy				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2703	20:21	√	√		√													
2	2		2703	20:22						√								√			
3	3		2603	20:27	√			√		√											
4	4		2400	20:33						√											
5	5		2103	20:41	√	√		√													
6	6		2102	20:42						√								√			
7	7		1803	20:50						√											
8	8		1504	20:58	√	√		√													
9	9		1504	20:59						√											
10	10		1204	21:07						√											
11	11		1003	21:13	√	√		√													
12	12		1004	21:14						√											
13	13		685	21:24	√	√		√													
14	14		684	21:24						√											
15	15		505	21:30		√															
16	16		505	21:30						√				√							
17	17		206	21:39		√		√		√				√							
18	18		100	21:43	√	√															
19	19		100	21:44						√				√	√						
20	20		76	21:47		√		√		√					√						
21	21		51	21:50		√		√		√				√	√						
22	22		31	21:53		√		√		√					√						
23	23		8	21:56		√		√										√			
24	24		8	21:56						√	√	√		√	√						

Lat & lon at bottom

Station	IB12A	CTD No	95	Date	12/08/2012
Lat	60º 14.995'N	Event No	99	Time I/W (GMT)	23:55
Lon	19º 59.987'W	Depth (m)	2643	Time bottom (GMT)	00:54
Filename	D379_095.hex	Cast Depth (m)	2633	Time O/W (GMT)	02:17
Weather	Wind force 4, foggy				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2633	00:56																	
2	2		2633	00:56						√											
3	3		2503	01:01																	
4	4		2503	01:02						√											
5	5		2003	01:14																	
6	6		2003	01:15						√											
7	7		1504	01:27																	
8	8		1504	01:27						√											
9	9		1005	01:39																	
10	10		1005	01:40						√											
11	11	OMZ	745	01:47																	
12	12	OMZ	745	01:48						√											
13	13		505	01:54																	
14	14		505	01:55						√											
15	15		206	02:03																	
16	16		206	02:04						√											
17	17		100	02:08																	
18	18		100	02:08						√											
19	19		50	02:11																	
20	20		50	02:12						√											
21	21		6	02:15																	
22	22		6	02:16						√					√						
23																					
24																					

Lat & lon at bottom

Station	IB13	CTD No	96	Date	13/08/2012
Lat	60º 30.012'N	Event No	100	Time I/W (GMT)	04:15
Lon	19º 59.920'W	Depth (m)	2537	Time bottom (GMT)	05:15
Filename	D379_096.hex	Cast Depth (m)	2510	Time O/W (GMT)	06:34
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1		1	2510	05:17		√		√													
2		2	2510	05:17						√								√			
3		3	2400	05:21		√				√											
4		4	2000	05:31		√				√								√			
5		5	1500	05:44		√		√		√								√			
6		6	1200	05:51		√				√											
7		7	1000	05:57		√		√													
8		8	1000	05:57						√											
9		9	620	06:01		√		√													
10		10	620	06:01						√											
11		11	500	06:12		√															
12		12	500	06:12						√				√							
13		13	200	06:20		√		√													
14		14	200	06:20						√				√							
15		15	100	06:24		√		√													
16		16	100	06:24						√				√	√			√			
17		17	75	06:27		√		√													
18		18	75	06:27						√					√						
19		19	50	06:28		√		√													
20		20	50	06:28						√				√	√						
21		21	30	06:30		√		√													
22		22	30	06:30						√				√	√						
23		23	5	06:33		v		v			√										
24		24	5	06:33						√					√						

Lat & lon at bottom

Station	IB13A	CTD No	97	Date	13/8/2012
Lat	60º 44.950'N	Event No	102	Time I/W (GMT)	08:56
Lon	19º 59.702'W	Depth (m)	2374	Time bottom (GMT)	09:52
Filename	D379_097.hex	Cast Depth (m)	2353	Time O/W (GMT)	11:01
Weather	Wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2353			√		√													
2	2		2353							√								√			
3	3		1997				√			√											
4	4		1498							√								√			
5	5		1000			√		√													
6	6		1000							√											
7	7		756			√		√													
8	8		756				√			√											
9	9		504							√											
10	10		204							√											
11	11		100			√		√													
12	12		100							√											
13	13		50			√		√													
14	14		50							√											
15	15		7			√		√													
16	16		7							√					√			√			
17																					
18																					
19																					
20																					
21																					
22																					
23																					
24																					

Lat & lon at bottom

Station	IB14	CTD No	98	Date	13/08/2012
Lat	60º 59.990'N	Event No	103	Time I/W (GMT)	13:22
Lon	20º 00.024'W	Depth (m)	2397	Time bottom (GMT)	14:11
Filename	D379_098.hex	Cast Depth (m)	2387	Time O/W (GMT)	15:42
Weather	Grey, wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2387	14:12		√		√													
2	2		2387	14:13	√					√								√			
3	3		2299	14:17					√	√											
4	4		2203	14:22		√			√	√											
5	5		2003	14:28		√		√													
6	6		2003	14:28					√	√								√			
7	7		1804	14:34	√	√			√	√											
8	8		1604	14:39					√	√											
9	9		1404	14:45		√		√	√	√								√			
10	10		1204	14:51					√												
11	11		1004	14:57		√		√	√	√											
12	12	OMZ	800	15:03		√		√													
13	13	OMZ	800	15:03	√				√	√											
14	14		600	15:09					√	√								√			
15	15		500	15:14	√					√				√							
16	16		400	15:18		√		√	√	√											
17	17		200	15:24		√			√	√				√							
18	18		100	15:29		√		√													
19	19		100	15:29					√	√				√	√						
20	20		75	15:32		√		√		√					√						
21	21		50	15:35		√		√													
22	22		50	15:36	√					√				√	√						
23	23	Cmax	18	15:39		√		√		√				√	√						
24	24		6	15:41		√		√		√	√	√			√			√			

Lat & lon at bottom

Station	IB15	CTD No	99	Date	13/08/2012
Lat	61º 15.034'N	Event No	104	Time I/W (GMT)	17:46
Lon	20º 00.016'W	Depth (m)	2385	Time bottom (GMT)	18:49
Filename	D379_099.hex	Cast Depth (m)	2370	Time O/W (GMT)	20:25
Weather	Wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1					√		√		√								√			
2	2					√		√													
3	3						√			√											
4	4					√				√											
5	5					√		√		√								√			
6	6					√				√											
7	7					√		√		√											
8	8					√		√													
9	9						√			√											
10	10					√															
11	11									√				√	√		√				
12	12					√		√													
13	13						√			√				√			√				
14	14					√		√													
15	15									√				√			√				
16	16					√		√													
17	17									√											
18	18					√		√													
19	19									√				√			√				
20	20					√		√		√				√							
21	21				stopper	missing	-	-	-	-	-	-	-	-	-	-	-	-			
22	22					√		√													
23	23									√	√							√			
24																					

Lat & lon at bottom

Station	IB16	CTD No	100	Date	13/08/2012
Lat	61º 30.002'N	Event No	105	Time I/W (GMT)	23:20
Lon	20º 00.098'W	Depth (m)	2216	Time bottom (GMT)	00:14
Filename	D379_100.hex	Cast Depth (m)	2206	Time O/W (GMT)	01:32
Weather	Wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		2206	00:15		√		√				√									
2	2		2206	00:15						√								√			
3	3		2164	00:18					√	√											
4	4		1803	00:27					√												
5	5		1604	00:32		√		√	√	√		√									
6	6		1404	00:38					√									√			
7	7		1204	00:44		√			√	√		√									
8	8		1004	00:50		√		√	√	√		√									
9	9		795	00:58		√		√				√									
10	10		793	00:58					√	√											
11	11		504	01:06		√						√									
12	12		504	01:06						√				√				√			
13	13		404	01:10					√												
14	14		204	01:16		√						√									
15	15		205	01:16					√	√				√							
16	16		105	01:20		√		√				√									
17	17		105	01:20					√	√				√	√						
18	18		75	01:23		√		√		√					√						
19	19		50	01:25		√		√				√									
20	20		50	01:25						√				√	√						
21	21		21	01:28		√		√													
22	22		21	01:28						√				√	√						
23	23		5	01:30		√		√				√									
24	24		5	01:30						√					√						

Lat & lon at bottom

Station	IB16A	CTD No	101	Date	14/08/2012
Lat	61º 45.061'N	Event No	107	Time I/W (GMT)	04:48
Lon	19º 59.916'W	Depth (m)	1803	Time bottom (GMT)	05:35
Filename	D379_101.hex	Cast Depth (m)		Time O/W (GMT)	06:13
Weather					
Comments	No bottles fired				

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					
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Lat & lon at bottom

Station	IB17	CTD No	102	Date	14/08/2012
Lat	62º 00.040'N	Event No	108	Time I/W (GMT)	09:04
Lon	20º 00.191'W	Depth (m)	1807	Time bottom (GMT)	09:57
Filename	D379_102.hex	Cast Depth (m)	1787	Time O/W (GMT)	11:12
Weather	Wind force 6, 3/4m swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1787	09:58		√		√													
2	2		1787	09:58						√								√			
3	3		1702	10:02		√			√	√											
4	4		1603	10:06					√												
5	5		1503	10:10					√	√											
6	6		1403	10:13		√		√													
7	7		1403	10:14					√	√											
8	8		1202	10:20					√	√											
9	9		1002	10:26		√		√													
10	10		1003	10:26					√	√											
11	11		849	10:31		√		√													
12	12		849	10:32					√	√											
13	13		799	10:35		√			√	√											
14	14		502	10:43		√		√													
15	15		503	10:43						√				√							
16	16		403	10:47					√												
17	17		204	10:54		√			√	√				√				√			
18	18		100	10:58		√		√													
19	19		100	10:59					√	√				√	√						
20	20		74	11:02		√				√					√						
21	21		50	11:04		√		√		√				√	√						
22	22		16	11:07						√				√	√						
23	23		5	11:09		√		√													
24	24		5	11:10						√	√				√			√			

Lat & lon at bottom

Station	IB18S	CTD No	103	Date	14/08/2012
Lat	62º 19.973'N	Event No	109	Time I/W (GMT)	15:54
Lon	19º 50.034'W	Depth (m)	1803	Time bottom (GMT)	16:40
Filename	D379_103.hex	Cast Depth (m)	1750	Time O/W (GMT)	17:46
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1750	16:40	√					√								√			
2	2		1750	16:40		√		√													
3	3		1700	16:45						√											
4	4		1500	16:51		√															
5	5		1500	16:51			√			√											
6	6		1200			√				√											
7	7		1000	17:06		√				√											
8	8		800	17:12		√		√													
9	9		800	17:12	√		√			√											
10	10		600	17:13																	
11	11		500	17:22		√		√													
12	12		500	17:22	√					√				√				√			
13	13		200	17:30			√			√											
14	14		200	17:30		√								√							
15	15		100	17:34						√				√	√						
16	16		100	17:34		√		√													
17	17		75	17:36						√					√						
18	18		75	17:36		√		√													
19	19		50	17:38	√					√				√	√						
20	20		50	17:38		√		√													
21	21		12	17:41						√				√	√						
22	22		12	17:41		√		√													
23	23		3	17:44						√					√			√			
24	24		3	17:44		√		√													

Lat & lon at bottom

Station	IB19S	CTD No	104	Date	14/08/2012
Lat	62º 40.051'N	Event No	110	Time I/W (GMT)	20:42
Lon	19º 39.931'W	Depth (m)	1687	Time bottom (GMT)	20:27
Filename	D379_104.hex	Cast Depth (m)	1667	Time O/W (GMT)	22:41
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1666	21:27		√		√										√			
2	2		1667	21:28						√											
3	3		1602	21:32					√	√											
4	4		1452	21:37		√		√	√	√											
5	5		1302	21:42					√												
6	6		1202	21:46		√			√	√											
7	7		1003	21:52		√		√	√	√											
8	8		903	21:56						√											
9	9		752	22:02		√		√	√	√											
10	10		302	22:07					√	√											
11	11		503	22:11		√		√													
12	12		503	22:12						√				√							
13	13		403	22:16					√									√			
14	14		203	22:23		√			√	√				√							
15	15		104	22:27		√		√													
16	16		104	22:28					√	√				√	√						
17	17		74	22:31		√															
18	18		74	22:31						√				√	√						
19	19		49	22:34		√		√													
20	20		49	22:34						√					√						
21	21		19	22:37		√															
22	22		19	22:37						√				√	√						
23	23		6	22:39		√		√													
24	24		6	22:02						√	√				√			√			

Lat & lon at bottom

Station	IB20S	CTD No	105	Date	15/08/2012
Lat	62º 55.003'N	Event No	111	Time I/W (GMT)	01:18
Lon	19º 33.020'W	Depth (m)	1400	Time bottom (GMT)	01:54
Filename	D379_105.hex	Cast Depth (m)	1391	Time O/W (GMT)	02:59
Weather	Raining, wind force 5, 2/3m swell				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1391	01:55		√		√													
2	2		1391	01:56	√					√								√			
3	3		1351	01:59					√	√											
4	4		1301	02:01					√												
5	5		1201	02:05					√	√											
6	6		1002	02:11		√			√	√											
7	7		902	02:15					√	√											
8	8		772	02:20		√		√													
9	9		772	02:20	√					√								√			
10	10		600	02:26					√	√											
11	11		503	02:30		√		√													
12	12		502	02:30						√				√							
13	13		402	02:34					√												
14	14		202	02:40		√															
15	15		202	02:40					√	√				√							
16	16		101	02:44		√		√													
17	17		101	02:45					√	√				√	√						
18	18		75	02:47		√				√					√						
19	19		50	02:50		√		√													
20	20		50	02:51						√				√	√						
21	21		20	02:53		√		√													
22	22		20	02:54						√				√	√			√			
23	23		5	02:57		√		√			√										
24	24		5	02:57						√					√						

Lat & lon at bottom

Station	IB21S	CTD No	106	Date	15/08/2012
Lat	63º 07.988'N	Event No	112	Time I/W (GMT)	05:54
Lon	19º 55.163'W	Depth (m)	1046	Time bottom (GMT)	06:16
Filename	D379_106.hex	Cast Depth (m)	1020	Time O/W (GMT)	07:03
Weather					
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		1020	06:18		√		√										√			
2	2		1020	06:18						√											
3	3		970	06:22																	
4	4		970	06:22						√											
5	5		900	06:25		√															
6	6		900	06:25						√											
7	7		750	06:30		√		√													
8	8		750	06:30						√											
9	9		600	06:35																	
10	10		600	06:35						√											
11	11		500	06:39		√															
12	12		500	06:39						√				√							
13	13		200	06:47																	
14	14		200	06:47						√				√							
15	15		100	06:51		√		√													
16	16		100	06:51						√				√	√						
17	17		75	06:53		√															
18	18		75	06:53						√					√						
19	19		50	06:56		√		√													
20	20		50	06:56						√				√	√						
21	21		20	06:58		√		√													
22	22		20	06:58						√				√	√						
23	23		5	07:01		√		√			√										
24	24		5	07:01						√					√						

Lat & lon at bottom

Station	IB22S	CTD No	107	Date	15/08/2012
Lat	63º 12.980'N	Event No	113	Time I/W (GMT)	08:17
Lon	20º 04.039	Depth (m)	670	Time bottom (GMT)	08:38
Filename	D379_107.hex	Cast Depth (m)	662	Time O/W (GMT)	09:16
Weather	Wind force 6				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		662	08:39		√		√													
2	2		662	08:40						√											
3	3		602	08:43		√															
4	4		602	08:43						√											
5	5		502	08:47		√		√													
6	6		502	08:47						√				√							
7	7		402	08:51		√															
8	8		402	08:51						√											
9	9		302	08:55		√															
10	10		302	08:55						√											
11	11		202	08:59		√															
12	12		202	08:59						√				√							
13	13		103	09:03		√		√													
14	14		102	09:04						√				√	√						
15	15		77	09:06																	
16	16		77	09:07						√					√						
17	17		53	09:09		√		√													
18	18		52	09:09						√				√	√						
19	19		22	09:12																	
20	20		22	09:12						√				√	√						
21	21		7	09:15		√		√													
22	22		7	09:15						√	√				√						
23																					
24																					

Lat & lon at bottom

Station	IB22X	CTD No	108	Date	15/08/2012
Lat	63º 16.022'N	Event No	114	Time I/W (GMT)	10:07
Lon	20º 08.636'W	Depth (m)	143	Time bottom (GMT)	10:17
Filename	D379_108.hex	Cast Depth (m)	139	Time O/W (GMT)	10:24
Weather	Wind force 5				
Comments					

Fire Seq	***Bot. No.***	***Rosette pos.***	***Depth (m)***	***Time (GMT)***	**DIC/TA SAMS**	**DIC/TA NOCS**	**O_2**	**C^{13}**	**Al**	**Nuts**	**SEM**	**I^{129}**	**Biolum**	**POC**	**Chl**	**Lugols SAMS**	**Lugols NOCS**	**Salinity**			***Bot. No.***
1																					
2																					
3																					
4																					
5																					
6																					
7																					
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9																					
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Lat & lon at bottom

Station	IB23S	CTD No	109	Date	15/08/2012
Lat	63º 19.072'N	Event No	115	Time I/W (GMT)	11:11
Lon	20º 12.990'W	Depth (m)	122	Time bottom (GMT)	11:20
Filename	D379_109.hex	Cast Depth (m)	112	Time O/W (GMT)	11:35
Weather	Wind force 5				
Comments					

Fire Seq	*Bot. No.*	*Rosette pos.*	*Depth (m)*	*Time (GMT)*	DIC/TA SAMS	DIC/TA NOCS	O_2	C^{13}	Al	Nuts	SEM	I^{129}	Biolum	POC	Chl	Lugols SAMS	Lugols NOCS	Salinity			*Bot. No.*
1	1		122	11:20						√				√							
2	2		122	11:21		√		√													
3	3		103	11:23						√				√	√						
4	4		103	11:23		√		√													
5	5		77	11:25						√					√						
6	6		77	11:26		√		√													
7	7		53	11:28						√				√	√						
8	8		53	11:28		√		√													
9	9		17	11:31						√				√	√						
10	10		17	11:32		√		√													
11	11		7	11:33						√					√						
12	12		7	11:34		√		√													
13																					
14																					
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