

# National Oceanography Centre, Southampton

## Cruise Report No. 28

### **FS Poseidon Cruises**

P343 04 OCT-17 OCT 2006

and

P345 28 NOV-07 DEC 2006

RAPID-MOC Autumn 2006 Eastern Boundary  
moorings refurbishment cruises

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2008

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## DOCUMENT DATA SHEET

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<i>ABSTRACT</i> <p>This report describes the Autumn 2006 Eastern Boundary moorings refurbishment cruises for the RAPID-MOC programme Monitoring the Atlantic Meridional Overturning Circulation at 26.5°N. Two cruises are reported here: FS <i>Poseidon</i> cruise P343 (4 OCT – 17 OCT) and FS <i>Poseidon</i> cruise P345 (28 NOV – 7 DEC). Both cruises sailed to and from Las Palmas, Gran Canaria.</p> <p>Six moorings were recovered during P343 and 13 deployed. Parafil failures on EB1 and EB2 (5000m long moorings located near 24°N, 24°W) during deployment necessitated immediate recovery. This led to an emergency cruise P345 to recover EB2 and to redeploy EB1 and EB2. P343 was also notable for the first deployment of seven mini-moorings consisting of a single microcat between 500m and 50m depth.</p>	
<i>KEYWORDS</i> RAPID-MOC, thermohaline circulation, Atlantic Ocean, Eastern Boundary, <i>Poseidon</i> , cruise 2006, cruise P343, cruise P345, moorings, SeaBird, microcats, bottom pressure recorders, CTD	
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# 1. Scientific and Ship's Personnel

Table 1: P343 Scientific and Technical Staff

<i>Name</i>	<i>Task</i>	<i>Affiliation</i>
Torsten Kanzow	Principal Scientist	National Oceanography Centre (Southampton)
Stuart Cunningham	Senior Scientist	National Oceanography Centre (Southampton)
Rory Bingham	Scientist	Proudman Oceanographic Laboratory (Liverpool)
Maria Paz Chidichimo	Scientist	Max Planck Institut (Hamburg)
Clotilde Dubois	Scientist	Max Planck Institut (Hamburg)
Craig Wallace	Scientist	National Oceanography Centre (Southampton)
Robert McLachlan	Mooring Technician	National Oceanography Centre (Southampton)
Aziz Agouzouk	Moroccan Observer	Agouzouk abdelaziz Insitut National des Recherche Halieutique (Casablanca)
Steve Whittle	Mooring Technician	National Oceanography Centre (Southampton)
Peter Keen	CTD Technician	National Oceanography Centre (Southampton)
Christian Crowe	Mooring Technician	National Oceanography Centre (Southampton)

Table 2: P345 Scientific and Technical Staff

<i>Name</i>	<i>Task</i>	<i>Affiliation</i>
Stuart Cunningham	Chief Scientist (Fahrtleiter)	NOCS
John Wynar	Technician	NOCS
Colin Hutton	Technician	NOCS

Table 3: P345 Ship's Crew

<i>Name</i>	<i>Rank</i>
M. Schneider	Kapitän
H.-O Stange	Ltd. Ing.
M. Günther	1. Offz.





## 2. Description of vessel

**FS *Poseidon*, IMO-No. 7427518. Call sign DBKV.**

The FS *Poseidon* is a 61 metre research vessel, operated by Briese Schifffahrts GmbH & Co. The boat was built in 1976 in Bremerhaven, Germany, although Kiel is now her home port. Propelled by a diesel electric 1265 horse power main engine the boat is capable of a speed of 9 kts and additional manoeuvrability is provided by a 394 horse power 360 degree thruster. The displacement of the boat is approximately 1509 tons.

The port and aft decks provide deployment and recovery space for mooring equipment and two laboratories are situated on the main deck. An A-frame is installed towards the aft of the boat and a deck CTD-winch system operates on the port side.

## 3. Itinerary

### **P343**

Depart Las Palmas, Gran Canaria 4<sup>th</sup> October 2006 – Arrive Las Palmas, Gran Canaria 17<sup>th</sup> October 2006

### **P345**

Depart Las Palmas, Gran Canaria 28<sup>th</sup> November 2006 – Arrive Las Palmas, Gran Canaria 7<sup>th</sup> December 2006

## 4. Acknowledgements

The Captain and crew of the FS *Poseidon* were dedicated to achieving the maximum amount of science possible during both cruises. The second cruise P345 was organised after technical problems with some moorings during P343 and Dr. Thomas J. Müller of IFM-GEOMAR was critical in ensuring that P345 was successfully planned at short notice.

## 5. Introduction

RAPID-MOC is a joint UK/US programme to monitor the Atlantic Meridional Overturning Circulation at 26.5°N. There are three partners each contributing key observations. The Atlantic Oceanographic and Meteorological Laboratory (AOML) – part of the USA National Oceanic and Atmospheric Administration (NOAA) – leads a programme to monitor Florida Current transport using telephone cables. Frequent cruises are used to calibrate the cable measurements.

AOML also complete an annual CTD section across the Deep Western Boundary Current (DWBC) east of the Bahamas along 26.5°N to monitor long-term property changes.

The Rosenstiel School of Marine and Atmospheric Sciences (RSMAS), University of Miami maintains three moorings in the DWBC for transport measurements. The National Oceanography Centre, Southampton manages a transatlantic array of moorings to monitor the interior Atlantic circulation.

The goal of RAPID-MOC is to develop a pre-operational array to monitor the Atlantic

Meridional Overturning Circulation at 26.5°N (<http://www.noc.soton.ac.uk/rapidmoc>). The programme is funded to make four years of continuous observations between 2004 and 2008.

## 6. Bridge Logs

### **P343**

Appendix A : P343 Bridge Log

### **P345**

Appendix B : P345 Bridge Log

## 7. Meteorological Report – P343

### **4<sup>th</sup> October 2006. 277**

Ship sailed at 12:00hrs, in a north easterly trade, with the Azores high to the north. Relative humidity was high throughout the day, evening and night, not falling below 78%. Mean 6 hourly air temperature was approximately 23.8 deg C in the afternoon, varying little into the night. Mean wind speed between 12:00 and 23:59 GMT was 9.3 cm s<sup>-1</sup>, enough to maintain a significant swell.

Location of vessel at 12:00 GMT: 28.25N 15.29W

### **5<sup>th</sup> October 2006. 278**

Still within the Canary vicinity, the ship continued to experience a dominant northeasterly wind. To the north, the Azores high weakened slightly from 1030 to 1029mb, and ship-measured pressure fell during the 5th to 1019.1mb. Air temperature showed remarkably little variation throughout the night into morning, falling slightly from 22.8 to 22.4 deg C, remaining constant into the night of the 5th. Humidity varied from 69% to 75% during the 24 hours. Towards late evening the wind backed northerly for a short while, and the 6-hourly mean wind speed rose slightly during the day (12.7 cm s<sup>-1</sup> 18:00-23:59) with sea conditions remaining reasonably rough.

Location of vessel at 12:00 GMT: 27.91N 13.44W

### **6<sup>th</sup> October 2006. 279**

Azores high continuing to weaken slightly (1027mb at 12:00 GMT) and ship-based pressure continuing to fall also, with final 6-hourly mean 1015.9mb. Mean air temperatures showing little variation, remaining around ~22.0 deg C for the entire 24 hours. Humidity rose today from 73.4% to 84.9%. Wind direction remained constant, either northeast, or backing north-northeast for short periods. Wind speed showed little in the way of change remaining around 12-13 cm s<sup>-1</sup>.

Location of vessel at 12:00 GMT: 27.92N 13.44W

### **7<sup>th</sup> October 2006. 280**

The general synoptic trend continued from the 6th, with the Azores high weakening to

approximately 1020mb according to the 00:00 analysis. With little synoptic development to the south, the dominant airflow onboard remained north easterly, although significant periods of northerly winds are evident from the ship's sensors during the afternoon. MSLP measured on board varied little during the 24 hours – between 1014.9mb and 1015.3. A rise in temperature is evident throughout the day – rising from 21.8 deg C (00:00-05:59hrs) to 23.1 deg C (18:00-23:59hrs) – too large for the negligible diurnal cycle, and not accountable by southward transit of the vessel.

Location of vessel at 12:00 GMT: 27.66N 14.14E

### **8<sup>th</sup> October 2006. 281**

Significant synoptic development overnight with eastern section of the Azores high completely dissipating replaced by a very weak low situated over the Gibraltar strait. With the vessel also commencing a southwest transit, the regional pressure gradient was extremely slack – reflected by the abrupt decrease in wind speed – just 5 cm s<sup>-1</sup> (6hrly mean), and associated improvement in sea state. The low wind speed seems to have allowed for more variable wind direction – with sensors logging south easterly early in the morning, and variable north or north easterly later on in the day. Ship MSLP rose 1mb during the 8<sup>th</sup> – from 1014.7mb to 1015.7mb. Humidity varied little, with a 24hr-mean value of 79.6% and temperature rose slightly during the 24 hours, from 22.9 deg C to 23.7 deg C.

Location of vessel at 12:00 GMT: 26.46N 17.49W

### **9<sup>th</sup> October 2006. 282**

The regional synoptic analysis continues to show very slack MSLP gradients morning of 9<sup>th</sup>. Wind speeds remained low throughout the 24 hours, although temperature continued rising trend and rose from 23.6 deg C (00:00–05:59 GMT) to 24.45 deg C (18:00-23:59 GMT). MSLP rose another 1mb during the 24 hours with the final 6 hourly average reading 1016.9mb. Vessel continuing south west transit following mooring line.

Location of vessel at 12:00 GMT: 24.95N 21.27W

### **10<sup>th</sup> October 2006. 283**

A very warm day – mean 24 hour temperature 24.4 deg C, exacerbated by high humidity (75%). A complex pressure pattern has developed north west of our position although pressure gradient remains very weak locally, and thus very gentle wind and relatively calm sea state. Wind direction is dominantly north easterly, veering easterly into the evening. Atmospheric pressure rose from 1016.7mb (00:00-05:59 GMT) to 1018.4mb (18:00-23:59 GMT).

Location of vessel at 12:00 GMT: 23.81N 24.13W

### **11<sup>th</sup> October 2006. 284**

Regional surface analysis (06:00 GMT) shows a more organised high pressure system building to our northwest and a locally stronger MSLP gradient. Mean 6 hourly wind speeds rose as a response during the day to 7 m s<sup>-1</sup> – though still relatively light. Light wind allowed another very warm day with a mean 24 hour air temperature of 24.65 deg C with the final 12 hours slightly warmer than the first. Little change in humidity, with a mean value of 76.6%. Mean 24 hour MSLP 1017.4mb –

showing no trend during the day.

Location of vessel at 12:00 GMT: 23.81N 24.14W

### **12<sup>th</sup> October 2006. 285**

MSLP analysis for 12:00 shows high pressure feature to north west has fractured, replaced by a col directly to our north and locally very weak pressure gradients. Gentle east to north easterly breeze and very warm, with the 6 hourly mean air temperature exceeding 25 deg C for first time on cruise (12:00-1759 GMT). Humidity continuing high (~76%) and MSLP showing no trend and a 24 hour mean of 1016.02mb. Holding position for mooring work.

Location of vessel at 12:00 GMT: 23.84N 24.21W

### **13<sup>th</sup> October 2006. 286**

Few synoptic features in our vicinity, a frontal wave far north of our position and a very weak developing low far to our northeast. The trades continue to blow northeasterly, occasionally easterly and temperatures very warm (24 hour mean 24.6 deg C). Humidity falling very slightly from 76.9% (00:00-05:59 GMT) to 74.9 % (18:00-23:59 GMT) during course of day and little variability in MSLP, 24 hour mean 1016.4mb.

Commenced northeasterly course early afternoon to retrace mooring line and then back to Las Palmas.

Location of vessel at 12:00 GMT: 23.99N 23.78W

### **14<sup>th</sup> October 2006. 287**

Weak frontal wave moving south towards our position as we continue transit on a northeastern course. Remaining warm, although mean temperature decreasing slightly to 23.6 deg C (18:00-23:59 GMT). Little change in MSLP, with a 24 hour mean of 1016.5mb and 73.2% mean relative humidity. Wind northeasterly or east of northeast throughout the day, backing northerly into the night. Mean 6 hourly wind speeds of 5.9, 5.1, 3.8 and 5.1 cm s<sup>-1</sup> for the 24 hours.

Location of vessel at 12:00 GMT: 25.33N 20.35W

### **15<sup>th</sup> October 2006. 288**

The passing of a weak cold front from the north is evident in variable wind direction, initially veering easterly during the morning of the 15<sup>th</sup>, before backing north westerly marking the arrival of the front. Wind speeds remained low. The front, and associated weather, was not significant enough to bring rain. Temperature did not deviate significantly from cruise normals either: 23.2 deg C (00:00-05:59 GMT), 22.9 deg C (06:00-11:59 GMT) and 23.2 deg C (12:00-17:59 GMT). Vessels sensors stopped logging at 18:16 GMT.

Location of vessel at 12:00 GMT: 26.54N 17.27W

## 8. Computing and Data Logging

Stuart Cunningham

### Network

FS *Poseidon* has a widely distributed Ethernet (RJ45 sockets), running throughout the laboratories. This is attached to a DHCP server for dynamic allocation of I.P. numbers. We attached sohydro6 (SunOS sohydro6 5.9 Generic\_112233-12 sun4u sparc SUNW, Sun-Blade-1000), two mac minis and a variety of PC laptops. The principle software on sohydro6 for processing is: v6.0 forte, v14.3 matlab, v5 pexec, v7v1 uniras.

For ease of transferring data from PCs when downloading from instruments in other labs we installed a wireless network. However, we made little use of this because there were sufficient RJ45 sockets in each lab.

The macs were able to display the UNIX common desktop environment and so acted as additional UNIX terminals. The following script enabled X11 to display the CDE:

```
#!/bin/csh -f
/bin/rm -r -f /tmp/.X3-lock
xset +fp tcp/sohydro6:7100 && /usr/X11R6/bin/Xnest -query sohydro6 -geometry
1280x854 -depth 24 :3 &
```

For colour printing we attached a HP2300 inkjet printer.

Four mounts for the data and email servers were available from the network Wissenschaft: Adcp, ctd, Datavis, Fs-Poseidon, and could be mounted to any mac attached to the network. Some of these servers were available to FTP by I.P. address and some were not. Data transfer from datavis and ctd was done by FTP directly to sohydro6 and for Adcp and Fs-Poseidon first copied to a mac and then FTP to sohydro6.

### Backup

Daily archives of sohydro6's local disk /local1 in the form of TAR files of the data directories were created by a UNIX cshell script. These TAR files were ftp'd to one of the mac mini's and to an external disk attached to the mac.

### Ship's Data Logging

Data from instruments listed in Table 4, were passed via Ethernet to a dataserver running on a LINUX computer. The dataserver logged and displayed these data using an IFM-GEOMAR proprietary programme DataVis (version 0.0.7, alpha release) that was written in the three days prior to sailing. To display data DataVis could be run on any pc attached to the network. At a frequency of 1 Hz, a comma delimited (CSV) data line was stored, containing all data arriving at the dataserver in that period. Generally, most instruments output data at this frequency, the main exceptions being the meteorological and echo sounding data that are obtained at about 0.1 Hz. These CSV format data files were incremented for one hour, before a new file was opened. The file names of the raw CSV files were yyyyymmddhh.csv, where hh is incremented each hour and indicates the starting hour for the sampling period. These files were archived daily by ftp to sohydro6.

This dataserver was only backed up manually, approximately once per day. No spares or manuals for the network or server were provided. Without technical support the success of the data logging rested on the reliability of this server.

On Sunday 17<sup>th</sup> Oct the data server hung. Despite rebooting no connection between DataVis and the server could be made. Therefore, there was no data logging from then until the end of the cruise. No data are available for the recovery and redeployment of bottom pressure lander EBL2.

## ***Starting the dataserver***

1. Switch on pc
2. At login prompt: Login as user > root, password > DataVis
3. A 'Konsole' window may appear with the following message:

### Starting DVS

---

Setting up ports, wait...

Ports have been started...

Now starting DASA-server...

To stop the server type HALT and wait for prompt...

This indicates that the server is running and you should be able to record data using the datavis software.

**IF** the 'Konsole' does not start the server automatically then you start it by clicking once on the desktop icon "Datavis Server". This will then start "Konsole" with the message as above.

To stop the data server type HALT in the "konsole".

## ***Starting the Datavis monitor and logging software***

1. First start the dataserver as described above.
2. On the desktop click the icon "DataVis Monitor". This starts the data display and logging software (DataVis Version 0.0.7, alpha release). Software written by Boris Kisjeloff. For help from Boris phone +49 431 600 1569 or email bkisjeloff@ifm-geomar.de.
3. Change voyage number to cruise e.g. P343. This sets the directory to which the raw data files are written. **This directory must exist in the directory /data1.**
4. **Server:** click with mouse and then click on Connect. At this point data should be displayed.
5. To begin data logging: **Recorder:** click on. Data will now be logged to files. Formats and naming conventions described above.

Table 4: Logged Instruments and variables. Each record has 54 comma separated fields.

1	Header	Year
2		Month
3		Day
4		Hour
5		Minute
6		Second
7		Latitude
8		Longitude
9	GPS1 (Shipmate)	Year
10		Month
11		Day
12		Hour
13		Minute
14		Second
15		Latitude
16		Longitude
17	Course over ground	
18	Speed over ground kn	
19	Glonass GG24	Year
20		Month
21		Day
22		Hour
23		Minute
24		Second
25		Latitude
26		Longitude
27	Course over ground	
28	Speed over ground	
29	ADU2	Hour
30		Minute
31		Second
32		Latitude
33		Longitude
34		Course over ground
35		Speed over ground
36		Heading (true)
37	Pitch	
38	Roll	
39	Gyro	Heading (true)
40	Doppler Log	Speed through water
41		Trip meter
42	Echosounder	Depth below transducer
43	German weather service (DWD)	Wind direction relative
44		Wind speed relative m/s
45		Wind direction absolute
46		Wind speed absolute m/s
47		Air temperature °C
48		Humidity %
49		Air Pressure hPa
50		Water temperature °C
51	Thermosalinograph	Water temperature

52		Conductivity mS/cm
53		Salinity
54		sigmaT (not calculated)

## **Shipboard ADCP Ocean Surveyor 75 kHz**

Data from the OS75 were logged to a pc in the main lab and were archived via sohydro6. FTP was unavailable to this computer but it could be mounted via a mac (Wissenschaft:Adcp), so data could be copied, either using >cp in a terminal window or by drag and drop.

### **Email**

A single email account is available for scientific use ([poseidon@ifm-geomar.de](mailto:poseidon@ifm-geomar.de)). LINUX KMail tool sends and receives email via Inmarsat and transfers are made by the scientific party. As all scientists receive email on a single account mail must have the name of the recipient in the subject line. Filters can then be set in KMail to move mail to individual folders. For privacy password protected word files can be sent and received.

## **9. CTD Operations**

**Peter Keen and Stuart Cunningham**

### **Summary**

A total of seven CTD casts were completed during P343 and four during P345. The main purpose of these casts was to compare in situ CTD values from the SeaBird microcat (SBE 37 SMP or IMP) mooring instruments (recovered or to be deployed subsequently) with values obtained from a Sea Bird 9/11+ frame mounted system that is calibrated against bottles samples for salinity taken from a variety of depths. Cast depths were determined either by the maximum pressure rating of the microcat pressure housings (some instruments were rated only to 3500m) or to 4660m which was the maximum amount of cable available on the CTD winch. For deployment the Microcats were mounted in spare spaces on the CTD bottle rosette, six of the twelve bottles being removed to accommodate these. Additional microcats were fitted to the frame using ratchet hold-down straps and rope.

In addition IXSEA AR861 and RT661 acoustic release units were at times attached to the CTD frame and taken to depth before testing their telemetry and release functions under pressure using the TT300 deck unit and over the side transducer.

The 9+ system was supplied by the vessel as part of the barter agreement and operated by NOC scientific staff.

A typical cast involved taking the CTD package to approximately 10m and waiting for the pump to start and readings to stabilize. The package would then be lowered to the required depth and held at the bottom for sufficient time to fire and test any releases that may have been on the frame and to allow a minimum of 5 minutes data acquisition by the Microcats, as well as taking a water sample. The upcast was punctuated by data acquisition stops at full depth, 4250m, 3500m, 2750m, 2250m, 2000m, 1750m, 1250m, 1000m, 500m, 250m, and 50m. At some of these stops and depending on how many bottles were in the rosette (either 6 or 12) bottles were fired for subsequent salinity sampling.

After the final sampling stop the CTD package was brought immediately to the surface and straight on board the vessel.



## **Configuration report for SBE 911/917 plus CTD**

---

Frequency channels suppressed : 2  
Voltage words suppressed : 2  
Computer interface : RS-232C  
Scans to average : 1  
Surface PAR voltage added : No  
NMEA position data added : Yes  
Scan time added : Yes

### **1) Frequency, Temperature**

Serial number : 034051  
Calibrated on : 12 Jan 01  
G : 4.34730944e-003  
H : 6.40964959e-004  
I : 2.20586610e-005  
J : 1.91011023e-006  
F0 : 1000.000  
Slope : 1.00000000  
Offset : 0.0000

### **2) Frequency, Conductivity**

Serial number : 042537  
Calibrated on : 30 Jan 01  
G : -1.03427848e+001  
H : 1.60944455e+000  
I : -1.42067786e-003  
J : 2.08757234e-004  
CTcor : 3.2500e-006  
CPcor : -9.57000000e-008  
Slope : 1.00000000  
Offset : 0.00000

### **3) Frequency, Pressure, Digiquartz with TC**

Serial number : 82991  
Calibrated on : 18 Dec 00  
C1 : -4.078134e+004  
C2 : -4.747219e-001  
C3 : 1.048620e-002  
D1 : 3.198100e-002  
D2 : 0.000000e+000  
T1 : 3.016830e+001  
T2 : -3.816546e-004  
T3 : 3.229140e-006  
T4 : 4.708030e-009  
T5 : 0.000000e+000  
Slope : 1.00000000  
Offset : 0.00000  
AD590M : 1.280400e-002  
AD590B : -8.709539e+000

#### 4) A/D voltage 0, Oxygen, SBE 43

Serial number : 0631  
Calibrated on : 31-Jan-04  
Soc : 4.0060e-001  
Boc : 0.0000  
Offset : -0.5104  
Tcor : 0.0008  
Pcor : 1.35e-004  
Tau : 0.0

### **CTD Cast Log**

FS *Poseidon* crew re-terminated the CTD end of the cable prior to any cast being conducted.

#### **P343001**

Function test dip for Sonardyne mini mooring releases and validation of CTD system. Only one of these releases worked and the deck units battery pack was found to be low. It was decided to repeat the cast immediately in much the same position. Bottles all fired at 200m, 1502 GMT.

#### **P343002**

Release test. No bottles fired.

#### **P343003**

Bottles in odd numbered positions only. Twelve microcats being a mixture of IPM and SMPs. Two AR861 releases (s/n 323 and 282). Digital word display of pump status changed to 0001 (cf 0011 normally) at 1400m, with continuous alarm from deck unit. Determined that this was a result of the bottom contact switch weight falling slower than the CTD package veered as the vessel moved in the swell. Winch paused by crew for reasons unspecified 1803GMT @ 2026m until 1805 and 1816GMT @ 2804m until 1818.

#### **P343004**

Microcat calibration cast. Six bottles fired at 3500, 2000m, 1500m, 500m, 250m, 50m all stops held for five minutes below 1000m. Additional stops for microcat data acquisition at 2750m, 2500m, 2250m, 1750m, 1250m, and 1000m.

#### **P343005**

Calibration cast for Microcats and release wire test. During the course of the downcast there was an issue with the logging software. This affected the display and bottle firing module leading to no bottles being successfully fired on this cast despite use of the manual firing buttons on the SBE11 deck unit. Data logging was not affected and 5 minute stops for microcat acquisition were observed. Cycling the power on the deck unit and re-starting the software after the cast rectified the problem.

#### **P343006**

Microcat cast to 4665 and release wire test. Standard stops and bottle firings. No problems reported.

#### **P343007**

Microcat calibration cast. Standard stops and bottle firings. A few modulo errors on the down and upcast. Bottle number 7 failed to seal properly. No other problems to report.

#### **P345001**

Microcat calibration cast. Microcats for EB1. Only bottle one closed due to software problems.

**P345002**

Microcat calibration cast and release test. Microcats for EB2. Six of six bottles closed satisfactorily.

**P345003**

Microcat calibration cast and release test. Microcats for EB2. Bottle one did not fire. Restarted acquisition software and after third reboot of the deck unit communications were re-established. Downcast in one file, upcast in two files. Remaining bottles fired successfully.

**P345004**

Microcat calibration cast and release test. Microcats from recovered EB2.

## 10. CTD Data Processing and Calibration

### Stuart Cunningham

CTD data processing followed procedures outlined in more detail in [Bryden, 2003] and [Cunningham, 2005].

### 10.1 SeaBird Processing Routines

Sea-Bird routines (software version 5.30a) converted raw engineering data to physical units applying the calibration coefficients above (datcnv), removed outliers (wildedit), applied conductivity cell thermal mass corrections (cellTM), and output an ascii file of 24Hz CTD data (trans) *P343nnn.dat* and a rosette file *P343nnn.ros* with a single scan of CTD data at the time at each Niskin bottle closure. Stations P345003 and 004 reprocessed at NOCS using SeaBird software version 7.12. File names in Table 5 and output variables in the .dat and .ros files in Table 6.

Table 5: Raw data file and output data filename extensions

File extension	
.dat	Raw data file in engineering units
.CON	Calibration file
.HDR	File header
.cnv	ascii file produced by datcnv, wildedit, cellTM, trans. Subsequently processed in PSTAR.
.ros	Single scan of CTD data at time of bottle closure. Subsequently merged with 10s averaged file in PSTAR processing
.BL	Time stamp and datacycle numbers for bottle closure. Not used in subsequent processing.

Table 6: Output variables from Sea-Bird routines

Variable	Unit	Contained in file
Pressure, Digiquartz	db	.dat, .ros
Temperature	ITS-90, deg C	.dat, .ros
Conductivity	S/m	.dat, .ros
Salinity	psu	.dat, .ros
Latitude	degrees	.dat, .ros
Longitude	degrees	.dat, .ros
Elapsed time	seconds	.dat, .ros
Scan number	num	.ros
Number of bottles fired	nbf	.ros
flag		.dat, .ros

Variable elapsed time is time in seconds from the moment the first data are logged by the deck unit, with the time stamp taken from the PC clock. Data frequency is 24 Hz. Position data are taken in real time from an NMEA message supplied by a “Shipmate” GPS receiver.

On completion of the Sea-Bird processing the data were transferred to sohydro6 (see computing section) for further processing.

## 10.2 CTD Processing

Processing of CTD profiles beyond the .cnv files and assimilation of bottle sample data are performed by PSTAR fortran programmes run from the following cshell execs.

*ctd0*: read 24Hz ascii Sea-Bird .cnv file into PSTAR. Note that Sea-Bird conductivities were output in units of S/m and are multiplied by 10 here to convert to units of mS/cm. Time elapsed in seconds is corrected to time in seconds from the start of the year. File out: *ctd343nnn.24hz*.

*ctd1*: despike and average 24Hz file to 1Hz and further average to 10s. An extra time variable day-of-year (doy) is calculated from time in seconds. This variable is required for plotting CTD data against microcat data. Two further calibrations were applied to the 1hz data from pressure and temperature corrections obtained by laboratory calibration on 13<sup>th</sup> February 2006.

$$\text{Temp\_corr} = \text{temp} - 0.0018 \text{ } ^\circ\text{C}$$

$$\text{press\_corr} = (\text{press} - 0.11429) * 0.99926434 \text{ dbar}$$

Finally the time base was corrected for drift in the PC clock (Table 7). This correction was obtained by taking the difference of the PC system time and NMEA time in the header of the cnv files. File out: *ctd343nnn.1hz*, *ctd343nnn.10s*.

*ctd2*: create 1hz file with bad records at start and end of cast removed (.ctu) , and create 2db file. File out: *ctd343nnn.2db*, *ctd343nnn.ctu*.

*ctd3\_matlab.m*: plot .ctu file.

*fir0*, read SeaBird ros file into PSTAR and merge on CTD data from 10s file. File out: *fir343nnn*

*sam0*: create a blank PSTAR sample file using master file *sam\_masterP343* and paste in CTD data at bottle closure produced by *fir0*. File out: *sam343nnn*.

*ctd.positions.exec*: Using data cycles from *ctd2* extract three times from the 1hz file for start and end of downcast and end of upcast. For P343 navigation data was merged onto these times and for P345 the positions are taken directly from the navigation stream logged with the CTD data (*nnn.position*).

*add\_pos.exec*: adds the nadir position to the PSTAR header files for ctd data files only..

Table 7: Time difference (PC-NMEA) in header of csv file. This time difference is subtracted. Note that for P345 this correction has not been applied so that there will be a mismatch in the CTD timebase and microcat time base. As bottle stops were 300s, this is unlikely to be a significant source of error in comparing CTD and microcat data.

Station	PC – NMEAs
P343003	84
P343004	86
P343005	148
P343006	19
P343007	114
P345001	12
P345002	6
P345003	-22
P345004	-69

### 10.3 Calibration of CTD Conductivities

CTD conductivities are calibrated by comparing them to bottle conductivities derived from salinity samples obtained during the CTD upcast (see below for details). The CTD upcast is calibrated and applied to the downcast.

Bottle salinity sample data are entered in an excel file as text (csv delimited) files and ftp'd to the UNIX system. File out: *sal343nnn.csv*. Variables in csv file: sampnum, statnum, botlnum, position.on.roset, botsala, botsalb, botsal.

*sal.exec*: convert csv file to PSTAR format. File out *sal343nnn.txt*, *sal343nnn*.

*passal*: paste salinity sample files (*sal343nnn*) into sample file (*sam343nnn*). File *sam343nnn* now contains CTD data at time of Niskin bottle closure and the salinity sample values from the bottle.

*botcond.exec*: calculates bottle conductivity from bottle salinity and CTD upcast temperature and pressure at the time of Niskin bottle closure. A single appended file of sample data is created in PSTAR format and then a matlab file *sam\_append\_cal.mat* of appended station sample files is created from the PSTAR file.

*ctd\_cal.m*: determine CTD conductivity calibration(see below).

### 10.4 Method

CTD conductivities are corrected to match bottle conductivities using the ratio  $K = (C_{bot}/C_{CTD})$  where  $C_{bot}$  is the measured bottle conductivity,  $C_{CTD}$  the upcast CTD conductivities. Outlying bottle samples were removed from the calibration that had a difference greater than 0.1 mS/m from the CTD and then bottles whose conductivities are more than 2 standard deviations from the station average difference.

On each cruise four stations were taken with bottle samples for calibration. This and the relatively poor environment for the salinity sample analysis led to CTD-bottle salinity residuals larger than usual. Therefore, in this calibration we have relied on determining calibrations using the eight available stations together. First we fitted a second order polynomial to  $K = (C_{bot}/C_{CTD})$  versus  $C_{bot}$  using all bottle samples not including the outliers:

$$K = (C_{bot}/C_{CTD}) = -8.9669 \times 10^{-7} \times C_{bot}^2 + 8.0772 \times 10^{-5} \times C_{bot} + 0.998623$$

This greatly reduced the scatter of bottle-CTD differences. However, a trend in station mean differences as a function of station number was fitted by a second order polynomial to

$$K = (C_{bot}/C_{CTD}) \text{ versus } Statnum \text{ to reduce the mean offsets:}$$

$$K = (C_{bot}/C_{CTD}) = -5.8824 \times 10^{-7} \times Statnum^2 - 2.1592 \times 10^{-6} \times Statnum + 1.000055$$

resulting in station by station corrections (Table 8).

Table 8: Conductivity corrections obtained by fitting a second order polynomial to  $K = (C_{bot}/C_{CTD})$  versus  $C_{bot}$ .

Station	K
P343003	1.0000436
P343004	1.0000373
P343005	1.0000163
P343006	1.0000212
P343007	1.0000114
P345001	1.0000004
P345002	0.9999883
P345003	0.9999749
P345004	0.9999604

Plots of  $(C_{bot}/C_{CTD})$  and  $(C_{bot} - C_{CTD})$  versus  $statnum$ ,  $C_{bot}$  and  $press$  after calibration are shown in Figure 1 and the final residuals are summarised in Table 9.

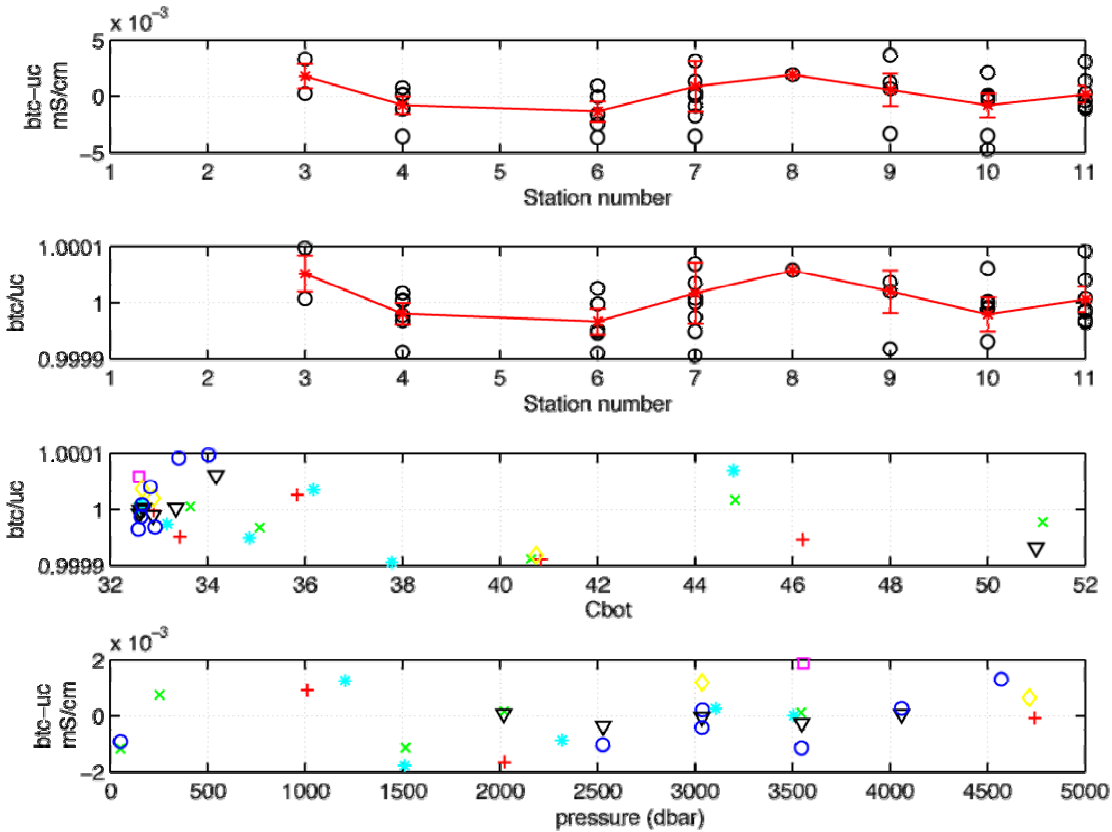


Figure 1: Calibrated CTD data: i.  $(C_{bot} - C_{CTD})$  v  $statnum$ , ii.  $(C_{bot}/C_{CTD})$  v  $press$ , iii.  $(C_{bot}/C_{CTD})$  v  $C_{bot}$  and, iv.  $(C_{bot} - C_{CTD})$  v  $press$ . Where  $C_{bot}$  is bottle conductivities. 343003 blue circle, 343004 green cross, 343006 red plus, 343007 cyan star, 345001 magenta square, 345002 yellow diamond, 345003 black triangle, 345004 blue circle.

Table 9: Bottle-CTD conductivity residuals in mS/cm mean ( $\mu$ ) and standard deviation ( $\sigma$ ). N\_tot is the total number of bottle samples and N those used to compute the mean.

Mean	$\sigma$	N	N_tot	Limits	Notes
0.0000	0.0028	43	60	$\pm 0.01$ mS/cm	Final data set
-0.0001	0.0014	18	23	P > 2500db, $\pm 0.01$ mS/cm	Final data set

The execs *ctd\_calib\_P343/345.exec* applied these calibrations to the 1hz files, and then the routines from *ctd2* onward created the calibrated CTD and sample files.

A summary of CTD station positions and depths is given in Table 10.

Table 10: Summary of times, positions and minimum and maximum pressures of CTD stations

statnum	cruise	year	month	day	time	lat	lat	lon	lon	pmin	pmax
		yyyy	mm	dd	hhmmss	deg	min	deg	min	dbar	dbar
003	343	2006	10	04	182742	28	25.2	-15	12.0	1	3041
004	343	2006	10	08	093606	26	29.7	-17	24.3	1	3545
005	343	2006	10	10	190010	23	48.9	-24	06.6	1	4743
006	343	2006	10	11	192829	23	49.1	-24	08.7	1	4745
007	343	2006	10	15	090502	26	29.7	-17	25.3	1	3505
001	345	2006	11	30	090122	24	36.5	-22	22.6	1	3557
002	345	2006	11	30	135911	24	33.0	-22	31.6	1	4717
003	345	2006	12	01	151014	23	47.5	-24	14.9	1	4745
004	345	2006	12	03	111906	24	42.5	-22	13.6	1	4573

## 10.5 References

- Bryden, H.L., RRS Charles Darwin Cruise 139, 01 MAR - 15 APR 2002, Trans-Indian Hydrographic Section across 32°S, pp. 122, Southampton Oceanography Centre, Southampton, 2003.
- Cunningham, S.A., RRS Discovery Cruise 279, 04 APR - 10 MAY 2004: A transatlantic hydrographic section at 24.5°N, pp. 150, Southampton Oceanography Centre, Southampton, 2005.

## 11. Surface Temperature and Salinity

Surface temperature and salinity were measured continuously during the cruise. The sensor is situated at the bow of the ship two metres below the surface with continuously running water passing through the temperature and conductivity sensor. To calibrate the conductivity, water samples were taken twice a day. Due to a mysterious illness on the 12<sup>th</sup> October and the difficult access to the water tap, only one sample was taken on that day.

## 12. Water Sample Salinity Analysis

Stuart Cunningham

### **Salinometry**

Salinity samples were analysed on the AUTOSAL Guideline 8400B salinometer s/n 68426 by comparison to standard sea water samples. FS *Poseidon* does not have a constant temperature laboratory, so the salinometer was located in the chemistry lab, which is sandwiched between the main lab and wet lab, and so has no door directly to the outside, limiting temperature fluctuations. However, the ship's air conditioning was quite variable in efficiency and the chemistry lab temperature ranged between 21 and 26°C. The salinometer bath temperature was set to 24 °C and samples were analysed when the lab temperature had been stable for several hours and colder than 24 °C.

### **Sample Collection and Analysis**

Duplicate sea water samples were collected from six 10 l Niskin bottles on each CTD cast. These samples were drawn in 200 ml glass sample bottles, rinsed three times and sealed with disposable plastic stoppers and screw on caps after drying the cap and neck. Prior to analysis the salinity samples were equilibrated to the CT lab temperature. In addition to samples for CTD calibration, underway surface samples were taken for calibration of the TSG.

The salinometer's RS value was adjusted at the beginning of cruise P343 to give the correct conductivity ratio of a standard seawater sample. At the beginning of station P343007 the RS value was again adjusted to standard. SSW values obtained are reported in Table 11. Analysis followed the standard procedure. A sample of IAPSO Standard Sea Water (batch P147) was run every 12 samples for salinometer calibration. The bottles were kept in the constant temperature laboratory prior to analysis for a minimum of 24 hours to allow equilibrium to the laboratory temperature. The water sample analysis followed the standard procedure. The crates were analysed in pairs with a standard seawater run at the start, between two crates and at the end. The samples were inverted and then flushed three times for the salinity samples and were flushed five times for the standard seawater P147 before any readings were report. The reading is carried out until the stable value is obtained.

Raw conductivities from the salinometer were converted to salinities using an Excel spreadsheet, adjusting to the standard seawaters.



Table 11: Standard Sea Water conductivity ratios obtained with batch P147 for separate standards at the start and end of each station's salinity samples. The value to calculate final bottle salinities is used. No samples were obtained for station P343005.

Cruise	Station	Start	End	Used
343	003	1.99974	1.99967	1.99967
343	004	1.99967	1.99974	1.99967
343	005			
343	006	1.99967	1.99970	1.99969
343	007	1.99964	1.99973	1.99969
345	001	1.99963	1.99963	1.99963
345	002	1.99963	1.99963	1.99963
345	003	1.99963	1.99964	1.99963
345	004	1.99964	1.99965	1.99964

### 13. Mooring Operations – P343

**Robert McLachlan**

Table 12: Moorings recovered during cruises P343 and P345

Mooring Number	Name	Deployed on	Recovered on
2006/19	EB1	D304	P343
2006/10	EBH5	D304	P343
2006/11	EBH4	D304	P343
2006/16	EBHI	D304	P343
2005/13	EBL2	CD170	P343
2005/17	EBL1	CD170	P343
2006/20	EB2	D304	P345

Table 13: Moorings deployed during cruises P343 and P345

Mooring Number	Name	Deployed on	Recovered on
2006/41	EB1	P343	
2006/42	EB2	P343	P343
2006/43	EBH4	P343	P343
2006/45	EBL1	P343	
2006/46	EBL2	P343	
2006/44	EBHI	P343	
2006/47	EBM1	P343	
2006/48	EBM2	P343	
2006/49	EBM3	P343	
2006/50	EBM4	P343	
2006/51	EBM5	P343	
2006/52	EBM6	P343	
2006/53	EBM7	P343	
2006/54	EB1	P345	
2006/55	EB2	P345	

### 13.1 Diary of events

2/10/06

Arrived at ship at 0800, started unloading containers, all went well. Set up lab spaces with instrumentation, generally just sorting everything out.

CTD instrumentation was not packed in to containers, arranging airfreight.

Lithium LRT batteries did not make the freight; investigation revealed that they were never ordered.

No option but to use the standard battery packs.

Air freight from UK (mini moorings) has been delayed, agent not even aware of any air freight.

Need to ensure that the right information is passed on to agent.

Started putting batteries in to SBE 37's.

3/10/06

Set up LRT releases with their acoustic ID's and frequency, checked release function, all worked fine. Details recorded for future use, details written on LRT's.

Serviced B2S release hook on release SN282, stripped completely, cleaned, greased where appropriate and reassembled with tectyl coating on all metal mating surfaces.

Assembled mini moorings.

Air freight arrived (LRT kit) 1100 GMT.

Attached LRT's to CTD frame using rope and cable ties.

Chris suggested looking at redesigning the SBE clamps (for use on the CTD frame) to incorporate two SBE's at once.

4/10/06

CTD airfreight due to arrive at midday.

Started allocating SBE's, VHF beacons and LRT's to the mini moorings, now known as EBM 1 – 7.

Produced working diagrams of EBM moorings.

Sailed at 11.00 GMT without the airfreight, this is in Madrid, still to be transported to Las Palmas in case we need to go back in and get it.

Started first CTD deployment at 14.10 GMT, after a wire re-termination.

CTD was stopped at 450m and an attempt was made to communicate with the LRT's.

There were only a couple of ranges received after a number of attempts.

The decision was made to release two of the releases, ID's 001 and 002.

The display on the deck unit indicated that the release attempt was a failure.  
We then came up to 400m. We received ranges from 003 and 004 (both 390m). They were both released but the display said they had failed.  
We then came up to 300m. We received ranges from 005 and 006 but the inevitable happened and they failed.  
So we came up to 200m and had good ranges on ID. 007. First attempt at release failed but the second attempt was confirmed as successful.  
It became apparent that the closer to the surface we came the better the communication became, but we were still unable to release all of the LRT's.  
We decided to check the deck unit batteries whilst waiting for the CTD to be recovered.  
The batteries were 10V when they should have been 12V; this would probably drop below 10V when in use. So we swapped the battery pack for a spare that came with the unit.  
Upon recovery of the CTD, the LRT's were as expected – only 007 had released.  
We re-loaded 007 and put it back on the CTD with the others.  
The CTD was deployed again to 450m. 15.50 GMT.  
Communication with the LRT's was dramatically improved with the first three (001, 002, and 004) giving consistent ranges and fired straight away.  
This did not last long though as the consistency of the ranges decreased and we could not get any more to release.  
We decided to bring them up to 250m; this would have been OK for deployment depths.  
The remaining LRT's all worked fine, giving good ranges and releasing with no problems.  
We believe that the batteries in the deck unit are becoming drained too quickly; we checked the batteries and they had not gone down by much, 12V to 11.8V, the expiry date on the battery pack had an expiry date of October 2004 so this is where we believe the problem may lie; the original pack was going flat and the spare had expired two years ago.  
Upon recovery ID. 002 had failed so this needs to be re-tested.  
All the others were fine.  
We then loaded up the CTD with 12 SBE's, SN's 3210, 3211, 3203, 3250, 3253, 3273, 3481, 4469, 4470, 4798, 4799 and 4800. And two AR861's, SN's 323 and 282.  
The CTD was deployed at 17.30 to 3000m.  
Established contact with the releases at 18.25, good ranges (3004 and 3001) both fired OK and release was confirmed.  
CTD recovered at 19.55.  
The plan is to steam to EBH4 recovery position overnight.

5/10/06

Heading towards EBH4 site ETA 10.30. Extreme weather conditions are likely to prevent any science for the day. Too dangerous to work on deck.  
Started putting together the mini moorings ready for a 19.00 start deployment.  
Deployed all mini moorings, starting with EBM1 through to EBM 7. Deployment was carried out by lowering the buoys in by hand and then slipping the anchor. The deployments were done whilst the ship was steaming along.  
All done by 10.00 GMT.  
Sheltered behind the islands overnight.

6/10/06

Looks as though we are going to lose another day due to bad weather. Stuart and Torsten are looking at what impact on the science there will be if we have to start not servicing some of the moorings. Seems that the old man is having a big say in events.  
Produced final "as deployed" mooring diagrams for the EBM moorings.  
12.45. Arrived at EBH5 site and had clearance from the bridge to start communicating with the release, communication was established straight away and we were given the go ahead to release the mooring despite the weather conditions. The mooring was released at 12.54 and came straight up. The 40" sphere came up on the port side and the bottom sphere pack came up on the STBD

side. Careful manoeuvring by the bridge rectified the problem.

Recovery commenced on the port side and apart from taking water over the side and getting wet a couple of times, all went well considering the marginal conditions.

We then set off for EBH4 site. We arrived at the site at 14.40 and established communication with the release at 14.46, good ranges were received and the release was fired at 14.58 the mooring was released.

Recovery commenced from the port side, all went well considering the conditions.

We were then told that no mooring deployment would take place today. So the PIES were downloaded whilst we prepared EBH4 for a next day deployment. We will use AR861 SN. 323: and the same light that we recovered from EBH4.

7/10/06

Weather still bad, had a meeting with the boson and the captain and it was decided we could go ahead with the EBH4 deployment. Started at 08.07, all done by 08.34.

All went well.

After lunch we prepared EBL2 for deployment. Inserted batteries in to SBE 37's and the BPR, ready for an after breakfast start tomorrow.

19.40. arrived at EBL2, we were given permission by the old man to communicate to the release, we were lucky he stopped as he deemed the weather would be too bad and too bad tomorrow so he was just going to keep going.

We established communication with the release straight away, with two good ranges, 3317 and 3310, the release was confirmed as vertical and the voltage was 8.8V. This is a lot lower than the 10V it should be. I have explained to the PSO the fact that we are now leaving this lander to move on to EB1 and 2, and that if we don't have the time to pick it up on the way back then it will have been deployed for two and a half years before we have another chance. The issues being not only the batteries but also the engineering, i.e.; links and shackles, the frame should be fine as will the ropes.

8/10/06

The decision was made yesterday evening to move on to EB1 and EB2 site, stopping at EBHI for a recovery and deployment, ETA 11.00 in the morning.

The weather has improved so the captain allowed us to do a CTD dip.

Carried on steaming to EBHI.

Serviced and put new batteries in to recovered releases, SN's. 361 and 359, bench tested OK.

Wired up the hydraulic power pack to the ships supply.

Inserted batteries in to SBE's.

9/10/06

Arrived at EBHI site at 11.00, attempted communication with release but we were having no luck so we moved closer but still no luck so we switched to the STBD side and established communication with the release. Good ranges were received and we released at 11.55. Recovery was over the port side again and it all went well given the calmer conditions.

We used the reeler to wind the rope on to a drum via the ships capstan, this worked well. We have expressed our wish to recover EB1 and EB2 over the stern.

The CTD that was due to happen between recovery and deployment has been canceled due to the time it took to do the recovery.

So we prepared EBHI for deployment. Deployment was carried out over the stern and all went well. Intentions are to steam to EB1 site, ETA sometime in the morning.

10/10/06

We arrived at EB1 site at 08.30 and established communication with release SN 496, some rubbish ranges then all good. Had good ranges from SN 162. Fired 496 at 08.42, mooring came straight up as it is only 50m down.

Recovery commenced from the port side. The 200m of 3/16" wire was tangled round both the 48"

and the 28”.

There were a lot of tangles to contend with and our reeler stopped half way through so we used hand hydraulics for the remainder.

All the hardware is coming back in A1 condition; it's been out for six months. The doubler kits on the releases are showing signs of corrosion; we need to have these made from the same grade of stainless as the releases themselves, duplex. Or, better still, we should contact Ixsea to see if the release manufacturer can supply them. Also, SN 162 (661) from EB1 has crevice corrosion on the B2S hook where the doubler kit was touching, is this due to a change in material by Ixsea, i.e. Making the new 861's out of a superior material or is this one of the ones that MC made for us, and therefore the same material as the doubler kits, which I believe is not a duplex. Need to find out more about the spec of materials, in particular stainless steels.

Also worth noting is that the parts that have corroded had been covered in Lub Seal NM 91, this could be sealing the parts from any oxygen thus rendering the steels ability to oxidize and create its protective layer difficult.

The new stainless release links with small link chain has come back in excellent condition.

Once recovery was complete we started getting everything ready for the EB2 deployment in the morning, moved the anchor in to position, made up the glass and started setting up the MMP. Major downloading of the 24 micro cats recovered from EB1 is under way, need to get them done ready for a cal dip this evening. Make that 23 to download, one has flooded.

Serviced the release recovered from EBHI, SN 317, new batteries and bench test OK.

Serial numbers of releases to go down for wire test this evening, 5000m.

359, 262, 324. All fired OK.

11/10/06

Arrived at EBL1 site at 07.08 released at 07.11.

We could not pick up the VHF signal from the beacon; it took quite a while to finally spot the buoyancy.

It became immediately apparent why we could not pick up the VHF – the billings float had imploded. Recovery went well. The lander was in excellent condition, all the hardware was in good condition. This lander had been in the water for 18 months.

Readied deck for EB2 deployment.

Started deployment at 10.37. Deployed the MMP straight away using the release hook.

The deployment went well. We chased the buoy through the water and it became apparent that the 48” sphere wasn't going to sink. We spoke to the releases and they were on the bottom. The bridge then spotted the 12 pack of spheres on the surface as well. So we started recovery from the 48” sphere.

Upon completion of recovery we found that the parafil had parted at the termination below the 12 pack of spheres. This left the two releases, six SBE 37's, one RBR, twelve glass spheres and around 2500m of parafil in the ocean. It was decided that we would leave the rest of the mooring where it was for the time being.

We decided that for the EB1 deployment we would check all the terminations and change any that needed it.

The plan is to start at 6.00 in the morning, wind on EB1, changing terminations as we go, and then to deploy EB1.

Then we plan to deploy EBL1.

Serviced releases SN's 359, 162 (661) and 496.

Wire test of the following releases tonight down to 4600m, 359, 162, 496 and 317.

Prepare for EB1 deployment.

12/10/06

Started at 05.00, wound on EB1 ready for deployment, changed two or three terminations that looked used.

Started deployment at 09.57, all went OK, apart from a suspected SBE being deployed without it's blanking plug, so we hauled in a couple of hundred meters and found that it did indeed have it's

plug missing, so it was dried off, plug in place and re-deployed.  
 We decided to chase the buoy again and it became apparent that the wire had parted again.  
 The mooring was then recovered over the port side. Upon recovery it was found that the parafil had parted somewhere close to the mid point of the 320m length.  
 We communicated with the releases and they were confirmed as vertical and on the bottom, they confirmed as released but would not rise more than 40m, abandoned.  
 We then prepared EBL1 ready for deployment; the lander was deployed off the stern at 19.18

13/10/06

Arrived at old EB2 site and established communication with releases, confirmed as vertical. The decision was made to leave this mooring in position.  
 Arrived at the new broken EB2 site and recovered the rest of the mooring.  
 Steam to EBL2 site, ETA evening of Sunday.

14/10/06

Started boxing everything up, started to build up lander.

15/10/06

Carried on boxing things up and prepared lander for deployment.

16/10/06

We arrived at the EBL 2 site at 06.00, communication was established with the release and the mooring was released at 06.20, all on deck at 07.18.  
 Deployment of EBL2 commenced almost immediately with the lander released from the hook at 07.36.

End of science.

## **13.2 EBM Mooring instrument details**

### **LRT wire test details**

Table 14: LRT wire test details.

<b>SERIAL NUMBER</b>	<b>ACOUSTIC IDENTITY</b>	<b>FREQUENCY</b>	<b>MOORING</b>	<b>DEPTH RANGE</b>	<b>RELEASED OK</b>
240841-009	001	1	EBM1	440	YES
242200-001	002	1	EBM2	442	YES
240841-006	003	1	EBM3	242	YES
242200-003	004	1	EBM4	441	YES
242200-004	005	1	EBM5	242	YES
240841-010	006	1	EBM6	242	YES
242200-002	007	1	EBM7	241	YES

It has become apparent that the batteries in the deck unit can not be trusted. We should therefore investigate using an external power supply for these units, or carry plenty of spare battery packs.

## Instrumentation deployment details

Table 15: Instrumentation deployment details.

MOORING	VHF SN.	SBE SN.	LRT SN.	DEPLOYMENT DEPTH
EBM1	U08-013	3481	240841-009	500M
EBM2	U08-010	3273	242200-001	400M
EBM3	U08-008	4469	240841-006	325M
EBM4	U08-014	3250	242200-003	250M
EBM5	U08-007	3203	242200-004	175M
EBM6	U08-012	3211	240841-010	100M
EBM7	U08-011	3210	242200-002	50M

### 13.3 Instrumentation Deployed

#### **EBH4**

Light SN. S01-180.

SBE 37 SN. 4470, 4799, 4800.

AR 861 SN. 323.

#### **EBH1**

Light SN. T05-077.

SBE 37 SN. 3253, 4472, 4475.

AR 861 SN. 282.

#### **EBL1**

VHF SN. U08-009.

Light SN. H01-008.

SBE 26 SN. 0420, 0419.

AR 861 SN. 359, RT 661 SN. 162.

#### **EBL2**

VHF SN. T01-144.

Light SN. S01-181.

SBE 26 SN. 0400.

AR 861 SN. 324.

### 13.4 Lost instrumentation.

2 AR 861's were lost on EB1, SN's 496 and 317.

1 SBE 37 was lost on EB1, SN 4716.

### 13.5 EB1 and EB2 Parafil Failure

#### Preamble

Both of the moorings were deployed from the stern of the ship using a direct pull winch and utilizing a block on the AFT "A" frame. The deployments went as expected, with the anchors being cut away at around 2 meters from the surface of the ship, the sea state for both deployments was calm.

Once the anchor was cut away, the ship turned around and headed for the top spheres in order to follow its course through the water and eventual submergence.

On both deployments the top sphere and packs of glass spheres did not submerge and it was then obvious that things had not gone as planned.

The only thing we could do was to carry out a recovery of the moorings.

The recovery was carried out from the Port side, it all went as expected.

Upon recovery of EB2 at the 12 glass spheres we discovered where the mooring had failed; at the termination of the parafil directly below the 12 pack of glass, the termination was still attached to the shackle but there was no parafil.

Upon recovery of EB1 we found that the parafil had parted around the middle of the 320m length.

### Initial investigation

EB2; we cut away the heat shrink to reveal as much as we could of the termination, and we removed the sealant from the other end.

The tapered pin providing the mechanical lock on the Kevlar was still in place as was the Kevlar around the pin, so the Kevlar had not pulled out of the termination but had parted inside the termination.

EB1; there was no termination to remove as the parafil had parted in the middle, the jacket around the Kevlar was twisted and shredded to indicate a shock load caused the failure.

### Conclusions

It is impossible to determine at this time the exact cause of the failure, further tests need to be carried out, Ian Waddington is carrying out testing back at NOC and we have a sample taken from the failure area that we can also test.

It is worth noting, however, that we are using recycled parafil for the first time on this array.

See Ian Waddington's report for further details on the tests carried out.

## **13.6 Mooring data recovery**

All of the microcats recovered on EBH5, EBH4 and EB1 had good data throughout the 6 month deployment period. However from the two instruments on EBHi, one was flooded (#3480) and the other had corrupted pressure measurements. Sontek flooded, too? One of the BPRs (#0418) did not record any data. The remaining three BPRs, which had been deployed for about 17 months (in EBL1, EBL2), ran out of battery long before the end of the deployment period (about February 2006). The reason for this is that the sampling rate (10 minutes) was set under the assumption that lithium batteries would have been installed. On opening up the pressure cases it was found that alkaline batteries had been used.



### **13.7 Instrument problems**

One of the BPRs on EBL2 did not record any data. All of the recovered Seagauge BPRs ran out of battery before the end of deployment (alcalines had been used instead of lithiums).

#### *Microcats*

- #3480 – flooded
- #3479 – pressure corrupted
- #4798 - pump not working properly
- #4716 – lost, when the new EB1 (which broke on deployment) had to be recovered again.

#### *Seagauges*

- #0418 – did not record any data
- #0419 – stopped logging in February 2006
- #0420 – stopped logging in February 2006
- #0417 - stopped logging in December 2005

#### *MMP*

The MMP on EB2 had one of the current meter arms broken when the new EB2 (which broke on deployment) had to be recovered again.

### **13.8 Deployment setup of Instruments**

Microcats were set to sample at 30 minutes intervals. BPRs (now with lithium batteries installed) were set to 15 minutes sampling. EB1 and EB2 broke on deployment and had to be recovered again. In the course of this the bottom MicroCAT on EB1 (#4716) and two releases were lost and the MMP on EB2 has one of its current meter arms broken off.

### **13.9 CTD calibration dip casts**

All of the Microcats recovered and deployed were put on the CTD frame for a calibration dip. Five such casts were carried out (casts 3, 4, 5, 6, 7). For that the Microcat sampling rate had been set to 10 seconds. In order to be able to attach up to 14 Microcats on the 12 bottle frame, usually only 6 bottles were kept on and 6 Microcats were attached in the empty 6 bottle slots using our standard brackets. The remaining Microcats were attached in ratchet straps, that had been tightened on the frame's outside between the lower and upper ring. Almost all of the Microcats gave good data throughout the casts, except for #4798 (pump problems) and #4800 (which had been logging but had been forgotten to be attached on the frame on cast 3).

Microcats attached to CTD frame during calibration casts

Cast 3: 3210 3211 3203 3250 3273 3281 4469 4470 (4798) 4799 (4800)

Cast 4: 3253 4472 4475 4495 4496 4497 3207 3208 3209 3212 3213

Cast5: 4473 3890 4178 4179 4180 4181 4183 4708 4709 4710 4711 4712 4713 4715

Cast6: 4716 4717 4718 4719 4720 4721 4722 4723 4724 4725

Cast7: 3214 3215 3216 3217

## 14. Mooring operations – P345

### John Wynar

Due to hardware problems on the previous RAPID eastern boundary cruise on P343, FS *Poseidon* was again chartered to deploy EB1 and EB2. If time allowed the intention was also to recover the EB2 MMP mooring and interrogate a PIES mooring.

The ship was mobilized in Gran Canaria where the equipment from P343 had been left. Four spare chain anchors were also shipped to the vessel along with some extra consumables and hardware. Equipment was loaded on the 27<sup>th</sup> November and the ship sailed on the 28<sup>th</sup>, returning to port on the afternoon of the 7<sup>th</sup> December.

All times given below are in GMT.

### **Acoustic Release Wire Test**

The first of two wire tests was conducted on the 30/11/06 with two AR861 acoustic releases, s/n: 260 and 262, tied to the CTD frame. (A calibration of several microcat SBE37 instruments was also carried out during the cast.) The CTD wire on the FS *Poseidon* is approximately 4700m long and hence CTD casts are limited to a maximum wire out (in this case) of 4650m. The ship's echo sounder was turned off during the test which was carried out using a TT301 deck unit (s/n: 84) and dunking transducer. The results are given below:

#### **S/N: 260**

Arm range: 5349m; release range: 1604m; receive and execute LED's confirmed.  
(repeat):

Arm range: 4613m; release range: 4610m; receive and execute LED's confirmed.

Arm range: 4612m; diagnostic: 4754; receive and execute LED's confirmed.

#### **S/N: 262**

Arm range: 543m; release range: 712m; receive and execute LED's confirmed.  
(repeat):

Arm range: 4609m; release range: 4610m; receive and execute LED's confirmed.

Arm range: 4608m; diagnostic: 5315; receive and execute LED's confirmed.

When the ctd was brought on-board, both releases were seen to have operated successfully. Interestingly it can be seen from the results above that both releases initially gave erroneous ranges, subsequent ones being more consistent with the actual wire out.

The second wire test used AR861 releases s/n: 361 and 365, results given below:

#### **S/N: 361**

Arm range: 4636m; release range: 4637m; receive and execute LED's confirmed.

Arm range: 4637m; diagnostic: 3625; receive and execute LED's confirmed.

(repeat):

Arm range: 4637m; diagnostic: 5316; receive and execute LED's confirmed.

**S/N: 365**

Arm range: 4637m; release range: 4638m; receive and execute LED's confirmed.  
(repeat):

Arm range: 4636m; release range: 4638m; receive and execute LED's confirmed.

Arm range: 4337m; diagnostic: 5335; receive and execute LED's confirmed.

Again, when the CTD was recovered both releases had operated successfully.

***EB1 Deployment***

The mooring line for EB1 was predominantly wire, all the line having been wound on to the ship's winch previously. A standard deployment method was employed over the stern and buoy first.

Each of the two sub-surface buoys were fitted with SMM500 Argos beacons in case the top of the mooring was cut, the upper one s/n: 94 (id: 24027) and the lower one s/n: 79 (id: 24335).

Instrumentation comprised of SBE37 IMP's and SMP's. A measure of redundancy was provided for in the form of a dual acoustic release system using AR861 s/n: 260 and 262. Deployment began at about 08.00 on the 1<sup>st</sup> December 2006, remaining details given below:

Water depth: 5056m (uncorr.)

Anchor release: 11.48 at position 23° 48.58'N, 24° 8.91'W

Upper s.s. buoy submerged: 12.18 at position 23° 47.80'N, 24° 9.80'W

The mooring was configured as originally designed except that three adjustment wires (2 x 20m and 1 x 10m) were omitted due to shallower depths than expected.

The mooring was confirmed to be settled on the sea floor by ranging on acoustic release AR861 s/n: 262. The ranges received gave values consistent with the water depth as follows: 5180m, 5180m, 5183m, and 5184m.

***EB2 Deployment***

Deployment began at about 08.00 on the 2<sup>nd</sup> December 2006. The mooring line, made of 10mm polyester, was wound onto the ship's deck winch and over a block hung on the stern gantry for stern deployment. The instrumentation comprised of six SBE37 IMP's.

No Argos beacons were fitted but a dual acoustic release system was employed using AR861 s/n: 361 and 365.

Water depth: 5040m (uncorr.)

Anchor release: 09.52 at position 23° 52.04'N, 24° 10.31'W.

The mooring was monitored by acoustic ranging on the pair of AR861's until it had settled on the sea floor. This was noted to be at 10.55 with a final range of 5202m obtained from s/n: 361. The descent rate was calculated to be approximately 68m/min.

***EB2 MMP Mooring Recovery***

Recovery began on the afternoon of the 2<sup>nd</sup> December with wind strength and wave height (approx.

3m at the start) increasing. The acoustic release AR861 s/n: 321 was interrogated and gave a range of 5057m in a water depth of 5042m. Subsequent commands gave consistent results. The release signal was transmitted at 12.16 giving a range of 5051m. However, the execute led did not indicate that the signal had been received. At 12.17 a range of 4942m was received showing that the mooring had released and was rising. A short time later the sub surface buoy was observed on the surface and, when the master felt it prudent to so do, the vessel began maneuvering for recovery to begin. The operation was carried out from the port side traversing a block and capstan winch before being diverted to the aft deck storage winch.

Recovery of the sub surface buoy and first SBE37 ctd went smoothly and the MMP stopper was reached and detached from the Parafil line. After several hundred metres of line had been wound on, the Parafil became tangled with multiple lines (as many as five at one point) leaving the water. The tangled lines were hauled onboard using a mixture of winch and manual hauling. The Parafil was tied off at intervals and cut when it was safe and expedient to do so in order to remove instruments. When the MMP was recovered it was tangled up in Parafil with its bottom stop and a microcat. It was severely damaged, much of its outer shell missing along with its buoyancy spheres and the SBE41 ctd. At one point the line was observed to be leading ahead to the bows and this would later indicate a possible reason for the damage to the MMP. Finally the remaining buoyancy and two acoustic releases were recovered.

The instruments were washed down in fresh water and downloaded. In spite of the damage to the MMP, its pressure case was intact. The case was opened up and the data storage card removed and downloaded. The instrument had completed 168 profiles and achieved a total profiling distance of nearly 400,000m.

The following are extracts from the MMP's (s/n: 11794-01) sensor-time log and shows successful operation of the sensors over the initial:

Profile 0 CTD turned on at 06/01/2006 12:58:29  
Profile 0 CTD turned off at 06/01/2006 15:26:06

Profile 1 CTD turned on at 06/01/2006 20:58:29  
Profile 1 CTD turned off at 06/01/2006 23:33:37

and final two profiles:

Profile 167 ACM turned on at 12/02/2006 03:58:30  
Profile 167 ACM turned off at 12/02/2006 06:36:12

Profile 168 ACM turned on at 12/02/2006 06:53:59  
Profile 168 ACM turned off at 12/02/2006 09:27:11

From the complete data sets it is apparent that the damage to the MMP occurred during recovery and not during its deployment. It may also be inferred from the damage to the MMP that it suffered a collision or impact, possibly with the bow thruster of the ship (when the line was observed leading forward), causing the loss of its buoyancy and ctd. The marginal weather conditions, the inherent problems with this kind of distributed buoyancy mooring design, and the delay between sighting the mooring on the surface and final recovery were all contributory factors.

## 15. PIES data download via acoustic telemetry

### 15.1 Download set up

The data is transferred acoustically from the PIES to a transducer lowered from the vessel. Thus there is no need recovering the instrument to download the data. PIES may operate continuously in the ocean for up to 5 years. The PIES data available via telemetry (daily mean values of bottom pressure, acoustic travel time, time) is encoded as time delays of acoustic pulses relative to a marker pulse (“pulse delay telemetry”). The estimated download time for half a year of data amounts to 90 minutes. The time delays are measured by a Benthos DS7000 deck unit connected to the transducer. The Matlab based script PPDTb\_v3.m controls the set up of the reception channels of the deck unit and decodes and stores the incoming data. PPDTb\_v3.m is based on the PPDTb.m script originally supplied by the PIES manufacturer (R. Watts / G. Chaplin). The original was found to be susceptible to data transmission problems in trials carried out during CD 177. The data is sent in 14 minute long blocks followed by a 1 minute pause. A data block transfer will start with MSB (Most Significant Bite) and an LSB (Less Significant Bite) transmission and continue with LSB transmissions of the next 34 records (35 transmissions x 24 seconds=14 minutes) and then stop for one minute. Each block contains 35 values (34 days worth of data). The data is transferred in reverse order, such that the most recently recorded data is transmitted first. Based on telemetry trials carried out in the Burst Telemetry Mode during P343 the following standard setting were chosen:

- Telemetry Mode: File Telemetry
- Gain for DS7000: Gain 6 for channels 3, 4, 5, 7 and Gain 8 for channel 2. The channels 1, 6, 8 are not used.

### 15.2 Practical Operation

The recommended procedure of data download goes as follows. Let the vessel go to a position upstream of the PIES. The distance should be smaller than 1.5 nm. Make sure all devices operating between 10 and 13 KHz are switched off (Echosounder, CTD pinger, ...). This is the frequency range in which the PIES transfers its data. Let the vessel drift towards the PIES site (without using the bow thruster or propeller to keep the noise level down). Send the TELEM command to the PIES using the DS7000 (PIES should confirm reception with two 12.0 KHz pings). Then switch DS7000 from command to remote mode so that it can be controlled by the software. Edit PPDTb\_v3.m and enter output file name, number and path. Start programme. Channels should be set up automatically and the DS7000 should start to listen for the first marker pulse. Every received pulse is confirmed by an entry in the Matlab command window. If data reception becomes unreliable (vessel too far from site), the PIES should be sent the CLEAR command. This can be done in the one minute pause between any two of the 14 minute data blocks. Then the vessel can be repositioned to a location closer to the PIES and the session can be started again with a TELEM command. When the session is resumed within 24 hours, the download continued from the next data block. Otherwise the data pointer is reset to the most recently recorded value again.

### **EBP2 - Download**

Date: 06/10/2006  
Instrument: PIES #131  
TELEM command: 66

- start at 16:50, 7 cables upwind of EBP2 site

- consistent range of 1077 m (clearly audible)
- due to large winds both propeller and bowthruster had to be used to hold vessel stable (use of such engines is not recommended during PIES telemetry)
  - start transfer @ 17:15
  - first data record received from year day 280 (corresponding to 07.10.2006, so should have been day 279), MSB data (so first data point)
  - download continuously backward till day 327 (23.11.2005)
  - download finished @ 19:45
  - File stored on Darren's laptop in  
c:\p343\instruments\Pies\ebp2\Pfile2....

## ***EBP1 – Download***

Date: 10/10/2006

Instrument: PIES #131

TELEM command: 65

Narrative:

- At 18:09 consistent range of 5087 m (clearly audible)
- Start upload at 18:24. First data received from year day 275
- File stored on Darren's laptop in  
c:\p343\instruments\Pies\ebp1\Pfile1....
- at 18:53 switched off to allow for release test on CTD
- start transfer again @ 19:14
  - first data record received from year day 210 (corresponding to 29.7.2006), LSB data
  - download continuously backward till day 333(29.11.2005)
  - download finished @ 22:17
  - File stored on Darren's laptop in  
c:\p343\instruments\Pies\ebp1\Pfile2....
  - Pfile1 not found
- start transfer @ 21:45 to download data from the first day till the beginning of data stored in Pfile2...
- range of 5084 m (clearly audible)
- first data record received from year day 284 (corresponding to 11.10.2006, so should have been day 282), MSB data (so first data point)
- download continuously backward till day 179(28.6.2006)
- download finished @ 23:53
- File stored on Darren's laptop in  
c:\p343\instruments\Pies\ebp1\Pfile3....

## 16. Argo Float TEST & DEPLOYMENT

### 16.1 Introduction

The continuous instrument losses near the eastern boundary (due to intense fishery activity) led us to look for an alternative to acquire vertical density information. The Argo float programme, maintaining a dense network of floats profiling the water column up to depths of 2000 m at a rate of about 10 days, was one straightforward option. Investigations showed that only a very limited number of floats were present in our region of interest, and that some of them revealed problematic conductivity measurements.

To assess the capability of floats to mimic moored density measurements, 3 Argo floats were launched during the cruise Discovery 304 cruise along the eastern boundary part of the RAPID array. One more float was deployed during this cruise. The float was provided by the MetOffice in Reading (Jon Turton). Brian King supplied us with the knowledge required to test, start and launch the floats.

### 16.2 Deployment strategy

From previous float trajectories there was no indication that the floats would be flushed through our area of interest (east of EB1) in a systematic way. Thus long residence times (of many months) can be expected, which is clearly favourable for having floats mimic moored density measurements. On Discovery cruise 304 it was decided to launch two floats in the direct vicinity of the tall full water depth mooring EB1 (5090 m deep). This would enable us to carry out a direct comparison between both measurement techniques. In this cruise the float was deployed near EBH4 at only 1000m water depth.

### 16.3 Preparation of the Float

The Apex float was tested prior (06/10/06) to deployment following the standard method described below.

- Two alligator clips are connected to the float, one to the pressure sensor and another to the anode, and then to the PC serial port.
- **hyperterm** is used for communications using the followings settings :  
(1200/8/1/none, flow control: none)
- The float is started (reset) by passing a magnet slowly over the reset label on the float's side (mission is not started as float is connected to PC).
- All ARGOS parameters are verified prior to executing any commands.
- All command results were recorded in an appropriate logsheet

**Test Commands** (for extended instructions please refer to manual)

- Verification of communications using ARGOS receiver (SEIMAC passive beeper) : **I2**
- High-Pressure Pump test:     **I7** (check piston position ~101)  
                                      **I6** (extend pump, hear or feel the pump at work)  
                                      **I5** (retract pump)
- Check internal vacuum:     **I8** (open air valve)  
                                      **C** (battery voltage (>14) and check internal vacuum (~101 ± 5))
- Pneumatic System Test:    **I9** (close air valve)  
                                      **I1** (run air pump for 6 seconds)  
                                      **C** (check air bladder pressure, should be greater than internal vacuum  
  by approximately 20 counts (~128))  
                                      **I8** (open air valve)

**(Caution, air pump should never be run for more than approx. ten seconds due to risk of overstressing bladder)**

- Seabird CTD Test:            **SS** (after several seconds, terminal will display Pressure, Temperature

and Salinity values )  
- Float Hibernation : **H** (hibernate & re-verify all parameters)

Once all tests are concluded, the float is left dormant (using command **H**), and will begin its programmed mission when reset.

## **16.4 APEX Float Deployment Procedure**

### **Mission Start and Final Testing**

Between one and six hours before deployment, the APEX float is reset (using a magnet), which causes it to start its mission. Confirmation of mission start is achieved by listening to 6 Argos beeps from the passive tester (held within 30 cm of Argo antenna). The pump inside the float can be heard or felt as it starts to inflate the bladder at the bottom of the float. Inflation of the bladder is verified by removing the bottom bung and feeling the bladder manually. Once these tests are complete, the passive receiver continues to beep once every 45 seconds confirming correct operation. The float is left outdoors on deck until deployment in order to achieve satellite connection to the ARGOS system.

### **Deployment**

The float was deployed on the port side on the afterdeck. For deployment of the APEX float, ship speed was maintained at 1.5 knots. Instead of using the dedicated hole in the ring around the centre of the float (which is prone to get stuck), a loop around the whole float was used, secured by a wooden pin. The tension of the float's weight kept the rope firmly secured around it, making it easy and secure to lower by one or two people into the water. Once the float is lowered into the water, the loop loses tension and allows the float to float freely without risk of knots or entanglement. After 2 minutes the float becomes upright.

### **Comments:**

Due to difficulties in resetting the instrument, a stronger magnet had to be used to reset the float.

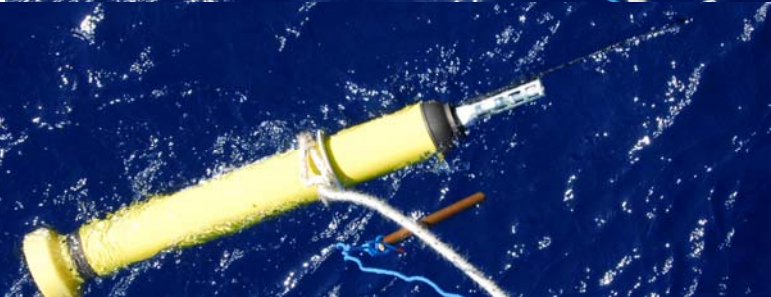
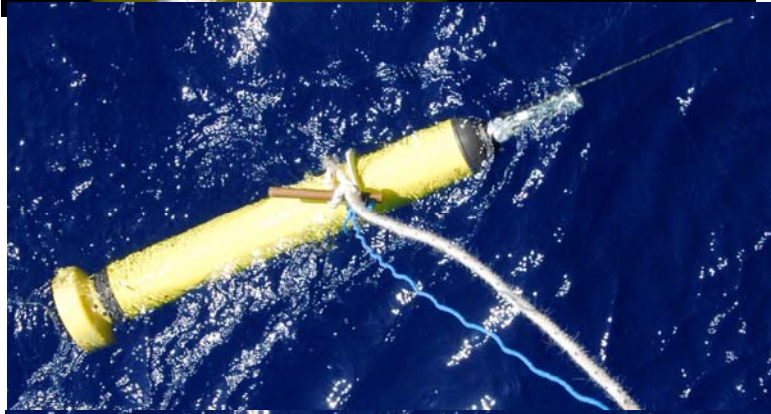
### **Float settings**

- Parking depth 1000 m (P1 = 1000)
- Profile depth 1000 m (P6 = 1000)
- Deep Profile every time (PD = 1)
- Profile every 5 days (107 hours down, 13 hours up)

### **Deployment information:**

- Date = 06/10/2006
- APEX Float number (N1) = 2646
- Decimal ARGOS ID (N2) = 3474
- Hex Argos ID (N3) = D26
- Latitude = 27 52.00 N
- Longitude = 13 30.96 W







## 17. Under way measurements

Underway measurements logged by the datavis system were concatenated from daily files into single cruise files and converted to pstar (file names : *data\_stream.master*).

**Appendix A : P343 Bridge Log**



Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat.-No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
	04.10.2006	14:00	Start of Research- and Stationwork																
838	04.10.2006	14:05	Ship @ Station	28° 25,18' N	015° 12,03' W	3392,0	± 047	± 0,0	270,0	0,0	1022,4	b/c	040 / 22	24,1	24,3			W 2	
		14:05	CTD/Rosette t/water	28° 25,18' N	015° 12,03' W	3392,0	± 044	± 0,0	60,4	0,0	1022,2	b/c	038 / 22	24,2	24,3	10			Slack with 0,5 - 1,0 m/s
		14:44	Heave CTD	28° 25,19' N	015° 12,01' W	3392,0	± 043	± 0,0	270,0	0,0	1022,2	b/c	043 / 22	23,3	24,3		450		Heave with 0,5 - 1,0 m/s
		15:11	CTD/Rosette an Deck	28° 25,19' N	015° 12,01' W	3392,0	± 042	± 0,0	270,0	0,0	1022,2	b/c	045 / 21	23,5	24,4				
		15:11	Station completed	28° 25,19' N	015° 12,01' W	3392,0	± 042	± 0,0	270,0	0,0	1022,2	b/c	045 / 21	23,5	24,4				
838-2	04.10.2006	15:48	Ship @ Station	28° 25,19' N	015° 12,01' W	3393,0	± 050	± 0,0	23,7	0,0	1022,2	b/c	037 / 22	23,4	24,5			W 2	
		15:50	CTD/Rosette t/water	28° 25,21' N	015° 12,00' W	3392,0	± 044	± 0,0	270,0	0,0	1022,2	b/c	037 / 21	23,4	24,5	10			Slack with 0,5 - 1,0 m/s
		16:27	Heave CTD	28° 25,21' N	015° 12,01' W	ES off	± 044	± 0,0	221,3	0,0	1022,0	b/c	044 / 23	23,7	24,5		450		Heave with 0,5 - 1,0 m/s
		16:42	CTD/Rosette an Deck	28° 25,20' N	015° 12,02' W	ES off	± 045	± 0,0	270,0	0,0	1021,9	b/c	045 / 23	24,0	24,4				
		16:42	Station completed	28° 25,20' N	015° 12,02' W	ES off	± 045	± 0,0	138,7	0,0	1021,9	b/c	045 / 23	24,0	24,4				
838-3	04.10.2006	17:31	Ship @ Station	28° 25,18' N	015° 12,00' W	3392,0	± 050	± 0,0	203,7	0,0	1022,1	b/c	042 / 23	24,0	24,5			W 2	
		17:33	CTD/Rosette t/water	28° 25,16' N	015° 12,01' W	3393,0	± 050	± 0,0	12,4	0,0	1022,1	b/c	042 / 22	24,0	24,5	10			Slack with 0,5 - 1,0 m/s
		18:29	Heave CTD	28° 25,20' N	015° 12,00' W	3392,0	± 038	± 0,0	221,3	0,0	1022,6	b/c	039 / 24	24,0	24,5		3000		Heave with 0,5 - 1,0 m/s
		19:55	CTD/Rosette an Deck	28° 25,19' N	015° 12,01' W	3394,0	± 045	± 0,0	270,0	0,0	1023,1	b/c	034 / 23	23,9	24,5				
		19:56	Station completed	28° 25,19' N	015° 12,01' W	3394,0	± 045	± 0,0	108,4	99,9	1023,1	b/c	034 / 23	23,9	24,5				
839	05.10.2006	19:10	Ship @ Station	27° 53,64' N	013° 24,48' W	500,0	± 029	± 0,0	270,0	0,0	1019,1	b/c	013 / 32	22,6	21,5				
		19:10	Deploy EBM 1	27° 53,64' N	013° 24,48' W	500,0	± 029	± 0,0	270,0	0,0	1019,1	b/c	013 / 32	22,6	21,5				
		19:10	Station completed	27° 53,64' N	013° 24,48' W	500,0	± 029	± 0,0	69,3	1,0	1019,1	b/c	013 / 32	22,6	21,5				
840	05.10.2006	19:24	Ship @ Station	27° 53,98' N	013° 23,46' W	399,0	± 028	± 0,0	270,0	0,0	1019,1	b/c	010 / 32	22,4	21,6				
		19:24	Deploy EBM 2	27° 53,98' N	013° 23,46' W	399,0	± 028	± 0,0	270,0	0,0	1019,1	b/c	010 / 32	22,4	21,6				
		19:24	Station completed	27° 53,98' N	013° 23,46' W	399,0	± 028	± 0,0	69,0	1,1	1019,1	b/c	010 / 32	22,4	21,6				
841	05.10.2006	19:39	Ship @ Station	27° 54,36' N	013° 22,34' W	321,0	± 039	± 0,0	270,0	0,0	1019,2	b/c	355 / 32	22,2	21,7				
		19:39	Deploy EBM 3	27° 54,36' N	013° 22,34' W	321,0	± 039	± 0,0	270,0	0,0	1019,2	b/c	355 / 32	22,2	21,7				
		19:39	Station completed	27° 54,36' N	013° 22,34' W	321,0	± 039	± 0,0	66,8	0,4	1019,2	b/c	355 / 32	22,2	21,7				
842	05.10.2006	19:46	Ship @ Station	27° 54,50' N	013° 21,97' W	254,0	± 010	± 0,0	270,0	0,0	1019,2	b/c	358 / 31	22,2	21,6				
		19:46	Deploy EBM 4	27° 54,50' N	013° 21,97' W	254,0	± 010	± 0,0	270,0	0,0	1019,2	b/c	358 / 31	22,2	21,6				
		19:46	Station completed	27° 54,50' N	013° 21,97' W	254,0	± 010	± 0,0	69,8	0,4	1019,2	b/c	358 / 31	22,2	21,6				
843	05.10.2006	20:16	Ship @ Station	27° 54,63' N	013° 21,57' W	172,0	± 020	± 0,0	270,0	0,0	1019,3	c	012 / 29	22,6	21,7				
		20:16	Deploy EBM 5	27° 54,63' N	013° 21,57' W	172,0	± 020	± 0,0	270,0	0,0	1019,3	c	012 / 29	22,6	21,7				
		20:16	Station completed	27° 54,63' N	013° 21,57' W	172,0	± 020	± 0,0	69,7	1,6	1019,3	c	012 / 29	22,6	21,7				
844	05.10.2006	20:36	Ship @ Station	27° 55,17' N	013° 19,92' W	98,0	± 018	± 0,0	270,0	0,0	1019,3	c	009 / 31	22,4	21,7				
		20:36	Deploy EBM 6	27° 55,17' N	013° 19,92' W	98,0	± 018	± 0,0	270,0	0,0	1019,3	c	009 / 31	22,4	21,7				
		20:36	Station completed	27° 55,17' N	013° 19,92' W	98,0	± 018	± 0,0	97,3	5,6	1019,3	c	009 / 31	22,4	21,7				
845	05.10.2006	21:33	Ship @ Station	27° 54,45' N	013° 13,59' W	70,0	± 006	± 0,0	270,0	0,0	1018,8	b/c/q	013 / 31	21,8	20,8				
		21:33	Deploy EBM 7	27° 54,45' N	013° 13,59' W	70,0	± 006	± 0,0	270,0	0,0	1018,8	b/c/q	013 / 31	21,8	20,8				
		21:33	Station completed	27° 54,45' N	013° 13,59' W	70,0	± 006	± 0,0	270,2	7,2	1018,8	b/c/q	013 / 31	21,8	20,8				
846	06.10.2006	12:41	Ship @ Station	27° 54,48' N	013° 21,69' W	160,0	± 022	± 0,0	270,0	0,0	1017,4	b/c/q	021 / 31	21,6	20,8			W 4	EBH 5
		12:42	Transducer t/water	27° 54,48' N	013° 21,69' W	160,0	± 022	± 0,0	264,6	0,2	1017,4	b/c/q	021 / 31	21,6	20,8				
		12:55	Mooring released	27° 54,46' N	013° 21,93' W	244,0	± 025	± 0,0	270,0	0,0	1017,3	b/c/q	021 / 29	22,0	20,9				
		12:56	Transducer @ deck	27° 54,46' N	013° 21,95' W	253,0	± 007	± 0,0	32,3	0,1	1017,3	b/c/q	021 / 29	22,0	20,9				
		13:00	Top buoy sighted	27° 54,53' N	013° 21,90' W	260,0	± 010	± 0,0	191,4	0,4	1016,9	b/c/q	020 / 28	22,0	20,9				
		13:19	Top buoy @ deck	27° 54,09' N	013° 22,00' W	296,0	± 048	± 0,0	270,0	0,4	1016,9	b/c/q	020 / 28	21,9	20,9				
		13:23	Mooring recovered	27° 54,09' N	013° 22,40' W	296,0	± 048	± 0,0	270,0	0,0	1016,9	b/c/q	020 / 28	21,9	20,9				
		13:23	Station completed	27° 54,09' N	013° 22,40' W	296,0	± 048	± 0,0	249,5	9,4	1016,9	b/c/q	020 / 28	21,9	20,9				
847	06.10.2006	14:45	Ship @ Station	27° 50,79' N	013° 32,40' W	1043,0	± 031	± 0,0	270,0	0,0	1015,7	c/q	026 / 33	22,1	21,8			W 4	EBH 4
		14:45	Transducer t/water	27° 50,79' N	013° 32,40' W	1043,0	± 031	± 0,0	225,5	0,3	1015,7	c/q	026 / 33	22,1	21,8				
		14:59	Mooring released	27° 50,59' N	013° 32,63' W	1050,0	± 029	± 0,0	270,0	0,0	1015,4	c/q	020 / 33	22,0	21,8				
		15:00	Transducer @ deck	27° 50,59' N	013° 32,64' W	1055,0	± 027	± 0,0	252,1	0,1	1015,4	c/q	020 / 33	22,0	21,8				



Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat. No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
		15:06	Top buoy sighted	27° 50,57' N	013° 32,71' W	1058,0	± 027	± 0,0	14,9	0,1	1015,5	c/q	019 / 33	22,2	21,9				
		15:23	Top buoy @ deck	27° 50,67' N	013° 32,68' W	1058,0	± 041	± 0,0	220,7	0,5	1015,5	b/c/q	021 / 31	21,9	21,9				
		15:55	Mooring @ deck	27° 50,29' N	013° 33,05' W	1058,0	± 030	± 0,0	270,0	0,0	1015,2	b/c/q	023 / 31	22,4	21,7				
		15:55	Station completed	27° 50,29' N	013° 33,05' W	1058,0	± 030	± 0,0	43,9	2,7	1015,2	c/q	023 / 31	22,4	21,7				
848	06.10.2006	16:43	Ship @ Station	27° 52,20' N	013° 30,97' W	1007,0	± 050	± 0,0	211,7	0,1	1015,5	o/q	012 / 32	21,9	21,7				EBP 2
		16:50	Transducer t/water	27° 52,10' N	013° 31,04' W	1071,0	± 039	± 0,0	221,5	0,8	1015,3	o/q	021 / 32	22,3	21,7				17:15 UTC Datatransfer started
		19:49	Transducer @ deck	27° 51,53' N	013° 31,61' W	1019,0	± 042	± 0,0	270,0	0,0	1015,7	o/q	025 / 28	21,8	21,1				19:48 UTC Datatransfer completed
		19:50	Station completed	27° 51,53' N	013° 31,61' W	1019,0	± 042	± 0,0	50,6	0,7	1015,7	o/q	025 / 28	21,8	21,1				
849	06.10.2006	20:21	Ship @ Station	27° 51,98' N	013° 30,99' W	1003,0	± 043	± 0,0	270,0	0,0	1015,9	o/q	030 / 28	21,7	21,0				ARGO 1
		20:01	Argos Float deployed	27° 51,98' N	013° 30,99' W	1003,0	± 043	± 0,0	75,9	0,1	1015,9	o/q	030 / 28	21,7	21,0				
		20:25	Station completed	27° 52,00' N	013° 30,90' W	999,0	± 042	± 0,0	218,8	2,6	1015,8	o/q	031 / 28	22,2	20,8				
850	07.10.2006	08:07	Ship @ Station	27° 49,98' N	013° 32,74' W	1031,0	± 020	± 2,0	12,5	0,0	1015,0	b/c/e	014 / 26	21,7	20,9			W 7	EBH 4
		08:08	Top buoy t/water	27° 50,02' N	013° 32,73' W	1031,0	± 022	± 1,5	270,0	0,0	1015,0	b/c/e	014 / 26	21,7	20,9				Microcat 1
		08:08	Float 1 t/water	27° 50,02' N	013° 32,73' W	1031,0	± 022	± 1,5	19,5	0,1	1015,0	b/c/e	014 / 26	21,7	20,9				Microcat 2
		08:10	Float 2 t/water	27° 50,12' N	013° 32,69' W	1032,0	± 027	± 1,6	41,5	0,0	1015,0	b/c/e	014 / 26	21,8	21,0				Microcat 3
		08:12	2 Benthos + Releaser t/w	27° 50,13' N	013° 32,68' W	1033,0	± 028	± 1,8	16,9	0,9	1015,0	b/c/e	013 / 26	21,9	21,0				Weight: 600 kg
		08:34	Anchor weight t/water	27° 51,03' N	013° 32,37' W	1047,0	± 026	± 3,0	270,0	0,0	1015,2	b/c/e	018 / 26	21,9	21,0				
		08:34	Station completed	27° 51,03' N	013° 32,37' W	1047,0	± 026	± 3,0	251,3	105,6	1015,2	b/c/e	018 / 26	21,9	21,0				
851	07.10.2006	19:30	Ship @ Station	27° 17,24' N	015° 25,28' W	ES off	± 024	± 0,0	270,0	0,0	1014,5	b/c/q	030 / 34	22,9	22,7				Stop @ EBL 2
		19:31	Transducer t/water	27° 17,24' N	015° 25,29' W	ES off	± 025	± 0,0	318,4	0,0	1014,5	b/c/q	030 / 34	22,9	22,7				
		19:36	Transducer @ deck	27° 17,27' N	015° 25,32' W	ES off	± 025	± 0,0	270,0	0,0	1014,6	b/c/q	028 / 35	23,0	22,9				
		19:36	Station completed	27° 17,27' N	015° 25,32' W	ES off	± 025	± 0,0	246,0	116,4	1014,6	b/c/q	028 / 35	23,0	22,9				
852	08.10.2006	08:35	Ship @ Station	26° 29,89' N	017° 24,49' W	3618,0	± 069	± 0,0	270,0	0,0	1016,3	c/o	063 / 13	23,5	24,4			W 2	
		08:36	CTD/Rosette t/water	26° 29,89' N	017° 24,48' W	3618,0	± 070	± 0,0	146,9	0,3	1016,3	c/o	063 / 13	23,5	24,4	10			Slack with 0,5 - 1,0 m/s
		09:39	Heave CTD	26° 29,67' N	017° 24,32' W	3619,0	± 055	± 0,0	101,3	0,4	1016,7	c/o	046 / 16	23,2	24,4	3500			Heave with 0,5 - 1,0 m/s
		11:24	CTD/Rosette an Deck	26° 29,60' N	017° 23,93' W	3619,0	± 045	± 0,0	270,0	0,0	1016,9	c/o	013 / 16	23,2	24,3				
		11:24	Station completed	26° 29,60' N	017° 23,93' W	3619,0	± 045	± 0,0	246,2	227,9	1016,9	c/o	013 / 16	23,2	24,3				
853	09.10.2006	11:06	Ship @ Station	24° 57,55' N	021° 15,36' W	4561,0	± 067	± 0,0	270,0	0,0	1017,4	b/c	075 / 09	24,0	25,5			W 4	EBHi
		11:08	Transducer t/water	24° 57,55' N	021° 15,36' W	4561,0	± 067	± 0,0	252,2	0,8	1017,4	b/c	075 / 09	24,0	25,5				
		11:56	Mooring released	24° 57,30' N	021° 16,22' W	4561,0	± 314	± 0,0	102,0	0,5	1017,3	b/c	045 / 10	23,9	25,7				11:26 Transducer t/water
		11:40	Transducer @ deck	24° 57,19' N	021° 15,65' W	4561,0	± 287	± 0,0	261,2	0,5	1017,2	b/c	071 / 10	24,2	25,7				11:51 Transducer t/water
		12:36	Top buoy sighted	24° 57,11' N	021° 16,22' W	4561,0	± 340	± 0,0	72,5	0,9	1017,0	b/c	068 / 10	24,2	25,8				
		12:52	Top buoy @ deck	24° 57,39' N	021° 15,24' W	4561,0	± 054	± 0,0	270,0	0,0	1016,9	b/c	066 / 10	24,0	25,8				
		12:53	4 x Benthos @ deck	24° 57,39' N	021° 15,23' W	4561,0	± 031	± 0,0	270,0	0,0	1016,9	b/c	066 / 10	24,0	25,8				
		12:58	RCM 11 @ deck	24° 57,39' N	021° 15,21' W	4561,0	± 026	± 0,0	270,0	0,0	1016,8	b/c	053 / 10	24,1	25,7				
		12:58	Sontek @ deck	24° 57,39' N	021° 15,21' W	4561,0	± 026	± 0,0	180,0	0,0	1016,8	b/c	053 / 10	24,1	25,7				
		13:01	4 x Benthos @ deck	24° 57,34' N	021° 15,21' W	4561,0	± 041	± 0,0	270,0	0,0	1016,8	b/c	070 / 10	24,0	25,8				
		13:01	Idronaut CTD @ deck	24° 57,34' N	021° 15,21' W	4561,0	± 041	± 0,0	199,9	0,1	1016,8	b/c	070 / 10	24,0	25,8				
		13:14	2 x Benthos @ deck	24° 57,24' N	021° 15,25' W	4561,0	± 086	± 0,0	270,0	0,0	1016,7	b/c	065 / 10	24,1	25,8				
		13:14	SBE 3479 @ deck	24° 57,24' N	021° 15,25' W	4561,0	± 086	± 0,0	270,0	0,0	1016,7	b/c	065 / 10	24,1	25,8				
		13:14	SBE 3480 @ deck	24° 57,24' N	021° 15,25' W	4561,0	± 086	± 0,0	180,0	0,0	1016,7	b/c	065 / 10	24,1	25,8				
		13:24	4x Benthos @ deck	24° 57,25' N	021° 15,25' W	4561,0	± 056	± 0,0	270,0	0,1	1016,5	b/c	050 / 10	24,0	25,7				
		13:24	Releaser @ deck	24° 57,25' N	021° 15,19' W	4561,0	± 056	± 0,0	270,0	0,0	1016,5	b/c	050 / 10	24,0	25,7				
		13:24	Mooring recovered	24° 57,25' N	021° 15,19' W	4561,0	± 056	± 0,0	270,0	0,0	1016,5	b/c	050 / 10	24,0	25,7				
		13:24	Station completed	24° 57,25' N	021° 15,19' W	4561,0	± 056	± 0,0	226,5	1,7	1016,5	b/c	050 / 10	24,0	25,7				
854	09.10.2006	14:25	Ship @ Station	24° 56,08' N	021° 16,55' W	4466,0	± 038	± 2,0	270,0	0,0	1016,0	b/c	055 / 10	24,4	25,9			W 7	EBHi
		14:26	Top buoy t/water	24° 56,08' N	021° 16,55' W	4466,0	± 038	± 2,0	61,1	0,0	1016,0	b/c	055 / 10	24,4	25,9				
		14:27	2 x Benthos t/water	24° 56,09' N	021° 16,53' W	4466,0	± 038	± 2,0	42,2	0,3	1016,0	b/c	055 / 10	24,4	25,9				1. Microcat
		14:35	2 x Benthos t/water	24° 56,31' N	021° 16,31' W	4469,0	± 031	± 2,6	42,2	0,3	1015,9	b/c	061 / 10	23,9	26,0				2. Microcat



Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat.-No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] ] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
		14:41	4 x Benthos t/water	24° 56,51' N	021° 16,11' W	4469,0	± 042	± 2,6	45,4	0,8	1015,8	b/c	067 / 09	24,1	25,9				3. Microcat
		14:58	Released	24° 57,10' N	021° 15,45' W	4468,0	± 040	± 2,6	270,0	0,0	1015,8	b/c	057 / 09	24,4	26,0				
		14:58	Anchor weight t/water	24° 57,10' N	021° 15,45' W	4468,0	± 040	± 2,6	233,2	0,3	1015,8	b/c	057 / 09	24,4	26,0				Weight: 600 kg
		15:04	Top buoy submerged	24° 56,91' N	021° 15,73' W	4469,0	± 230	± 0,4	163,2	0,0	1015,8	b/c	054 / 09	24,4	26,0				
		15:05	Station completed	24° 56,88' N	021° 15,72' W	4469,0	± 195	± 0,4	246,8	170,4	1015,8	b/c	054 / 09	24,4	26,0				
855	10.10.2006	08:34	Ship @ Station	23° 49,69' N	024° 07,67' W	5054,0	± 023	± 0,0	270,0	0,0	1017,3	b/c	030 / 09	24,3	26,0				EB 1
		08:35	Transducer t/water	23° 49,69' N	024° 07,67' W	5054,0	± 022	± 0,0	197,0	0,0	1017,3	b/c	030 / 09	24,3	26,0				
		08:42	Mooring released	23° 49,66' N	024° 07,68' W	5054,0	± 350	± 0,0	270,0	0,0	1017,4	b/c	018 / 09	24,2	26,0				
		08:43	Transducer @ deck	23° 49,66' N	024° 07,68' W	5054,0	± 350	± 0,0	270,0	0,0	1017,4	b/c	018 / 09	24,2	25,9				
		08:46	Inductive buoy sighted	23° 49,66' N	024° 07,68' W	5054,0	± 350	± 0,0	210,9	1,0	1017,4	b/c	018 / 09	24,2	25,9				
		09:32	48" Steel Sphere @ Deck	23° 48,82' N	024° 08,23' W	5054,0	± 140	± 0,0	222,5	0,0	1017,9	b/c	027 / 10	24,2	25,9				
		09:40	24" Steel Sphere @ Deck	23° 48,81' N	024° 08,24' W	5054,0	± 126	± 0,0	270,0	0,0	1017,9	b/c	020 / 10	24,4	25,9				
		09:43	1. Microcat @ deck	23° 48,81' N	024° 08,24' W	5054,0	± 112	± 0,0	270,0	0,0	1017,9	b/c	014 / 10	24,4	25,9				
		09:45	2. Microcat @ deck	23° 48,81' N	024° 08,24' W	5054,0	± 112	± 0,0	180,0	0,1	1018,0	b/c	022 / 10	24,4	25,9				
		09:54	3. Microcat @ deck	23° 48,76' N	024° 08,24' W	5054,0	± 105	± 0,0	180,0	0,0	1018,1	b/c	006 / 10	24,3	26,1				
		09:57	4. Microcat @ deck	23° 48,74' N	024° 08,24' W	5054,0	± 105	± 0,0	180,0	0,0	1018,1	b/c	010 / 11	24,3	26,1				
		10:01	5. Microcat @ deck	23° 48,72' N	024° 08,24' W	5054,0	± 105	± 0,0	180,0	0,0	1018,1	b/c	359 / 10	24,5	26,1				
		10:03	6. Microcat @ deck	23° 48,71' N	024° 08,24' W	5054,0	± 111	± 0,0	180,0	0,0	1018,1	b/c	015 / 10	24,6	26,1				
		10:05	7. Microcat @ deck	23° 48,70' N	024° 08,24' W	5054,0	± 114	± 0,0	270,0	0,0	1018,1	b/c	015 / 10	24,6	26,0				
		10:07	8. Microcat @ deck	23° 48,70' N	024° 08,24' W	5054,0	± 114	± 0,0	180,0	0,0	1018,1	b/c	012 / 10	24,2	26,0				
		10:09	9. Microcat @ deck	23° 48,69' N	024° 08,24' W	5054,0	± 114	± 0,0	270,0	0,0	1018,1	b/c	013 / 11	24,4	26,1				
		10:11	10. Microcat @ deck	23° 48,69' N	024° 08,24' W	5054,0	± 110	± 0,0	270,0	0,0	1018,3	b/c	020 / 11	24,3	26,1				
		10:13	11. Microcat @ deck	23° 48,69' N	024° 08,24' W	5054,0	± 092	± 0,0	42,5	0,0	1018,3	b/c	087 / 11	24,4	26,1				
		10:15	12. Microcat @ deck	23° 48,71' N	024° 08,22' W	5054,0	± 075	± 0,0	24,6	0,0	1018,3	b/c	020 / 11	24,3	26,1				
		10:17	13. Microcat @ deck	23° 48,73' N	024° 08,21' W	5056,0	± 058	± 0,0	335,4	0,0	1018,3	b/c	019 / 11	24,3	26,2				
		10:22	14. Microcat @ deck	23° 48,75' N	024° 08,22' W	5056,0	± 025	± 0,0	155,4	0,0	1018,3	b/c	008 / 11	24,2	25,9				
		10:25	12x Benthos @ deck	23° 48,73' N	024° 08,21' W	5056,0	± 078	± 0,0	180,0	0,0	1018,3	b/c	018 / 11	24,2	26,0				
		10:30	15. Microcat @ deck	23° 48,72' N	024° 08,21' W	5056,0	± 101	± 0,0	270,0	0,0	1018,2	b/c	022 / 11	24,2	26,1				
		10:34	16. Microcat @ deck	23° 48,72' N	024° 08,25' W	5056,0	± 124	± 0,0	298,7	0,0	1018,2	b/c	013 / 11	24,2	26,0				
		10:37	17. Microcat @ deck	23° 48,73' N	024° 08,27' W	5056,0	± 135	± 0,0	270,0	0,0	1018,2	b/c	006 / 11	24,4	26,1				
		10:40	18. Microcat @ deck	23° 48,73' N	024° 08,28' W	5056,0	± 143	± 0,0	290,0	0,0	1018,2	b/c	007 / 11	24,4	26,2				
		10:44	19. Microcat @ deck	23° 48,74' N	024° 08,31' W	5056,0	± 143	± 0,0	167,1	0,1	1018,3	b/c	013 / 11	24,4	26,2				
		11:04	20. Microcat @ deck	23° 48,66' N	024° 08,29' W	5056,0	± 107	± 0,0	163,0	0,0	1018,1	b/c	013 / 11	24,4	26,2				
		11:12	21. Microcat @ deck	23° 48,63' N	024° 08,28' W	5056,0	± 125	± 0,0	270,0	0,0	1018,0	b/c	014 / 11	24,4	26,2				
		11:13	10xBenthos @ deck	23° 48,63' N	024° 08,31' W	5056,0	± 020	± 0,0	270,0	0,0	1018,0	b/c	014 / 11	24,6	26,1				
		11:24	22. Microcat @ deck	23° 48,63' N	024° 08,29' W	5056,0	± 014	± 0,0	171,3	0,1	1018,0	b/c	014 / 11	24,3	26,1				
		11:32	23. Microcat @ deck	23° 48,57' N	024° 08,28' W	5056,0	± 352	± 0,0	180,0	0,1	1018,0	b/c	025 / 11	24,5	26,1				
		11:42	24. Microcat @ deck	23° 48,65' N	024° 08,28' W	5056,0	± 354	± 0,0	29,8	0,1	1018,0	b/c	024 / 11	24,6	26,1				
		11:45	8xBenthos @ deck	23° 48,73' N	024° 08,23' W	5056,0	± 351	± 0,0	24,6	0,0	1018,0	b/c	034 / 11	24,3	26,2				
		11:49	Mooring @ deck	23° 48,75' N	024° 08,22' W	5056,0	± 351	± 0,0	317,5	0,0	1018,1	b/c	036 / 11	24,3	26,0				
		11:50	Station completed	23° 48,76' N	024° 08,23' W	5056,0	± 351	± 0,0	88,4	1,4	1018,1	b/c	038 / 11	24,4	26,2				
856	10.10.2006	17:37	Ship @ Station	23° 48,80' N	024° 06,67' W	5052,0	± 021	± 0,0	42,5	0,0	1016,7	b/c	026 / 15	24,7	26,3			W 2	EBP 1
		17:39	CTD/Rosette t/water	23° 48,81' N	024° 06,66' W	5052,0	± 022	± 0,0	21,4	0,1	1016,7	b/c	026 / 15	24,7	26,4	10			Slack with 0,5 - 1,0 m/s
		17:52	Transducer t/water	23° 48,88' N	024° 06,63' W	5052,0	± 035	± 0,0	24,6	0,0	1016,7	b/c	023 / 14	24,6	26,3				
		19:00	Heave CTD	23° 48,92' N	024° 06,61' W	ES off	± 044	± 0,0	254,7	0,0	1017,3	b/c	039 / 14	24,8	25,3		4665		Heave with 0,5 - 1,0 m/s
		20:49	CTD/ Rosette @ deck	23° 48,91' N	024° 06,65' W	ES off	± 054	± 0,0	197,0	0,0	1018,4	b/c	055 / 12	24,6	26,3				18:26 UTC Datatransfer started
		21:17	Transducer @ deck	23° 48,88' N	024° 06,66' W	ES off	± 055	± 0,0	222,5	0,1	1018,9	b/c	057 / 12	24,7	26,7				18:27 Echosounder switched off
		21:38	Transducer t/water	23° 48,82' N	024° 06,72' W	ES off	± 055	± 0,0	287,3	0,1	1018,9	b/c	073 / 12	24,6	26,1				21:15 UTC Datatransfer completed
		22:53	Transducer @ deck	23° 48,84' N	024° 06,79' W	ES off	± 064	± 0,0	270,0	0,0	1019,4	b/c	070 / 12	24,8	26,1				21:38 UTC Datatransfer started



Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat.-No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] ] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
		22:53	Station completed	23° 48,84' N	024° 06,79' W	ES off	± 064	± 0,0	42,5	0,2	1019,4	b/c	070 / 12	24,8	26,1				23:52 UTC Datatransfer completed
857	11.10.2006	07:08	Ship @ Station	23° 48,97' N	024° 06,66' W	ES off	± 019	± 0,0	270,0	0,0	1017,2	b/c	029 / 14	24,4	26,1				EBL 1
		07:09	Transducer t/water	23° 48,97' N	024° 06,66' W	ES off	± 019	± 0,0	270,0	0,0	1017,2	b/c	029 / 14	24,4	26,1				
		07:11	Mooring released	23° 48,97' N	024° 06,69' W	ES off	± 350	± 0,0	314,0	0,2	1017,2	b/c	050 / 14	24,4	26,1				
		07:30	Hydrophon @ deck	23° 49,12' N	024° 06,86' W	ES off	± 030	± 0,0	167,9	0,5	1017,4	b/c	048 / 14	24,3	26,1				
		09:10	Top Bouy sighted	23° 48,65' N	024° 06,75' W	ES off	± 062	± 0,0	355,2	0,1	1017,8	b/c	026 / 17	24,7	26,1				
		09:24	7 x Benthos @ deck	23° 48,76' N	024° 06,76' W	ES off	± 015	± 0,0	270,0	0,0	1018,1	b/c	031 / 17	24,7	26,0				
		09:30	Anchor @ deck	23° 48,76' N	024° 06,76' W	ES off	± 320	± 0,0	270,0	0,0	1018,1	b/c	026 / 17	24,3	26,1				
		09:31	Station completed	23° 48,76' N	024° 06,76' W	ES off	± 320	± 0,0	224,9	3,8	1018,1	b/c	026 / 17	24,3	26,1				
858	11.10.2006	10:30	Ship @ Station	23° 46,06' N	024° 09,70' W	5063,0	± 030	± 0,0	180,0	0,0	1018,6	b/c	034 / 17	24,4	25,1			W 7	Deployment of mooring EB 2
		10:37	Top buoy t/water	23° 46,08' N	024° 09,70' W	5063,0	± 030	± 1,8	270,0	0,0	1018,6	b/c	027 / 17	24,4	25,1				
		10:40	48" Steel SN t/water	23° 46,08' N	024° 09,70' W	5063,0	± 032	± 1,8	270,0	0,0	1018,6	b/c	027 / 17	24,4	25,1				
		10:42	1. Microcat t/water	23° 46,08' N	024° 09,70' W	5063,0	± 032	± 1,8	27,4	0,4	1018,5	b/c	034 / 17	24,4	26,2				
		10:50	MMP t/water	23° 46,45' N	024° 09,49' W	5063,0	± 032	± 2,2	27,6	2,2	1018,5	b/c	038 / 18	24,7	26,2				
		11:53	6 x Benthos t/water	23° 48,41' N	024° 08,37' W	5053,0	± 039	± 1,1	270,0	0,0	1018,5	b/c	042 / 17	24,7	26,0				
		11:54	6 x Benthos t/water	23° 48,41' N	024° 08,37' W	5053,0	± 045	± 1,0	270,0	0,1	1018,4	b/c	057 / 17	24,5	26,1				
		11:56	2. Microcat t/water	23° 48,41' N	024° 08,25' W	5053,0	± 045	± 1,0	180,0	0,5	1018,4	b/c	042 / 17	24,7	26,2				
		12:08	3. Microcat t/water	23° 48,95' N	024° 08,25' W	5055,0	± 045	± 1,0	180,0	0,3	1018,4	b/c	042 / 17	24,9	26,2				
		12:11	4 x Benthos t/water	23° 48,61' N	024° 08,25' W	5055,0	± 045	± 1,0	270,0	0,0	1018,4	b/c	055 / 17	24,6	26,2				
		12:24	4. Microcat t/water	23° 48,61' N	024° 08,25' W	5055,0	± 045	± 1,0	37,9	0,3	1018,4	b/c	055 / 17	24,6	26,2				
		12:41	5. Microcat t/water	23° 48,88' N	024° 08,02' W	5055,0	± 045	± 1,0	23,1	0,2	1018,4	b/c	058 / 17	24,8	26,2				
		13:00	6. Microcat t/water	23° 49,03' N	024° 07,95' W	5055,0	± 045	± 0,0	48,8	0,1	1018,3	b/c	069 / 17	24,7	26,1				
		13:09	7. Microcat t/water	23° 49,07' N	024° 07,90' W	5055,0	± 045	± 0,7	2,4	0,4	1018,3	b/c	069 / 17	24,7	26,1				
		13:12	4 x Benthos t/water	23° 49,50' N	024° 07,88' W	5055,0	± 045	± 2,0	270,0	0,0	1018,1	b/c	058 / 17	24,6	26,2				
		13:12	4 x Benthos t/water	23° 49,50' N	024° 07,88' W	5055,0	± 045	± 2,0	77,7	0,4	1018,1	b/c	058 / 17	24,6	26,2				
		13:29	Releaser t/water	23° 49,58' N	024° 07,48' W	5055,0	± 045	± 3,0	270,0	0,0	1018,1	b/c	058 / 17	24,6	26,2				
		13:32	Anchorweight t/water	23° 49,58' N	024° 07,48' W	5055,0	± 045	± 3,0	270,0	0,0	1018,1	b/c	058 / 17	24,6	26,2				
		13:32	Station completed	23° 49,58' N	024° 07,48' W	5055,0	± 045	± 3,0	219,8	0,9	1018,1	b/c	058 / 17	24,6	26,2				
859	11.10.2006	14:30	Ship @ Station	23° 48,90' N	024° 08,10' W	ES off	± 081	± 0,0	180,0	0,0	1017,3	b/c	054 / 18	25,1	26,3				Mooring EB 2 recovered (partly)
		14:34	Top Bouy @ Deck	23° 48,89' N	024° 08,10' W	ES off	± 081	± 0,3	180,0	0,1	1017,2	b/c	049 / 18	24,8	26,3				
		14:36	48"Steel sphere @ Deck	23° 48,83' N	024° 08,10' W	ES off	± 094	± 0,4	270,0	0,0	1017,2	b/c	054 / 18	24,8	26,3				
		14:42	1. Microcat @ Deck	23° 48,83' N	024° 08,11' W	ES off	± 083	± 0,6	20,1	0,2	1017,2	b/c	055 / 18	24,9	26,3				
		15:37	MMP @ Deck	23° 48,98' N	024° 08,05' W	ES off	± 062	± 1,5	247,7	0,2	1016,8	b/c	055 / 17	25,0	26,2				
		15:45	12 x Benthos @ Deck	23° 48,92' N	024° 08,21' W	ES off	± 033	± 0,0	270,0	0,0	1016,9	b/c	079 / 17	25,0	26,3				Mooring line broken below 2 x 6 Benthos
		15:45	Station completed	23° 48,92' N	024° 08,21' W	ES off	± 033	± 0,0	289,5	0,3	1016,9	b/c	079 / 17	25,0	26,3				
860	11.10.2006	18:03	Ship @ Station	23° 49,03' N	024° 08,55' W	ES off	± 056	± 0,0	270,0	0,0	1016,2	b/c	058 / 17	25,0	26,2			W 2	
		18:03	CTD/Rosette t/water	23° 49,03' N	024° 08,55' W	5055,0	± 056	± 0,0	323,2	0,1	1016,2	b/c	058 / 17	25,0	26,2	10,0			Slack with 0,5 - 1,0 m/s
		19:15	Transducer t/water	23° 49,14' N	024° 08,64' W	5056,0	± 055	± 0,0	194,6	0,1	1016,5	b/c	049 / 16	24,8	26,2		4665		
		19:30	Heave CTD	23° 49,07' N	024° 08,66' W	ES off	± 060	± 0,0	197,0	0,1	1016,5	b/c	048 / 16	24,8	26,1		4665		Heave with 0,5 - 1,0 m/s
		21:07	CTD/ Rosette @ deck	23° 48,98' N	024° 08,69' W	ES off	± 066	± 0,0	270,0	0,0	1017,4	b/c	053 / 15	24,7	26,1				
		21:07	Transducer @ deck	23° 48,98' N	024° 08,69' W	ES off	± 066	± 0,0	270,0	0,0	1017,4	b/c	053 / 15	24,7	26,1				
		21:07	Station completed	23° 48,98' N	024° 08,69' W	ES off	± 066	± 0,0	272,9	3,7	1017,4	b/c	053 / 15	24,7	26,1				
861	11.10.2006	22:07	Start Profile	23° 49,17' N	024° 12,77' W	5072,0	± 041	± 0,0	37,4	7,3	1017,6	b/c	055 / 16	24,8	26,2				
		23:12	End Profile	23° 54,98' N	024° 07,91' W	5055,0	± 040	± 0,0	226,4	9,7	1017,5	b/c	051 / 15	24,9	26,1				
862	12.10.2006	09:44	Ship @ Station	23° 48,30' N	024° 15,59' W	5083,0	± 055	± 1,0	47,7	0,1	1016,8	b/c	052 / 17	24,8	26,1			W7	Deployment of mooring EB 1
		09:57	24" sphere t/water	23° 48,40' N	024° 15,47' W	5082,0	± 057	± 1,0	70,0	0,0	1016,8	b/c	052 / 17	24,9	26,0				
		09:59	1. Microcat t/water	23° 48,41' N	024° 15,44' W	5082,0	± 057	± 1,0	53,9	0,1	1016,8	b/c	053 / 17	24,9	26,0				
		10:05	2. Microcat t/water	23° 48,45' N	024° 15,38' W	5082,0	± 057	± 1,0	56,7	0,1	1016,8	b/c	055 / 16	24,9	26,2				
		10:09	3. Microcat t/water	23° 48,48' N	024° 15,33' W	5082,0	± 056	± 1,0	47,7	0,1	1016,8	b/c	055 / 16	24,9	26,2				



Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat.-No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] ] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
		10:15	48" Sphere t/water	23° 48,53' N	024° 15,27' W	5082,0	± 058	± 1,0	61,3	0,0	1016,9	b/c	054 / 16	24,7	26,1				
		10:18	4. Microcat t/water	23° 48,55' N	024° 15,23' W	5082,0	± 063	± 1,0	56,7	0,1	1016,9	b/c	056 / 16	24,6	26,1				
		10:22	5. Microcat t/water	23° 48,58' N	024° 15,18' W	5082,0	± 061	± 1,0	63,6	0,1	1016,9	b/c	056 / 16	24,7	26,0				
		10:26	6. Microcat t/water	23° 48,63' N	024° 15,07' W	5082,0	± 062	± 1,0	59,2	0,1	1017,0	b/c	059 / 16	24,8	26,0				
		10:29	7. Microcat t/water	23° 48,69' N	024° 14,96' W	5082,0	± 063	± 1,0	52,6	0,2	1017,0	b/c	056 / 16	25,0	26,1				
		10:35	8. Microcat + 2 Benth. t/water	23° 48,83' N	024° 14,76' W	5080,0	± 056	± 2,6	9,5	1,2	1017,1	b/c	054 / 16	25,0	26,0				
		10:42	9. Microcat + 2 Benth. t/water	23° 49,98' N	024° 14,55' W	5079,0	± 57	± 2,6	169,3	0,9	1017,1	b/c	064 / 16	24,6	26,1				
		10:47	10. Microcat + 2 Benth. t/water	23° 49,11' N	024° 14,37' W	5078,0	± 058	± 2,6	52,3	0,2	1017,1	b/c	053 / 16	25,0	26,0				
		10:53	11. Microcat + 2 Benth. t/water	23° 49,23' N	024° 14,20' W	5078,0	± 057	± 2,6	270,4	9,1	1017,1	b/c	062 / 16	24,8	26,1				
		10:56	12. Microcat + 2 Benth. t/water	23° 49,30' N	024° 14,11' W	5078,0	± 056	± 2,6	88,8	9,4	1017,1	b/c	063 / 16	24,7	26,1				
		11:05	13. Microcat + 2 Benth. t/water	23° 49,50' N	024° 13,80' W	5078,0	± 056	± 2,4	49,6	0,1	1017,0	b/c	056 / 16	24,7	26,0				
		11:08	14. Microcat t/water	23° 49,57' N	024° 13,71' W	5074,0	± 050	± 2,4	42,5	0,1	1017,0	b/c	057 / 16	24,8	26,0				
		11:10	15. Microcat t/water	23° 49,63' N	024° 13,65' W	5074,0	± 050	± 2,4	48,8	0,2	1017,0	b/c	059 / 15	25,0	26,0				
		11:15	16. Microcat + 2 Benth. t/water	23° 49,75' N	024° 13,50' W	5072,0	± 056	± 2,4	53,9	0,2	1017,0	b/c	053 / 15	24,7	26,1				
		11:20	17. Microcat + 2 Benth. t/water	23° 49,87' N	024° 13,32' W	5070,0	± 053	± 2,4	49,3	0,2	1017,1	b/c	056 / 15	24,8	26,1				
		11:25	18. Microcat + 2 Benth. t/water	23° 49,98' N	024° 13,18' W	5069,0	± 055	± 2,4	53,9	0,3	1017,1	b/c	064 / 15	24,8	26,1				
		11:32	2 x Benthos t/water	23° 50,14' N	024° 12,94' W	5069,0	± 055	± 2,3	49,6	0,2	1017,1	b/c	053 / 15	24,8	26,1				
		11:38	6 x Benthos t/water	23° 50,28' N	024° 12,76' W	5065,0	± 052	± 2,3	51,5	0,1	1017,1	b/c	067 / 15	24,1	26,1				
		11:42	19. Microcat t/water	23° 50,36' N	024° 12,65' W	5065,0	± 055	± 2,3	51,6	0,5	1017,1	b/c	056 / 15	24,5	26,0				
		12:07	20. Microcat t/water	23° 50,65' N	024° 12,25' W	5063,0	± 055	± 2,3	51,3	0,2	1017,1	b/c	056 / 15	24,9	26,0				
		12:13	4 x Benthos t/water	23° 50,76' N	024° 12,10' W	5063,0	± 056	± 2,2	52,0	0,2	1017,0	b/c	067 / 15	24,9	26,0				
		12:17	21. Microcat t/water	23° 50,86' N	024° 11,96' W	5064,0	± 057	± 2,9	47,0	0,3	1016,9	b/c	060 / 15	24,9	26,1				
		12:27	22. Microcat t/water	23° 51,09' N	024° 11,69' W	5062,0	± 057	± 2,9	56,1	0,3	1016,9	b/c	061 / 15	24,8	26,1				
		12:43	23. Microcat t/water	23° 51,25' N	024° 11,43' W	5062,0	± 057	± 2,9	53,1	0,2	1016,8	b/c	069 / 15	24,7	26,0				
		12:39	24. Microcat t/water	23° 51,36' N	024° 11,27' W	5062,0	± 057	± 2,9	49,9	0,3	1016,8	b/c	061 / 15	24,8	26,1				
		12:48	4 x Benth. + Releaser t/water	23° 51,56' N	024° 11,01' W	5060,0	± 055	± 2,1	51,7	0,7	1016,8	b/c	066 / 15	24,9	26,3				
		13:08	Anchorweight t/water	23° 52,00' N	024° 10,40' W	5058,0	± 055	± 2,4	234,0	1,2	1016,5	b/c	064 / 15	24,9	26,1				
		14:23	4 x Benthos @ deck	23° 51,27' N	024° 11,50' W	5058,0	± 014	± 0,0	282,3	0,1	1015,7	b/c	068 / 16	24,9	26,3				Mooring EB 1 recovered (partly)
		14:33	Microcat @ deck	23° 51,30' N	024° 11,65' W	5058,0	± 050	± 0,0	298,7	0,1	1015,7	b/c	065 / 16	24,9	26,3				
		14:43	Microcat @ deck	23° 51,35' N	024° 11,75' W	5058,0	± 058	± 0,0	281,2	0,2	1015,6	b/c	059 / 16	25,0	26,3				Mooring line broken after ~ 4500m
		14:50	Microcat @ deck	23° 51,39' N	024° 11,97' W	5058,0	± 145	± 0,0	238,2	0,3	1015,6	b/c	063 / 16	25,0	26,3				
		15:14	Microcat @ deck	23° 51,22' N	024° 12,27' W	5068,0	± 146	± 0,0	216,2	0,1	1015,4	b/c	056 / 15	24,9	26,4				
		15:21	6 x Benthos @ deck	23° 51,17' N	024° 12,31' W	5068,0	± 132	± 0,0	235,4	0,2	1015,4	b/c	060 / 15	25,2	26,3				
		15:36	Microcat + 2 Benth. @ deck	23° 51,05' N	024° 12,50' W	5065,0	± 155	± 0,0	245,8	0,2	1015,2	b/c	057 / 14	24,8	26,3				
		15:48	Microcat + 2 Benth. @ deck	23° 50,98' N	024° 12,67' W	5066,0	± 146	± 0,0	247,7	0,1	1015,3	b/c	065 / 14	24,9	26,4				
		15:56	Microcat + 2 Benth. @ deck	23° 50,95' N	024° 12,75' W	5065,0	± 145	± 0,0	250,0	0,1	1015,2	b/c	063 / 15	25,0	26,2				
		16:05	Microcat + 2 Benth. @ deck	23° 50,92' N	024° 12,84' W	5066,0	± 157	± 0,0	255,8	0,1	1015,2	b/c	065 / 15	25,1	26,3				
		16:13	Microcat @ deck	23° 50,89' N	024° 12,97' W	5066,0	± 152	± 0,0	257,7	0,0	1015,1	b/c	058 / 15	24,9	26,2				
		16:17	Microcat + 4 Benth. @ deck	23° 50,88' N	024° 13,02' W	5066,0	± 149	± 0,0	251,8	0,1	1015,1	b/c	073 / 15	25,1	26,3				
		16:25	Microcat @ deck	23° 50,85' N	024° 13,12' W	5068,0	± 154	± 0,0	257,7	0,0	1015,1	b/c	072 / 15	25,3	26,1				
		16:28	Microcat + 2 Benth. @ deck	23° 50,84' N	024° 13,17' W	5066,0	± 152	± 0,0	262,2	0,1	1015,1	b/c	063 / 15	24,9	26,2				
		16:35	Microcat + 2 Benth. @ deck	23° 50,83' N	024° 13,25' W	5067,0	± 153	± 0,0	270,0	0,0	1015,0	b/c	066 / 15	25,2	26,3				
		16:38	Microcat + 2 Benth. @ deck	23° 50,83' N	024° 13,30' W	5068,0	± 151	± 0,0	270,0	0,1	1015,0	b/c	065 / 15	25,0	26,3				
		16:42	Microcat + 2 Benth. @ deck	23° 50,83' N	024° 13,36' W	5068,0	± 151	± 0,0	261,1	0,1	1015,0	b/c	062 / 15	25,1	26,3				
		16:47	Microcat @ deck	23° 50,82' N	024° 13,43' W	5068,0	± 151	± 0,0	250,0	0,0	1015,0	b/c	066 / 15	25,2	26,3				
		16:50	Microcat @ deck	23° 50,81' N	024° 13,46' W	5068,0	± 151	± 0,0	241,3	0,0	1015,0	b/c	072 / 15	25,2	26,3				
		16:52	Microcat @ deck	23° 50,80' N	024° 13,48' W	5068,0	± 151	± 0,0	250,0	0,0	1015,0	b/c	065 / 15	25,2	26,3				
		16:54	Microcat @ deck	23° 50,79' N	024° 13,51' W	5068,0	± 151	± 0,0	250,0	0,0	1015,0	b/c	065 / 15	25,2	26,3				
		16:56	48" Sphere @ deck	23° 50,78' N	024° 13,54' W	5068,0	± 151	± 0,0	256,3	0,1	1015,0	b/c	065 / 15	25,2	26,3				





Cruise: POS 343  
Principal Scientist: Torsten Kanzow

Station - Log

Mapping 1,1 h Voyage: 1742,1 sm Station: 53,80 h Time for Air sampling:  
Distance: 7,3 sm Time: 308,90 h Stations: 33  
Ø speed: 6,7 kn Ø speed: W-line max.: 4665 m

Stat. No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] +4,3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
		17:02	Microcat @ deck	23° 50,76' N	024° 13,63' W	5068,0	± 152	± 0,0	270,0	0,0	1015,1	b/c	068 / 15	25,0	26,2				
		17:05	Microcat @ deck	23° 50,76' N	024° 13,67' W	5068,0	± 153	± 0,0	270,0	0,0	1015,1	b/c	068 / 15	25,0	26,2				
		17:07	Microcat @ deck	23° 50,76' N	024° 13,70' W	5068,0	± 154	± 0,0	241,3	0,0	1015,1	b/c	071 / 15	25,0	26,2				
		17:08	24" sphere @ deck	23° 50,75' N	024° 13,72' W	5068,0	± 154	± 0,0	270,0	0,0	1015,1	b/c	071 / 15	25,0	26,2				
		17:10	Recoveryline w. Benth. @ deck	23° 50,75' N	024° 13,73' W	5068,0	± 154	± 0,0	70,1	2,8	1015,1	b/c	071 / 15	25,0	26,2				
		17:50	Transducer t/water	23° 51,71' N	024° 10,83' W	ES off	± 137	± 0,0	236,7	0,1	1015,1	b/c	060 / 16	25,4	26,2				Mooring EB 1 recovered (Rest)
		17:55	Transducer @ deck	23° 51,68' N	024° 10,88' W	ES off	± 113	± 0,0	55,0	0,6	1015,1	b/c	072 / 16	25,3	26,2				Try to contact Releaser, answered and released, but didn't come to the surface
		18:06	Transducer t/water	23° 52,00' N	024° 10,38' W	ES off	± 061	± 0,0	294,5	0,1	1015,1	b/c	069 / 16	24,9	26,3				
		18:21	Transducer @ deck	23° 52,05' N	024° 10,50' W	ES off	± 074	± 0,0	270,0	0,0	1015,2	b/c	059 / 16	25,0	26,3				
		18:21	Station completed	23° 52,05' N	024° 10,50' W	ES off	± 074	± 0,0	72,6	5,1	1015,2	b/c	059 / 16	25,0	26,3				End of recovering new EB 1
863	12.10.2006	19:17	Ship @ Station	23° 53,57' N	024° 05,21' W	5049,0	± 116	± 0,0	137,6	0,0	1015,3	b/c	048 / 15	24,9	26,2			W 7	
		19:18	Billings float t/water	23° 53,55' N	024° 05,19' W	5049,0	± 115	± 0,0	180,0	0,0	1015,3	b/c	047 / 15	24,9	26,2				
		19:19	4 x Benthos t/water	23° 53,54' N	024° 05,19' W	5049,0	± 114	± 0,0	137,6	0,0	1015,3	b/c	048 / 15	24,8	26,2				
		19:20	4 x Benthos t/water	23° 53,53' N	024° 05,18' W	5049,0	± 113	± 0,0	148,6	0,0	1015,3	b/c	046 / 15	24,8	26,2				
		19:22	Releaser + 2 x MC t/water	23° 53,50' N	024° 05,16' W	5049,0	± 116	± 0,0	270,0	0,0	1015,3	b/c	051 / 15	24,9	26,2				
		19:22	Station completed	23° 53,50' N	024° 05,16' W	5049,0	± 116	± 0,0	206,5	5,4	1015,3	b/c	051 / 15	24,9	26,1				
864	13.10.2006	06:31	Ship @ Station	23° 48,65' N	024° 07,80' W	5054,0	± 034	± 0,0	137,5	0,0	1015,8	b/c	058 / 15	24,3	26,0			W 4	Mooring EB 2 recovered (2 nd part)
		06:33	Transducer t/water	23° 48,64' N	024° 07,79' W	5087,0	± 091	± 0,0	233,9	0,0	1015,8	b/c	059 / 15	24,3	26,0				
		06:37	Mooring released	23° 48,62' N	024° 07,82' W	ES off	± 133	± 0,0	232,0	0,1	1015,8	b/c	050 / 15	24,2	26,0				
		06:45	Transducer @ deck	23° 48,57' N	024° 07,89' W	ES off	± 143	± 0,0	2,6	0,4	1015,7	b/c	055 / 15	24,6	26,0				
		07:37	Benthos spheres sighted	23° 48,97' N	024° 07,87' W	ES off	± 097	± 0,0	13,8	0,6	1016,1	b/c	068 / 16	24,5	25,9				
		08:00	4 x Benthos @ deck	23° 49,53' N	024° 07,72' W	ES off	± 164	± 0,0	246,4	0,0	1016,2	b/c	060 / 16	24,3	26,1				
		08:03	Microcat @ deck	23° 49,51' N	024° 07,77' W	ES off	± 165	± 0,0	234,9	0,2	1016,2	b/c	060 / 16	24,3	26,1				
		08:17	Microcat @ deck	23° 49,42' N	024° 07,91' W	ES off	± 142	± 0,0	244,9	0,1	1016,4	b/c	066 / 16	24,4	26,1				
		08:22	Microcat @ deck	23° 49,39' N	024° 07,98' W	ES off	± 151	± 0,0	236,7	0,1	1016,5	b/c	063 / 16	24,4	26,0				
		08:27	Microcat @ deck	23° 49,36' N	024° 08,03' W	ES off	± 149	± 0,0	235,2	0,1	1016,6	b/c	062 / 16	24,8	26,0				
		08:37	Microcat + RBR 4737 M @ deck	23° 49,29' N	024° 08,14' W	ES off	± 144	± 0,0	225,8	0,1	1016,7	b/c	051 / 16	24,7	26,0				
		08:46	Microcat @ deck	23° 49,21' N	024° 08,23' W	ES off	± 141	± 0,0	222,5	0,0	1016,9	b/c	060 / 16	24,8	26,0				
		08:48	8 x Benthos @ deck	23° 49,19' N	024° 08,25' W	ES off	± 145	± 0,0	233,9	0,0	1016,9	b/c	064 / 15	24,4	26,0				
		08:50	Releaser @ deck	23° 49,17' N	024° 08,28' W	ES off	± 143	± 0,0	270,0	0,0	1016,9	b/c	061 / 15	24,5	25,9				
		08:50	Station completed	23° 49,17' N	024° 08,28' W	ES off	± 143	± 0,0	44,8	6,1	1016,9	b/c	061 / 15	24,5	25,9				End of recovering new EB 2
865	13.10.2006	09:50	Ship @ Station	23° 53,52' N	024° 03,55' W	ES off	± 148	± 0,0	270,0	0,0	1017,5	b/c	058 / 15	24,9	26,1				Check releaser of EB 2
		09:51	Transducer t/water	23° 53,52' N	024° 03,55' W	ES off	± 148	± 0,0	227,2	0,2	1017,5	b/c	058 / 15	24,9	26,1				
		10:00	Transducer @ deck	23° 53,41' N	024° 03,68' W	ES off	± 146	± 0,0	270,0	0,0	1017,7	b/c	088 / 15	24,8	26,1				
		10:02	Station completed	23° 53,41' N	024° 03,68' W	ES off	± 147	± 0,0	66,6	393,3	1017,7	b/c	088 / 15	24,8	26,1				
866	15.10.2006	08:03	Ship @ Station	26° 29,74' N	017° 24,83' W	3618,0	± 006	± 0,0	318,2	0,0	1015,7	c	025 / 10	22,8	24,2			W 2	
		08:05	CTD/Rosette t/water	26° 29,75' N	017° 24,84' W	3618,0	± 005	± 0,0	263,8	0,4	1015,8	c	028 / 10	22,6	24,2	10			Slack with 0,5 - 1,0 m/s
		09:05	Heave CTD	26° 29,71' N	017° 25,25' W	3618,0	± 154	± 0,0	165,7	0,4	1016,1	c	017 / 10	23,0	24,2		3500		Heave with 0,5 - 1,0 m/s
		10:32	CTD/Rosette an Deck	26° 29,36' N	017° 25,15' W	3617,0	± 108	± 0,0	180,0	0,0	1016,6	b/c	026 / 09	23,1	24,3				
		10:33	Station completed	26° 29,35' N	017° 25,15' W	3617,0	± 108	± 0,0	66,2	117,1	1016,6	b/c	026 / 09	23,1	24,3				
867	16.10.2006	06:15	Ship @ Station	27° 16,65' N	015° 24,99' W	3002,0	± 140	± 0,0	160,4	0,1	1013,7	b/c	258 / 09	22,8	23,4				Recover EBL 2
		06:17	Transducer t/water	27° 16,60' N	015° 24,97' W	ES off	± 140	± 0,0	180,0	0,0	1013,7	b/c	255 / 09	22,9	23,4				
		06:20	Mooring released	27° 16,59' N	015° 24,97' W	ES off	± 160	± 0,0	270,0	0,0	1013,7	b/c	255 / 09	22,9	23,4				
		06:20	Transducer @ deck	27° 16,59' N	015° 24,97' W	ES off	± 160	± 0,0	181,2	0,4	1013,7	b/c	255 / 09	22,9	23,4				
		06:55	Top Buoy sighted	27° 16,15' N	015° 24,98' W	3003,0	± 185	± 0,0	313,2	0,2	1013,8	b/c	264 / 10	22,8	23,4				
		07:14	Top Bouy @ Deck	27° 16,30' N	015° 25,16' W	3007,0	± 211	± 0,0	204,0	0,0	1014,0	b/c	249 / 10	23,1	23,4				
		07:16	6 x Benthos @ deck	27° 16,28' N	015° 25,17' W	3005,0	± 196	± 0,0	180,0	0,0	1014,0	b/c	251 / 10	22,8	23,5				
		07:18	Releaser @ deck	27° 16,25' N	015° 25,17' W	3006,0	± 178	± 0,0	270,0	0,0	1014,0	b/c	251 / 10	23,0	23,4				
		07:18	Station completed	27° 16,25' N	015° 25,17' W	3006,0	± 178	± 0,0	357,6	0,4	1014,0	b/c	251 / 10	23,0	23,4				



**Appendix B : P345 Bridge Log**



Cruise: POS 345  
Principal Scientist: Stuart Cunningham

### Station - Log

Mapping Distance: 0.0 h  
Ø speed: 0.0 sm  
Voyage: 1197.3 sm  
Station: 215.80 h  
Stations: 5.5 kn  
Wireline max.: 4669 m  
Time for Air sampling: 25.05 h

Stat.-No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [m] +4.3m	Course steered [°]	v [kn]	Ground Track [°]	Distance [nm]	Press. [hPa]	Weather	Wind [deg / knts]	Air Temp. [°C]	Water Temp. [°C]	Wire Length [m]	Wire Length max. [m]	Winch	Remarks
	30/11/06	08:00	Start of Research- and Stationwork																
923	30/11/06	08:00	Ship @ Station	24° 36.51' N	022° 22.80' W	4741.0	± 075	± 0.0	82.2	0.1	1018.6	b/c	086 / 15	23.0	24.7			W 2	
		08:05	CTD/Ro t/water	24° 36.52' N	022° 22.72' W	4740.0	± 076	± 0.0	101.3	0.1	1018.8	b/c	072 / 15	23.0	24.6	10			Slack w/0,5 (to 200m) - 1,0 m/sec
		09:07	Heave CTD/Ro	24° 36.50' N	022° 22.61' W	4740.0	± 073	± 0.0	254.6	0.0	1019.1	c	066 / 17	22.9	24.6	3500	3500		Heave w/0,5 - 1,0 m/s
		10:52	CTD/Ro @ deck	24° 36.49' N	022° 22.65' W	4740.0	± 076	± 0.0	270.0	0.0	1019.8	c	091 / 17	22.7	24.7				
		10:52	Station complete	24° 36.49' N	022° 22.65' W	4740.0	± 076	± 0.0	246.2	8.6	1019.8	c	091 / 17	22.7	24.7				
924	30/11/06	12:38	Ship @ Station	24° 33.03' N	022° 31.29' W	4740.0	± 080	± 0.0	270.0	0.0	1019.1	b/c	080 / 14	23.0	24.7			W 2	
		12:39	CTD/Ro t/water	24° 33.03' N	022° 31.29' W	4740.0	± 072	± 0.0	264.3	0.3	1019.0	b/c	087 / 14	23.0	24.7	10			Slack w/0,5 (to 200m) - 1,0 m/sec
		14:09	Heave CTD/Ro	24° 33.00' N	022° 31.62' W	4740.0	± 065	± 0.0	292.7	0.2	1018.0	b/c	059 / 13	23.4	24.7	4642	4642		Heave w/0,5 - 1,0 m/s
		16:09	CTD/Ro @ deck	24° 33.08' N	022° 31.83' W	4772.0	± 072	± 0.0	63.1	0.3	1017.2	b/c	049 / 14	23.1	24.8				
		16:39	Station complete	24° 33.20' N	022° 31.57' W	4771.0	± 072	± 0.0	243.3	103.8	1017.0	b/c	062 / 16	23.6	24.8				
925	30/11/06	07:53	Ship @ Station	23° 46.60' N	024° 13.23' W	5082.0	± 064	± 0.1	12.9	0.0	1018.9	b/c	086 / 15	23.3	25.2			W 7	Deployment of "EB 1"
		08:22	Top Buoy t/water	23° 46.64' N	024° 13.22' W	5079.0	± 072	± 1.3	270.0	0.0	1019.3	b/c	071 / 15	23.0	25.0				
		08:22	24" Steele Sphere t/water	23° 46.64' N	024° 13.22' W	5079.0	± 072	± 1.3	270.0	0.1	1019.3	b/c	071 / 15	23.0	25.0				
		08:27	1. Microcat t/water	23° 46.64' N	024° 13.14' W	5082.0	± 065	± 0.7	270.0	0.0	1019.4	b/c	074 / 15	23.0	25.2				08:25 - 08:34 pull back
		08:33	2. Microcat t/water	23° 46.64' N	024° 13.17' W	5082.0	± 069	± 1.6	61.3	0.2	1019.3	b/c	078 / 15	23.3	25.2				
		08:39	3. Microcat t/water	23° 46.72' N	024° 13.01' W	5080.0	± 062	± 0.7	74.7	0.0	1019.5	b/c	084 / 15	23.2	25.1				
		08:44	40" Steele Sphere t/water	23° 46.73' N	024° 12.97' W	5081.0	± 063	± 1.0	64.1	0.1	1019.5	b/c	072 / 15	23.3	25.2				
		08:49	4. Microcat t/water	23° 46.77' N	024° 12.88' W	5080.0	± 067	± 1.2	67.7	0.1	1019.5	b/c	075 / 15	23.2	25.2				
		08:51	5. Microcat t/water	23° 46.80' N	024° 12.80' W	5080.0	± 067	± 1.3	66.4	0.0	1019.5	b/c	089 / 15	23.1	25.1				
		08:54	6. Microcat t/water	23° 46.82' N	024° 12.75' W	8079.0	± 066	± 1.2	66.4	0.1	1019.6	b/c	087 / 15	23.3	25.1				
		09:01	4x Benthos t/water	23° 46.88' N	024° 12.60' W	5079.0	± 063	± 1.5	64.9	0.1	1019.6	b/c	080 / 15	23.2	25.1				
		09:04	7. Microcat t/water	23° 46.91' N	024° 12.53' W	5080.0	± 062	± 1.6	61.3	0.1	1019.6	b/c	075 / 15	23.1	25.1				
		09:10	8. Microcat t/water	23° 46.95' N	024° 12.45' W	5078.0	± 062	± 1.5	66.4	0.0	1019.7	b/c	072 / 15	23.3	25.1				
		09:11	9. Microcat t/water	23° 46.97' N	024° 12.40' W	5078.0	± 061	± 1.5	61.3	0.1	1019.7	b/c	069 / 15	23.3	25.1				
		09:12	4x Benthos t/water	23° 47.00' N	024° 12.34' W	5077.0	± 061	± 1.6	61.3	0.1	1019.7	b/c	069 / 15	23.3	25.1				
		09:16	10. Microcat t/water	23° 47.05' N	024° 12.24' W	5077.0	± 062	± 1.5	61.3	0.1	1019.8	b/c	078 / 15	23.1	25.1				
		09:20	11. Microcat t/water	23° 47.09' N	024° 12.16' W	5076.0	± 062	± 2.0	61.3	0.1	1019.8	b/c	076 / 15	23.5	25.1				
		09:22	12. Microcat t/water	23° 47.12' N	024° 12.10' W	5075.0	± 062	± 1.6	66.4	0.1	1019.8	b/c	073 / 15	23.5	25.0				
		09:25	5x Benthos t/water	23° 47.16' N	024° 12.00' W	5075.0	± 062	± 1.4	64.9	0.1	1019.9	b/c	078 / 15	23.3	25.0				
		09:28	13. Microcat t/water	23° 47.19' N	024° 11.93' W	5075.0	± 060	± 2.0	61.3	0.1	1019.9	b/c	073 / 15	23.0	25.1				
		09:33	14. Microcat t/water	23° 47.26' N	024° 11.79' W	5074.0	± 061	± 2.0	64.1	0.1	1019.9	b/c	073 / 15	23.3	25.1				
		09:36	15. Microcat t/water	23° 47.30' N	024° 11.70' W	5074.0	± 062	± 1.8	58.7	0.1	1019.9	b/c	079 / 15	23.3	25.1				
		09:39	4x Benthos t/water	23° 47.35' N	024° 11.61' W	5073.0	± 063	± 1.5	72.7	0.1	1019.9	b/c	079 / 15	23.2	25.1				
		09:42	16. Microcat t/water	23° 47.37' N	024° 11.54' W	5072.0	± 063	± 1.5	61.3	0.1	1020.0	b/c	080 / 15	23.3	25.0				
		09:47	17. Microcat t/water	23° 47.41' N	024° 11.46' W	5072.0	± 062	± 1.2	61.3	0.1	1020.0	b/c	081 / 15	23.4	25.0				
		09:52	18. Microcat t/water	23° 47.45' N	024° 11.38' W	5071.0	± 064	± 1.6	64.9	0.1	1020.0	b/c	075 / 15	23.1	25.0				
		09:58	4x Benthos t/water	23° 47.51' N	024° 11.24' W	5069.0	± 065	± 1.4	65.5	0.1	1020.1	b/c	074 / 15	23.5	24.9				
		10:04	19. Microcat t/water	23° 47.56' N	024° 11.12' W	5068.0	± 065	± 1.3	61.3	0.2	1020.2	b/c	075 / 15	23.3	25.0				
		10:14	20. Microcat t/water	23° 47.66' N	024° 10.92' W	5064.0	± 063	± 1.4	64.4	0.2	1020.3	b/c	078 / 15	23.4	24.9				
		10:22	4x Benthos t/water	23° 47.73' N	024° 10.76' W	5062.0	± 063	± 1.0	68.3	0.1	1020.3	b/c	076 / 15	23.3	25.1				
		10:28	21. Microcat t/water	23° 47.77' N	024° 10.65' W	5060.0	± 062	± 1.2	62.5	0.2	1020.4	b/c	076 / 15	23.2	24.9				
		10:40	22. Microcat t/water	23° 47.87' N	024° 10.44' W	5059.0	± 058	± 1.7	62.2	0.3	1024.5	b/c	075 / 15	23.1	24.9				
		10:54	5x Benthos t/water	23° 48.01' N	024° 10.15' W	5058.0	± 057	± 1.5	66.0	0.5	1024.6	b/c	075 / 15	23.3	24.9				11:00 - 11:06 pull back
		11:16	23. Microcat t/water	23° 48.21' N	024° 09.66' W	5056.0	± 056	± 1.5	61.3	0.1	1020.4	b/c	082 / 15	23.3	24.7				
		11:20	24. Microcat t/water	23° 48.25' N	024° 09.58' W	5053.0	± 056	± 1.3	62.8	0.2	1020.6	b/c	080 / 15	23.6	24.8				
		11:27	8x Benthos t/water	23° 48.33' N	024° 09.41' W	5051.0	± 056	± 1.2	61.3	0.5	1020.6	b/c	070 / 15	22.7	24.8				
		11:48	Releaser t/water	23° 48.57' N	024° 08.93' W	5056.0	± 058	± 1.6	270.0	0.0	1020.5	b/c	073 / 16	23.5	24.8				
		11:48	Anchor weight 1300 kg t/water	23° 48.57' N	024° 08.93' W	5056.0	± 058	± 1.6	226.0	1.1	1020.5	b/c	073 / 16	23.5	24.8				
		12:20	Kopfboje getaucht	23° 47.80' N	024° 09.80' W	5048.0	± 071	± 0.8	69.1	0.2	1020.3	b/c	074 / 16	23.5	24.7				
		12:27	Hydrophone t/W	23° 47.87' N	024° 09.60' W	5047.0	± 071	± 0.0	131.2	0.1	1020.2	b/c	076 / 16	23.4	24.6				
		12:41	Hydrophone @ deck	23° 47.83' N	024° 09.55' W	5044.0	± 073	± 0.0	270.0	0.0	1020.2	b/c	079 / 16	23.3	24.8				



Cruise: POS 345  
Principal Scientist: Stuart Cunningham

### Station - Log

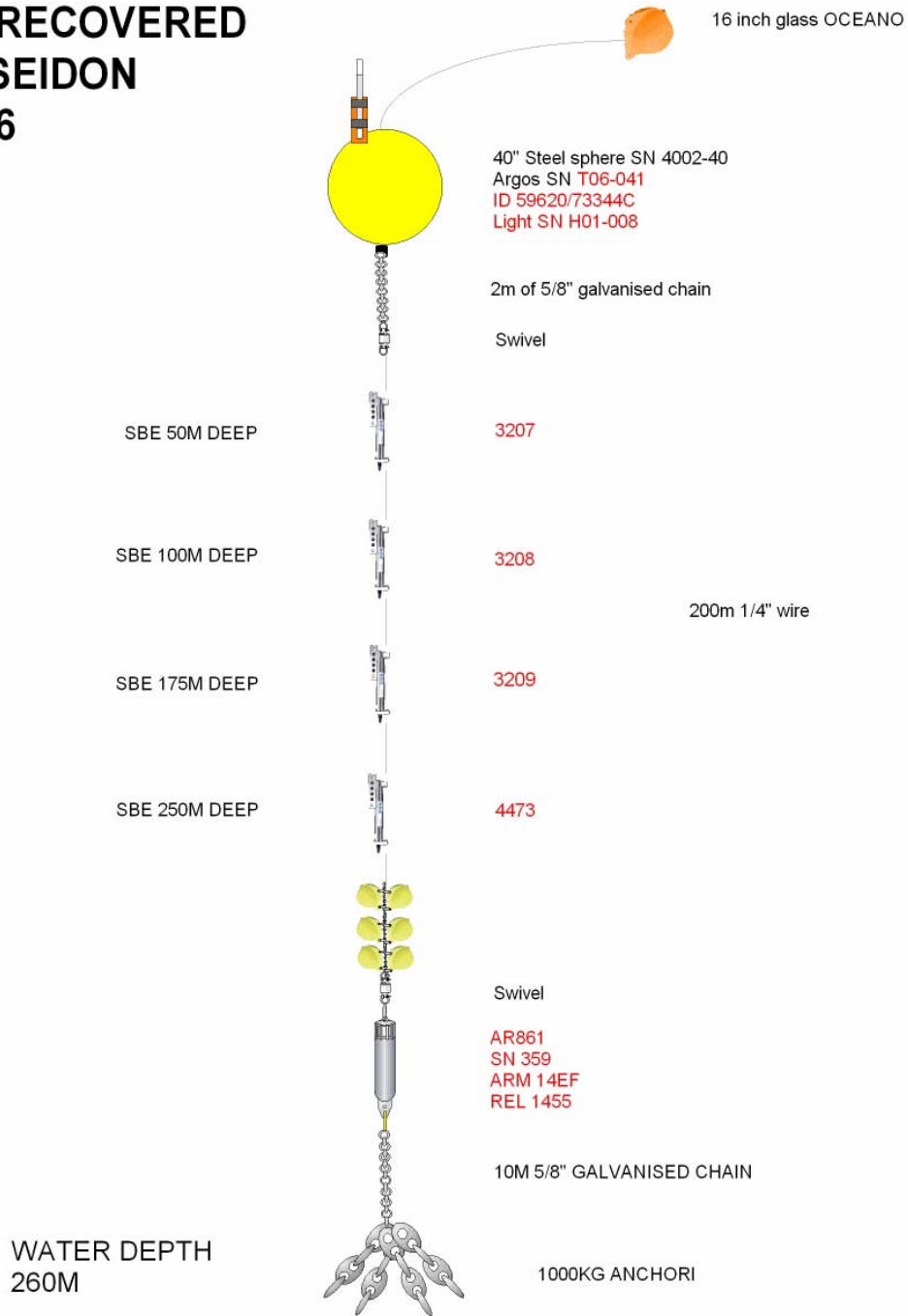
Mapping Distance: 0.0 h  
Ø speed: 0.0 sm  
Voyage: 1197.3 sm  
Station: 215.80 h  
Stations: 7  
Wireline max.: 4669 m  
Time for Air sampling: 25.05 h

Stat. No.	Date	Time UTC	Description	LATITUDE	LONGITUDE	WD [ m ] +4.3m	Course steered [ ° ]	v [ kn ]	Ground Track [ ° ]	Distance [ nm ]	Press. [ hPa ]	Weather	Wind [ deg / knts ]	Air Temp. [ °C ]	Water Temp. [ °C ]	Wire Length [ m ]	Wire Length max. [ m ]	Winch	Remarks
926	1/12/06	12:41	Station completed	23° 47.83' N	024° 09.55' W	5044.0	± 073	± 0.0	269.4	5.1	1020.2	b/c	079 / 16	23.3	24.8				
		13:54	Ship @ Station	23° 47.78' N	024° 15.08' W	5081.0	± 084	± 0.0	270.0	0.0	1019.4	b/c	084 / 15	24.0	25.3			W 2	
		13:56	CTD/Ro t/water	23° 47.78' N	024° 15.07' W	5082.0	± 081	± 0.0	150.1	0.3	1019.3	b/c	076 / 15	23.6	25.2	10			Slack w/0.5 (to 200m) - 1.0 m/sec
		15:30	Heave CTD/Ro	23° 47.51' N	024° 14.90' W	5083.0	± 078	± 0.0	186.0	0.8	1018.4	b	081 / 16	23.8	25.3	4669	4669		Heave w/1.0 m/s (Last layer on winch drum)
		17:32	CTD/Ro @ deck	23° 46.72' N	024° 14.99' W	5081.0	± 075	± 0.0	270.0	0.0	1018.4	b/c	077 / 20	24.0	25.2				
927	2/12/06	17:34	Station complete	23° 46.72' N	024° 14.99' W	5081.0	± 075	± 0.0	23.9	4.5	1018.4	b/c	077 / 20	24.0	25.2				
		07:55	Ship @ Station	23° 50.80' N	024° 13.01' W	5067.0	± 076	± 0.4	68.3	0.1	1021.7	b/c	074 / 25	23.1	24.7			W 7	Auslage "EB 2"
		08:07	Top Buoy w/recovery t/water	23° 50.84' N	024° 12.90' W	5066.0	± 075	± 1.0	270.0	0.0	1021.7	b/c	080 / 25	23.6	24.6				
		08:07	1. Microcat t/water	23° 50.84' N	024° 12.90' W	5066.0	± 075	± 1.0	62.9	0.8	1021.7	b/c	080 / 25	23.6	24.6				
		08:36	2. Microcat t/water	23° 51.20' N	024° 12.13' W	5068.0	± 071	± 1.7	64.1	0.4	1021.7	b/c	073 / 25	23.4	24.8				
		08:50	2x Benthos t/water	23° 51.36' N	024° 11.77' W	5068.0	± 069	± 1.6	270.0	0.0	1022.1	b/c/q	069 / 25	23.2	24.7				
		08:50	3. Microcat t/water	23° 51.36' N	024° 11.77' W	5068.0	± 069	± 1.6	62.9	0.3	1022.1	b/c/q	069 / 25	23.2	24.7				
		09:03	4. Microcat t/water	23° 51.51' N	024° 11.45' W	5068.0	± 070	± 2.3	61.9	0.4	1022.1	b/c/q	074 / 25	23.4	24.7				
		09:20	2x Benthos t/water	23° 51.72' N	024° 11.02' W	5063.0	± 074	± 2.2	270.0	0.0	1022.2	b/c/q	074 / 25	23.4	24.7				
		09:20	5. Microcat t/water	23° 51.72' N	024° 11.02' W	5063.0	± 074	± 2.2	66.4	0.3	1022.2	b/c/q	074 / 25	23.4	24.7				
		09:32	6. Microcat t/water	23° 51.86' N	024° 10.67' W	5063.0	± 068	± 2.2	51.5	0.1	1022.3	b/c/q	075 / 25	23.1	24.7				
		09:32	6x Benthos t/water	23° 51.94' N	024° 10.56' W	5063.0	± 071	± 2.1	270.0	0.0	1022.3	b/c/q	077 / 25	23.4	24.7				
		09:37	Releaser t/water	23° 51.94' N	024° 10.56' W	5063.0	± 071	± 2.1	66.4	0.2	1022.3	b/c/q	077 / 25	23.4	24.7				
		09:52	Anchor weight 400 kg t/water	23° 52.04' N	024° 10.31' W	5063.0	± 072	± 1.8	214.4	1.2	1022.5	b/c/q	075 / 25	23.6	24.8				
		10:12	Hydrophone t/water	23° 51.09' N	024° 11.02' W	5064.0	± 070	± 0.0	352.4	0.8	1022.6	b/c/q	078 / 26	23.5	24.8				
10:59	Hydrophone @ deck	23° 51.91' N	024° 11.14' W	5065.0	± 080	± 0.0	270.0	0.0	1023.3	b/c/q	069 / 25	23.8	24.8						
11:00	Station completed	23° 51.91' N	024° 11.14' W	5065.0	± 080	± 0.0	77.0	7.5	1023.3	b/c/q	069 / 25	23.8	24.8						
928	2/12/06	12:12	Ship @ Station	23° 53.59' N	024° 03.16' W	5042.0	± 075	± 0.0	137.6	0.0	1023.2	b/c/q	069/27	23.6	24.7			W 4	Aufnahme "EB 2"
		12:14	Hydrophone t/water	23° 53.58' N	024° 03.15' W	5042.0	± 071	± 0.0	118.7	0.0	1023.1	b/c/q	072 / 27	23.6	24.7				
		12:17	Mooring released	23° 53.57' N	024° 03.13' W	5042.0	± 072	± 0.0	270.0	0.0	1023.1	b/c/q	077 / 27	23.6	24.6				
		12:17	Hydrophone @ deck	23° 53.57' N	024° 03.13' W	5042.0	± 072	± 0.0	270.0	0.0	1023.1	b/c/q	077 / 27	23.6	24.6				
		12:18	Mooring sighted	23° 53.57' N	024° 03.12' W	5042.0	± 072	± 0.0	50.6	0.1	1023.0	b/c/q	072 / 27	23.4	24.6				
		12:45	48" Steele Sphere @ deck	23° 53.66' N	024° 03.00' W	5042.0	± 097	± 0.0	210.2	0.1	1022.8	b/c/q	068 / 27	23.5	24.6				
		12:51	1. Microcat @ deck	23° 53.55' N	024° 03.07' W	5042.0	± 150	± 0.0	214.1	1.5	1022.7	b/c/q	060 / 26	24.1	24.8				
		14:18	MMP @ deck	23° 52.28' N	024° 04.01' W	5042.0	± 131	± 0.0	270.0	0.0	1021.5	b/c/q	057 / 28	23.4	24.8				
		14:18	2. Microcat @ deck	23° 52.28' N	024° 04.01' W	5042.0	± 131	± 0.0	230.6	0.1	1021.5	b/c/q	057 / 28	23.4	24.8				
		14:26	3. Microcat @ deck	23° 52.22' N	024° 04.09' W	5042.0	± 149	± 0.0	238.2	0.3	1021.3	b/c/q	056 / 28	23.9	24.8				
		14:42	4. Microcat @ deck	23° 52.05' N	024° 04.39' W	5042.0	± 148	± 0.0	270.0	0.0	1021.4	b/c/q	066 / 28	23.9	24.7				
		14:42	6x Benthos @ deck	23° 52.05' N	024° 04.39' W	5042.0	± 148	± 0.0	229.6	0.2	1021.4	b/c/q	066 / 28	23.9	24.7				
		14:54	5. Microcat @ deck	23° 51.91' N	024° 04.57' W	5042.0	± 136	± 0.0	270.0	0.1	1021.3	b/c/q	066 / 28	23.2	24.8				
		14:56	6x Benthos @ deck	23° 51.91' N	024° 04.63' W	5042.0	± 154	± 0.0	228.8	0.1	1021.3	b/c/q	068 / 28	23.9	24.8				
		15:00	2x Benthos @ deck	23° 51.87' N	024° 04.68' W	5042.0	± 144	± 0.0	259.7	0.1	1021.2	b/c/q	068 / 28	23.3	24.7				
15:03	4x Benthos @ deck	23° 51.86' N	024° 04.74' W	5042.0	± 153	± 0.0	222.4	0.0	1021.2	b/c/q	061 / 28	23.6	24.7						
15:05	7. Microcat @ deck	23° 51.83' N	024° 04.77' W	5042.0	± 146	± 0.0	222.4	0.1	1021.2	b/c/q	062 / 28	23.7	24.9						
15:07	Releaser @ deck	23° 51.79' N	024° 04.81' W	5042.0	± 136	± 0.0	199.4	0.3	1021.2	b/c/q	063 / 28	23.8	24.6				Mooring geborgen		
15:28	Station completed	23° 51.53' N	024° 04.91' W	5042.0	± 072	± 0.0	63.3	113.4	1021.2	b/c/q	075 / 28	23.7	24.8						
929	3/12/06	10:03	Ship @ Station	24° 42.51' N	022° 13.80' W	4780.0	± 071	± 0.0	42.3	0.0	1024.5	b/c/q	079 / 29	23.0	24.6			W 2	
		10:07	CTD/Ro t/water	24° 42.54' N	022° 13.77' W	4780.0	± 080	± 0.0	111.5	0.1	1024.5	b/c/q	079 / 29	23.0	24.6				Slack w/0.5 (to 200m) - 1.0 m/sec
		11:18	Heave CTD/Ro	24° 42.49' N	022° 13.63' W	4780.0	± 081	± 0.0	199.8	0.5	1024.9	b/c/q	087 / 28	23.2	24.7	4500		Heave w/1.0 m/s (Last layer on winch drum)	
		13:19	CTD/Ro @ deck	24° 42.06' N	022° 13.80' W	4780.0	± 064	± 0.0	53.7	0.2	1024.0	b/c/q	092 / 25	23.0	24.7				
		13:24	Station complete	24° 42.20' N	022° 13.59' W	4781.0	± 058	± 0.0			1023.9	b/c/q	085 / 25	22.7	24.8				
		13:24	End of Research- and Stationwork																

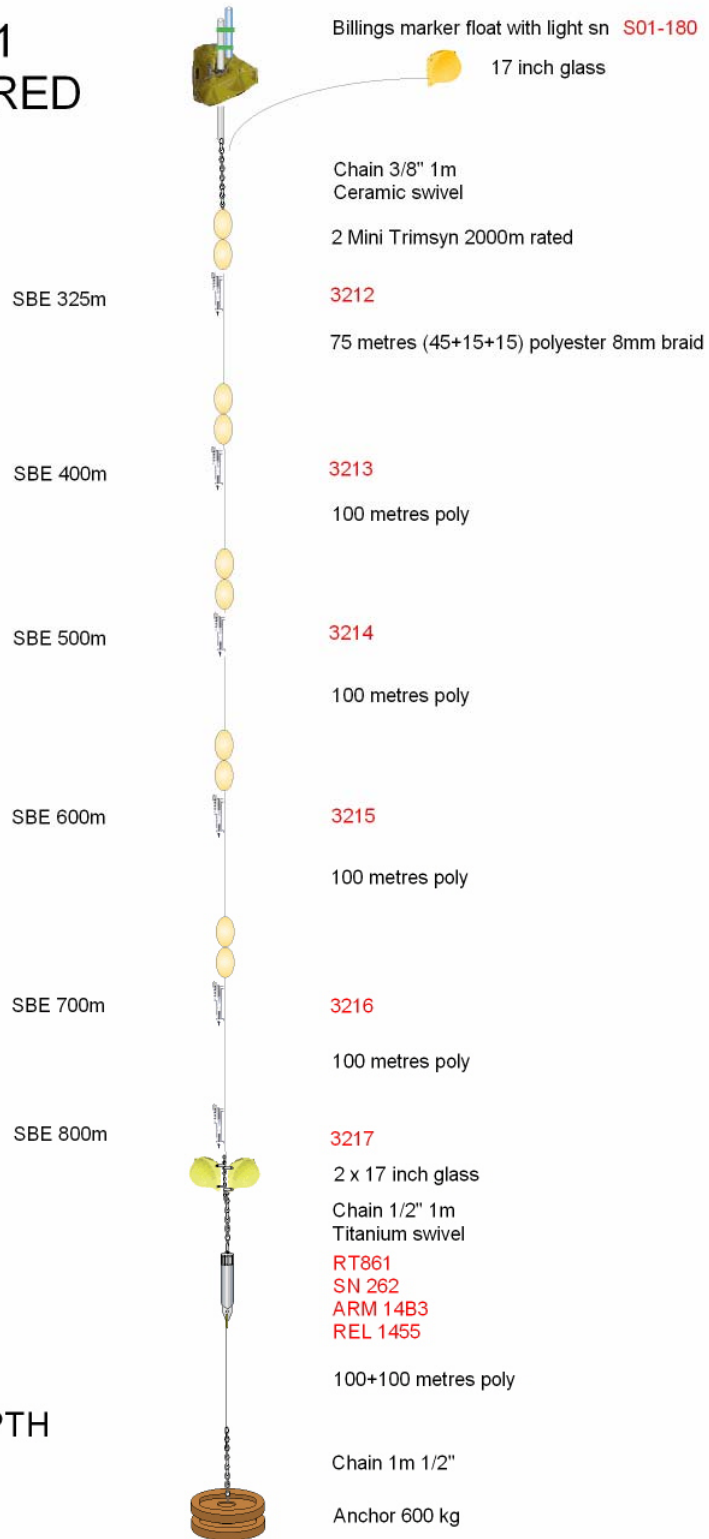
# Appendix C : Mooring Drawings

## P343 : Moorings Recovered

**EBH5 2006/10  
AS RECOVERED  
POSEIDON  
2006**

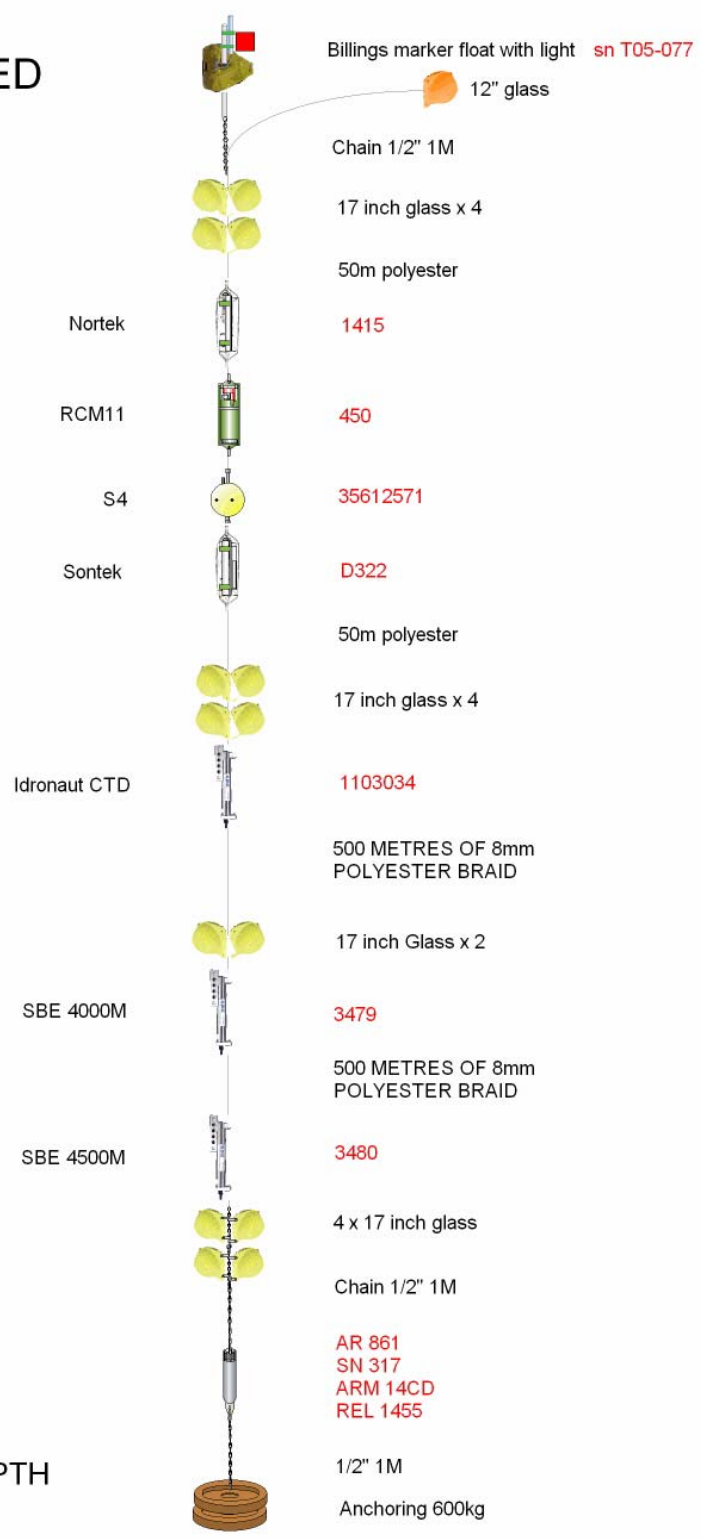


# EBH4 2006/11 AS RECOVERED POSEIDON 2006



WATER DEPTH  
1000M

EBHi 2006/16  
AS RECOVERED  
POSEIDON  
2006



WATER DEPTH  
4510M



**EB1 2006/19  
AS RECOVERED  
POSEIDON  
2006**

- SBE 110M
- SBE 160M
- BUOY 200M
- SBE 250M
- SBE 325M
- SBE 400M
- SBE 475M
- SBE 550M
- SBE 650M
- SBE 750M
- SBE 850M
- SBE 950M
- SBE 1050M
- SBE 1150M
- SBE 1250M
- SBE 1350M
- SBE 1550M
- SBE 1750M
- SBE 1950M
- SBE 2150M
- 2200M
- SBE 2650M
- SBE 3150M
- SBE 3650M
- SBE 4150M
- 4200M
- 4700M
- SBE 4800M



15m recovery line

24" STEEL SPHERE  
WITH ARGOS SN T04-044 ID 46243

3890  
100M 3/16" WIRE  
4178

48" STEEL SN.5218-4801  
ARGOS SN 256 ID 42748 LIGHT SN J12-028  
1M CHAIN AND SWIVEL

4179

4180

4181

4183

4708                    1000M 6-8 WIRE

4709

4710

4711

4712

4713

4714

4715                    12 X17"  
GLASS  
SWIVEL  
1200M

4716                    1000M 6-8 WIRE

4717

4718

4719

4720

4721                    1000M 6-8 WIRE

4722                    10 X17"  
GLASS  
SWIVEL  
3200M

4723                    1000M PARAFIL

4724

4725                    500M PARAFIL

                                 300M PARAFIL

                                 20M PARAFIL

8 X17"  
GLASS  
SWIVEL  
5000M

AR 861 SN 496 ARM 15A5  
AR 661 SN 162 ARM A351 REL A354

10M PARAFIL UNDER RELEASES

10M 1/2" CHAIN

ANCHOR CHAIN 2000 KG

TOTAL LENGTH  
WIRE            4930M  
HARDWARE     25M  
TOTAL           4955M  
THIS ALLOWS 35M  
FOR STRETCH

WATER DEPTH  
5090M CORR.

**EBL1 2005/17  
AS RECOVERED  
POSEIDON  
2006**

BILLINGS FLOAT 3 SPHERE TYPE  
WITH VHF **S/N T01-144** AND  
NOVATECH LIGHT

**2 OFF SBE 26  
SN 419 AND 420**

1/2M 1/2" CHAIN



15 METRES POLYPROP  
RECOVERY LINE 20mm

15 METRES 10mm  
POLYESTER ROPE

6 OFF 17 INCH SPHERES

15 METRES 10mm  
POLYESTER ROPE

ACOUSTIC RELEASE  
**SN365 ARM 14F5**

500 KG ANCHOR  
WELDED, SPINDLE

**EBL2 2005/13  
AS RECOVERED  
POSEIDON  
2006**

BILLINGS FLOAT 4 SPHERE TYPE  
WITH VHF AND LIGHT

1/2M 1/2" CHAIN

15 METRES POLYPROP  
RECOVERY LINE

15 METRES 10mm  
POLYESTER ROPE

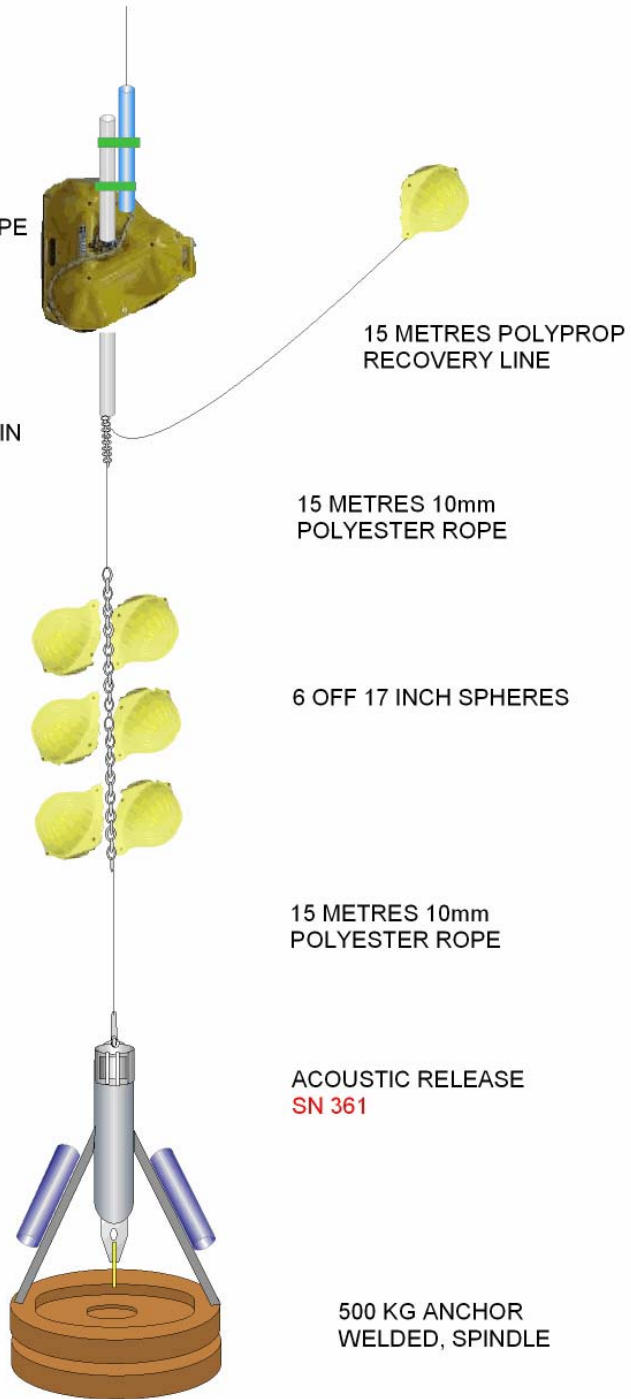
6 OFF 17 INCH SPHERES

15 METRES 10mm  
POLYESTER ROPE

ACOUSTIC RELEASE  
SN 361

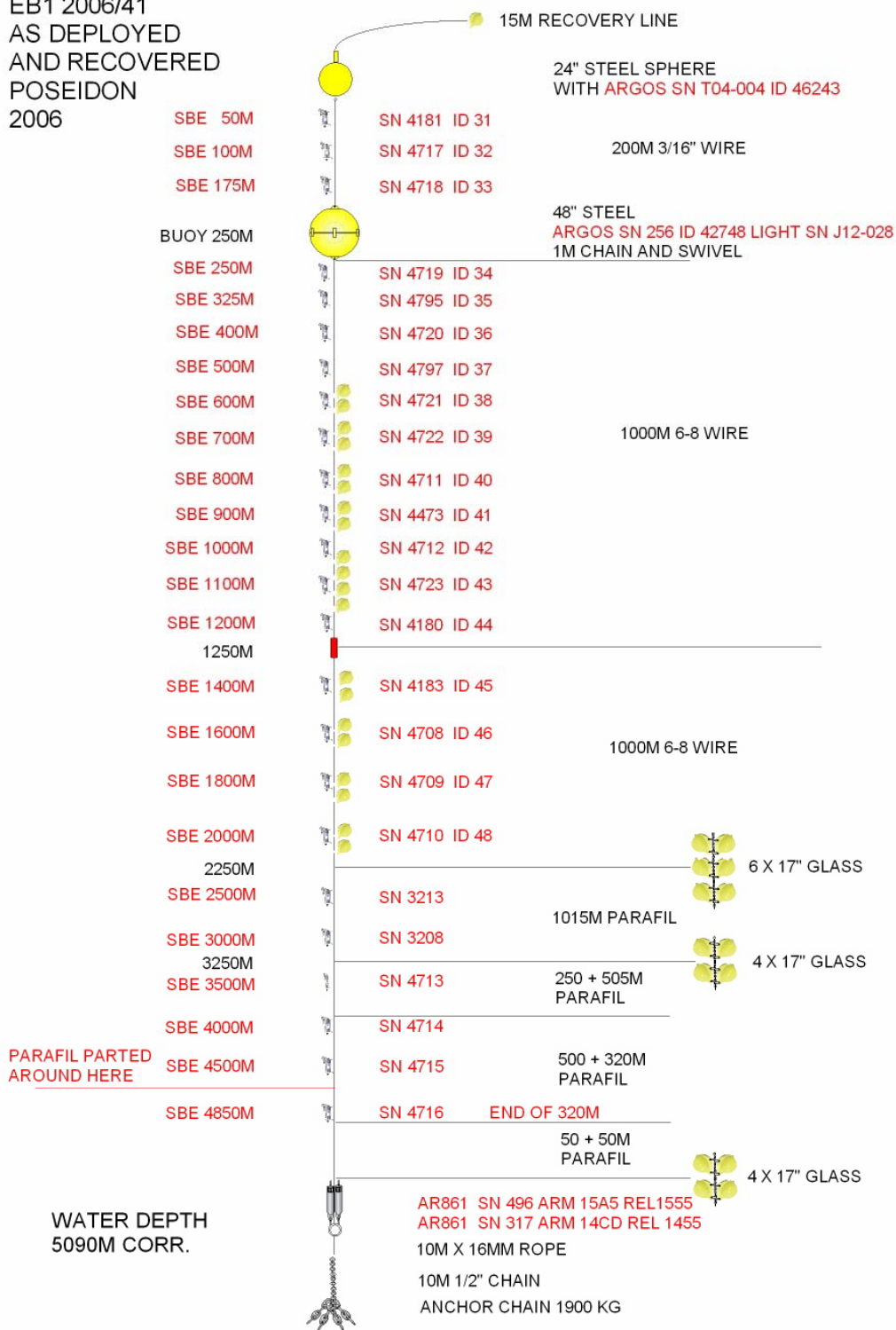
2 OFF SBE 26  
SN 417 AND 418

500 KG ANCHOR  
WELDED, SPINDLE

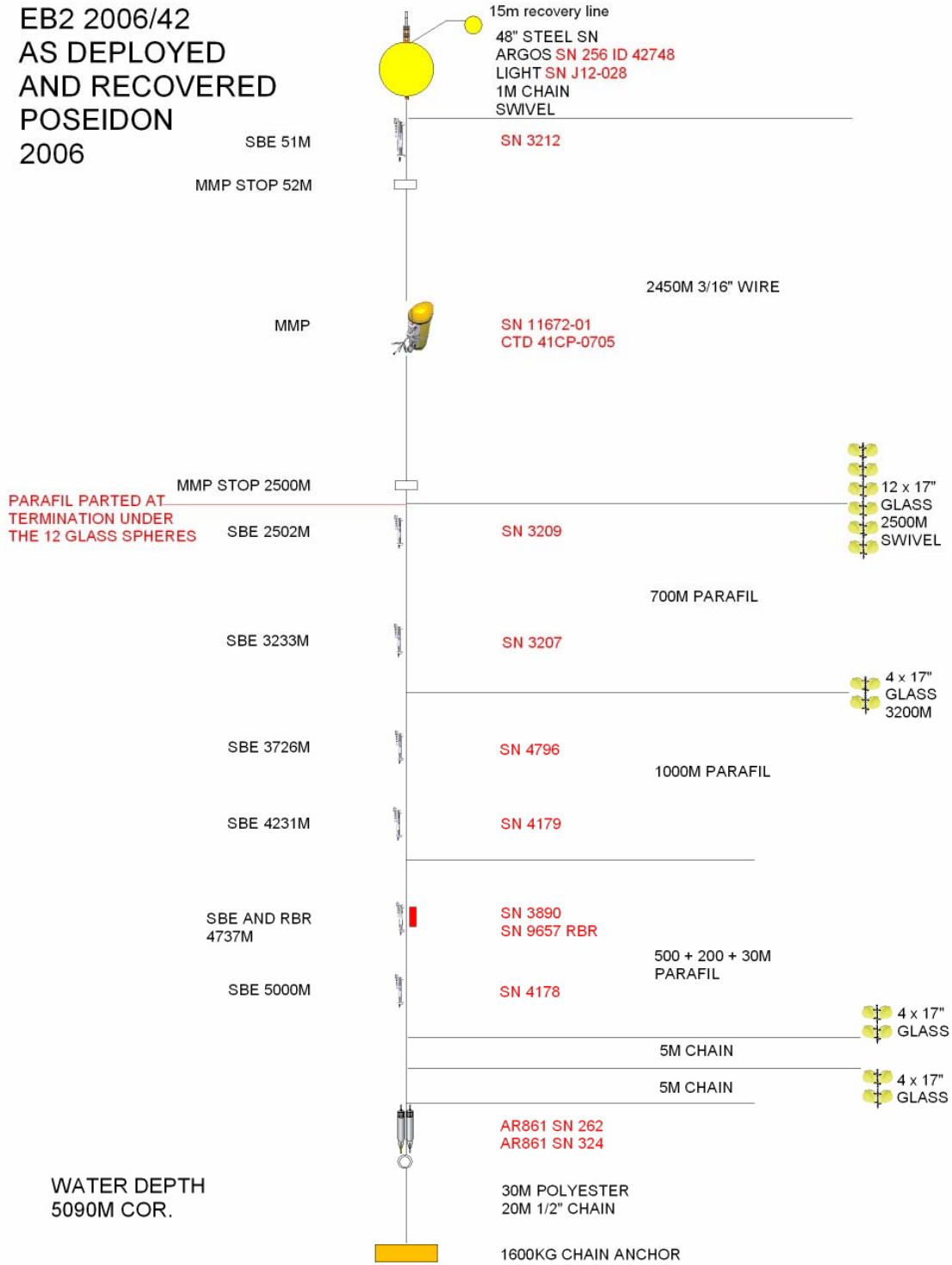


# P343 : Moorings Deployed

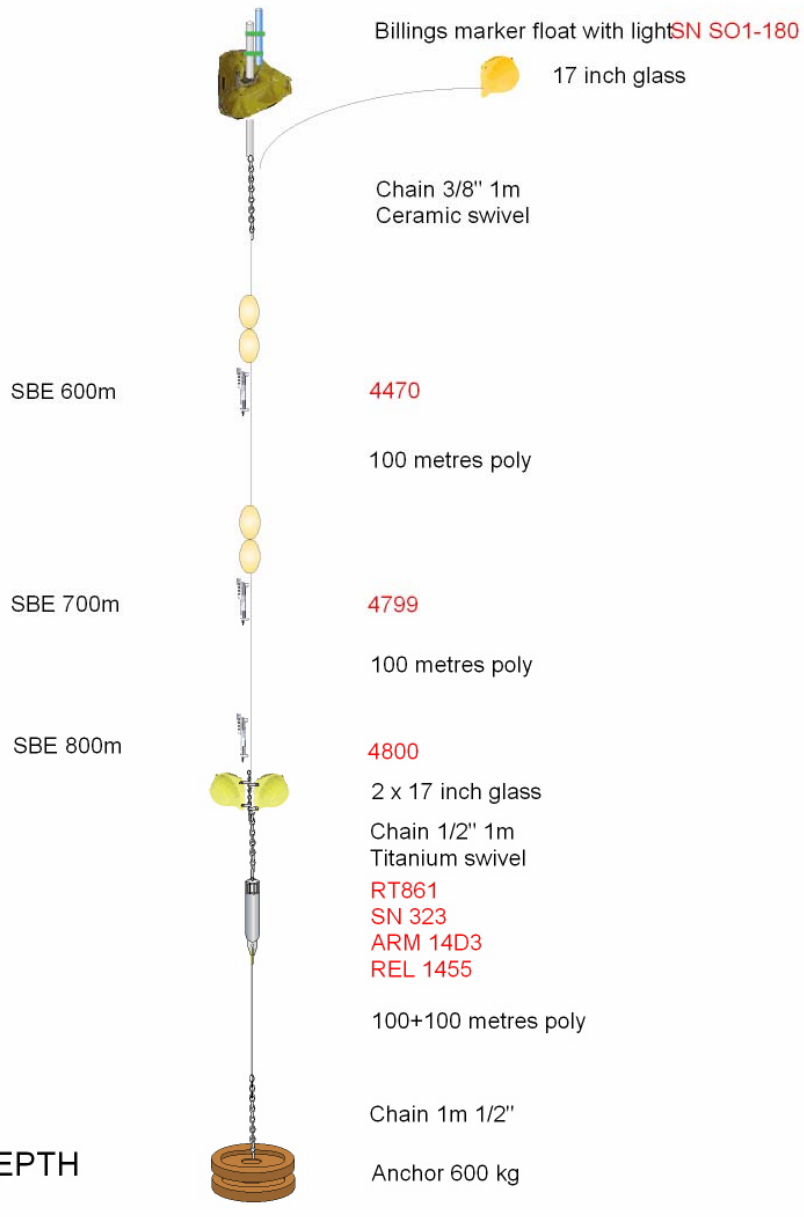
EB1 2006/41  
AS DEPLOYED  
AND RECOVERED  
POSEIDON  
2006



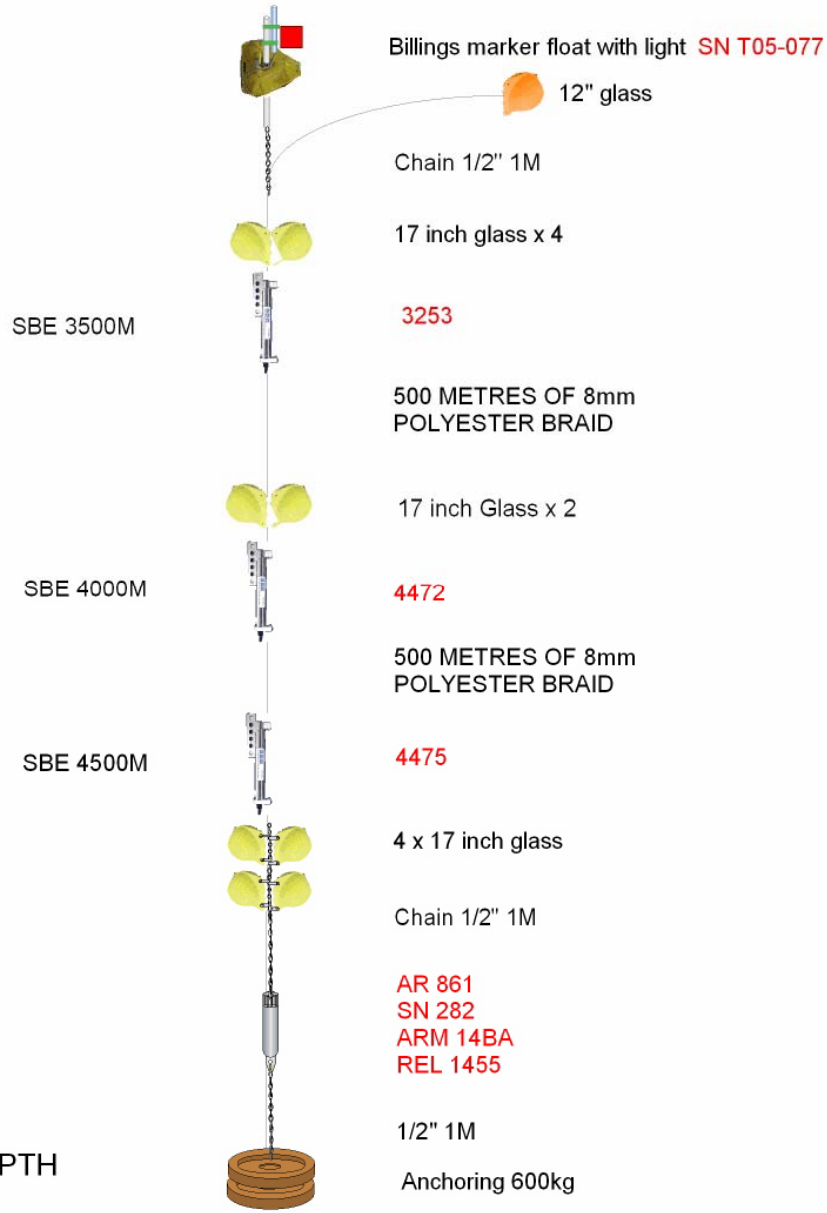
EB2 2006/42  
AS DEPLOYED  
AND RECOVERED  
POSEIDON  
2006



EBH4 2006/43  
 AS DEPLOYED  
 P343  
 2006



EBHi 2006/44  
 AS DEPLOYED  
 POSEIDON  
 2006



**EBL1 2006/45  
AS DEPLOYED  
POSEIDON  
2006**

BILLINGS FLOAT WITH  
VHF SN U08-009  
LIGHT SN H01-008

Chain 3/8" 1M.



17 inch glass

15m yellow/black  
20mm polyp

Link

4 x 17 inch glass

15m polyprop

4 x 17 inch glass

15M polyester

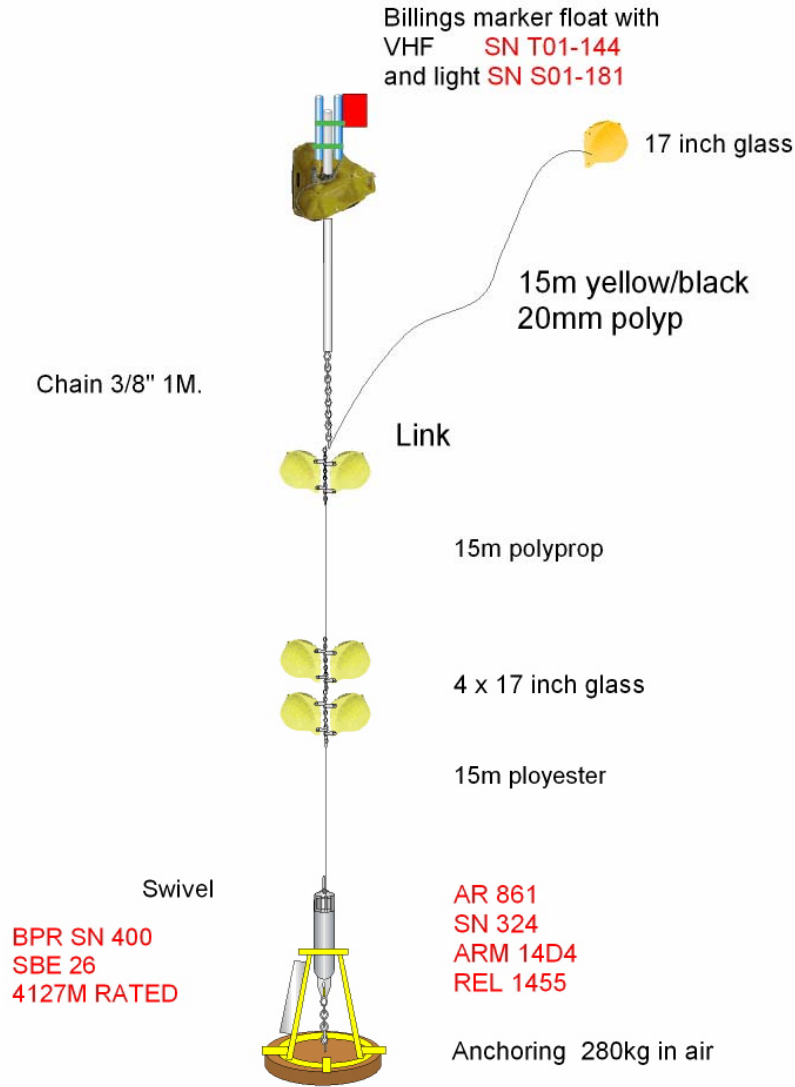
RT861 SN 359 ARM 14EF REL 1455  
RT661 SN 162 ARM A351 REL A354

2 OFF SBE 26  
SN 0420  
SN 0419  
BOTH 6885M RATED

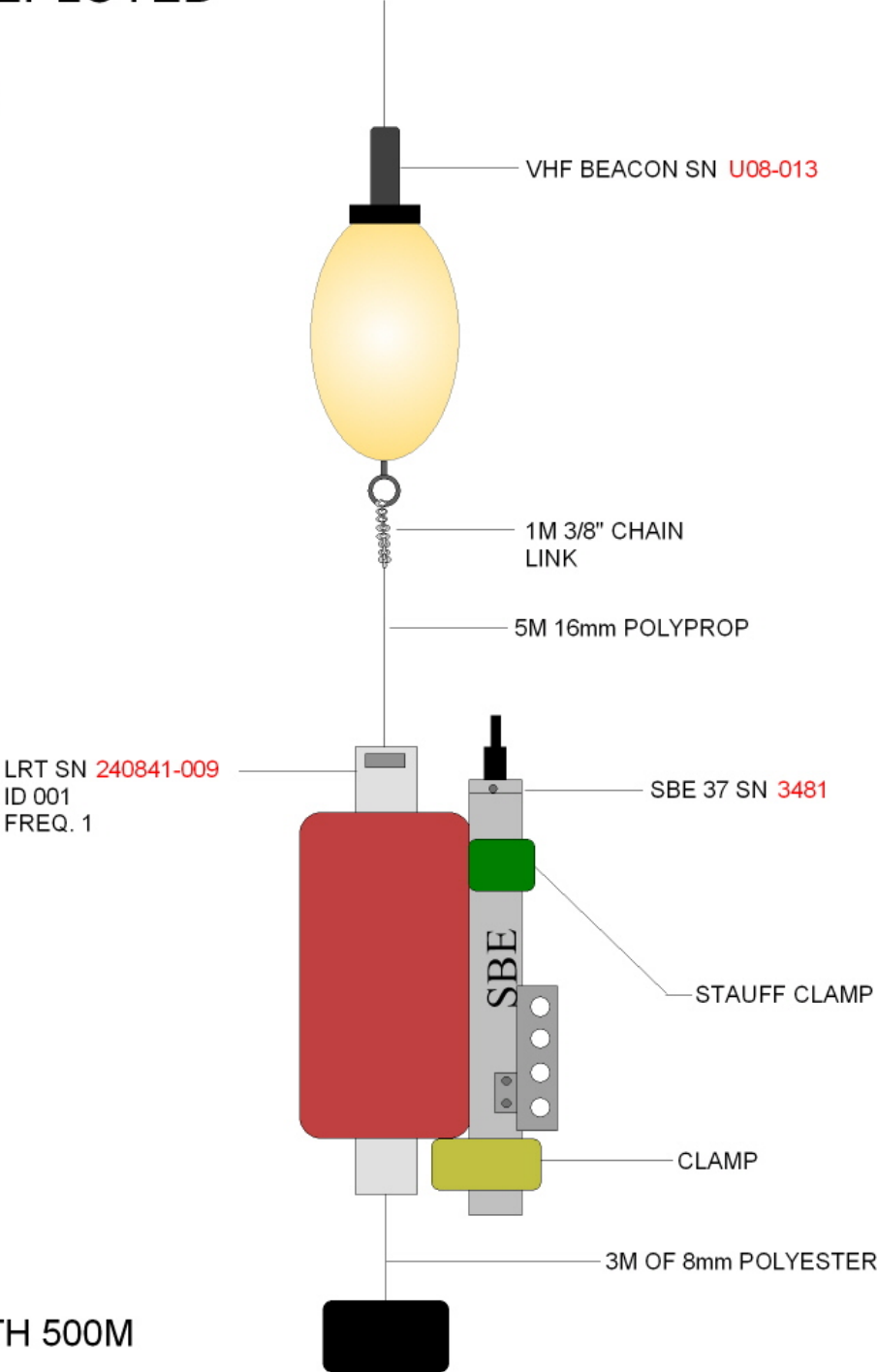
Anchoring 280kg in air



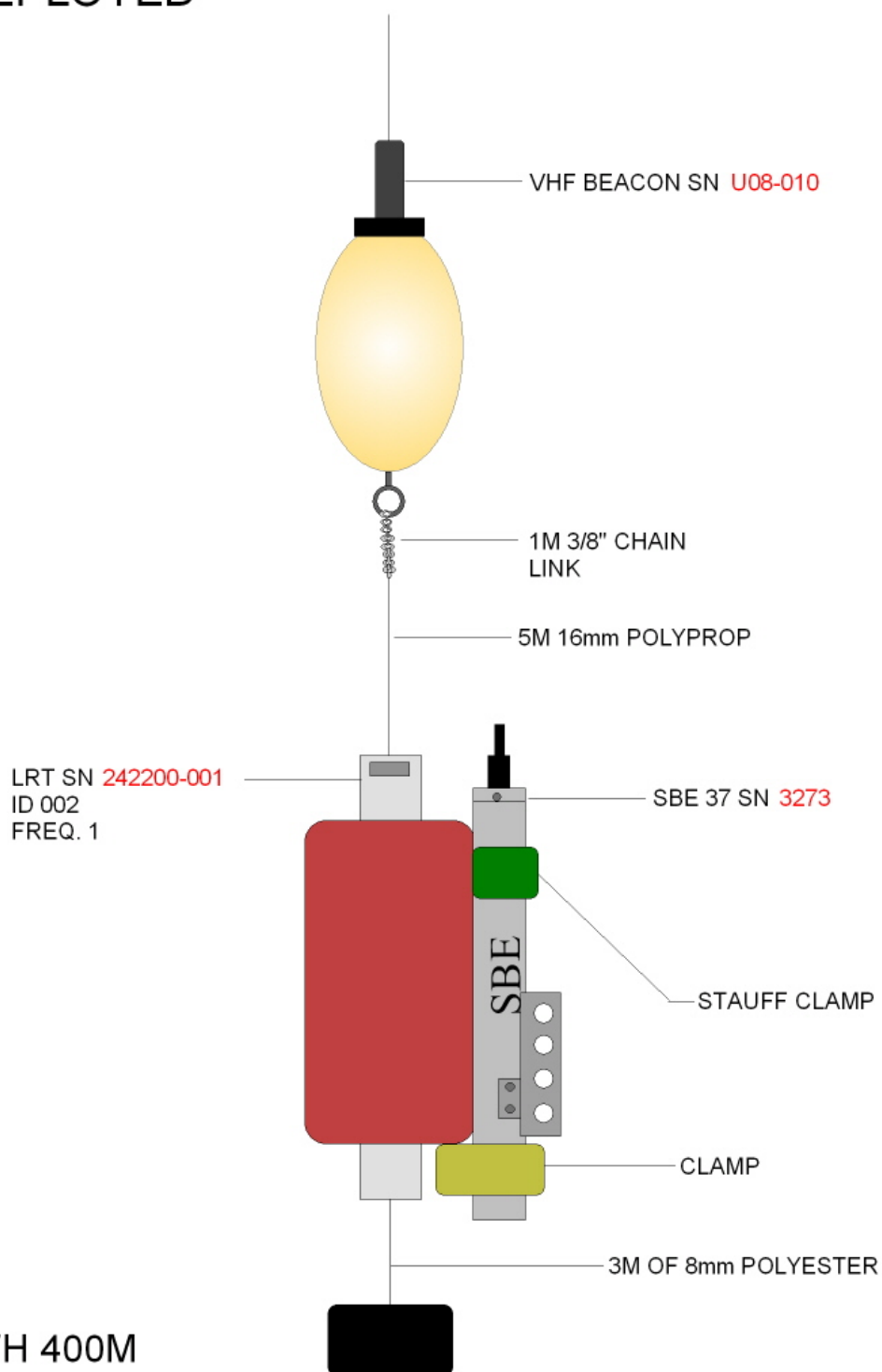
**EBL2 2006/46  
AS DEPLOYED  
POSEIDON  
2006**



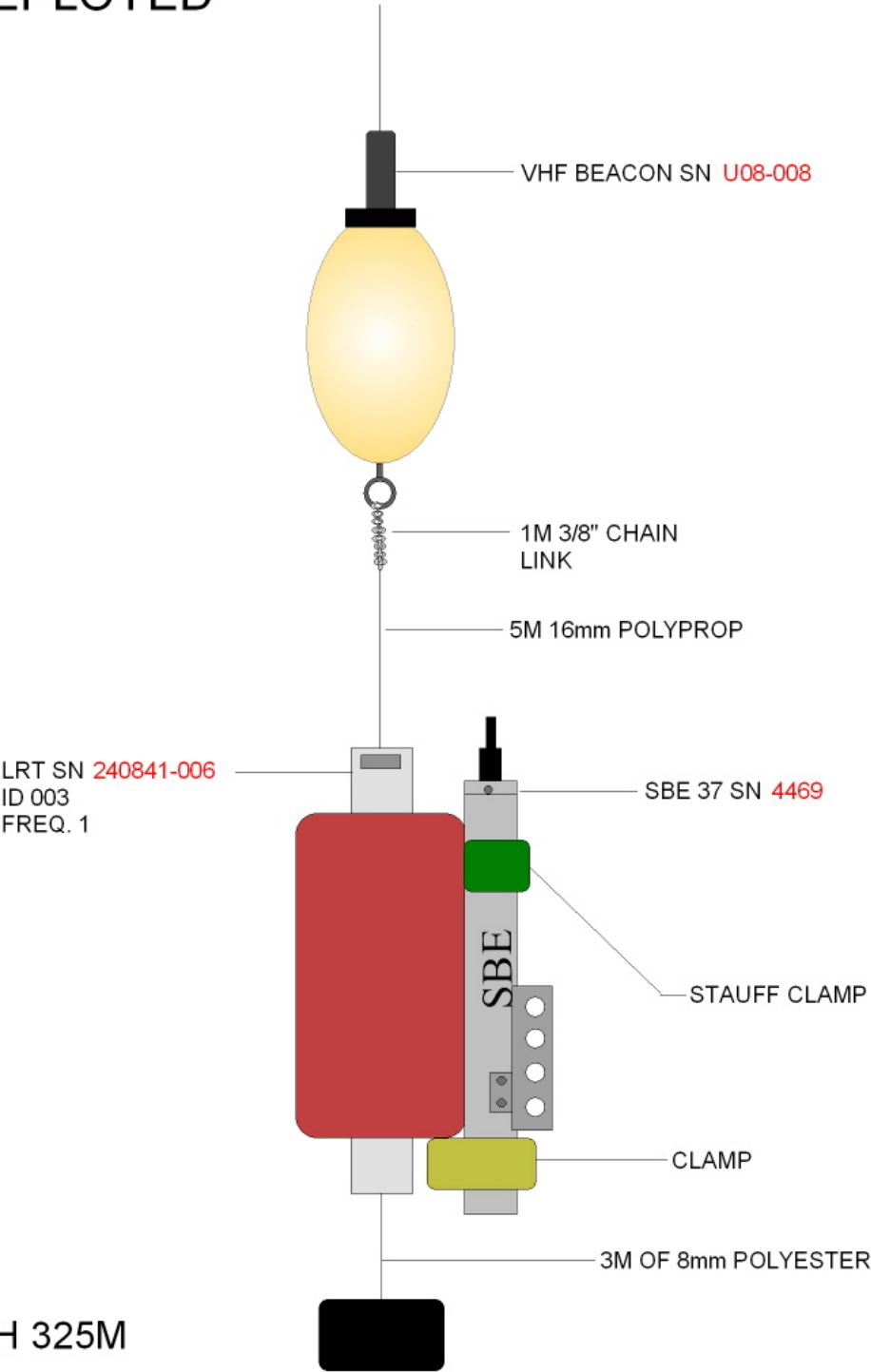
EBM1  
AS DEPLOYED  
P343  
2006



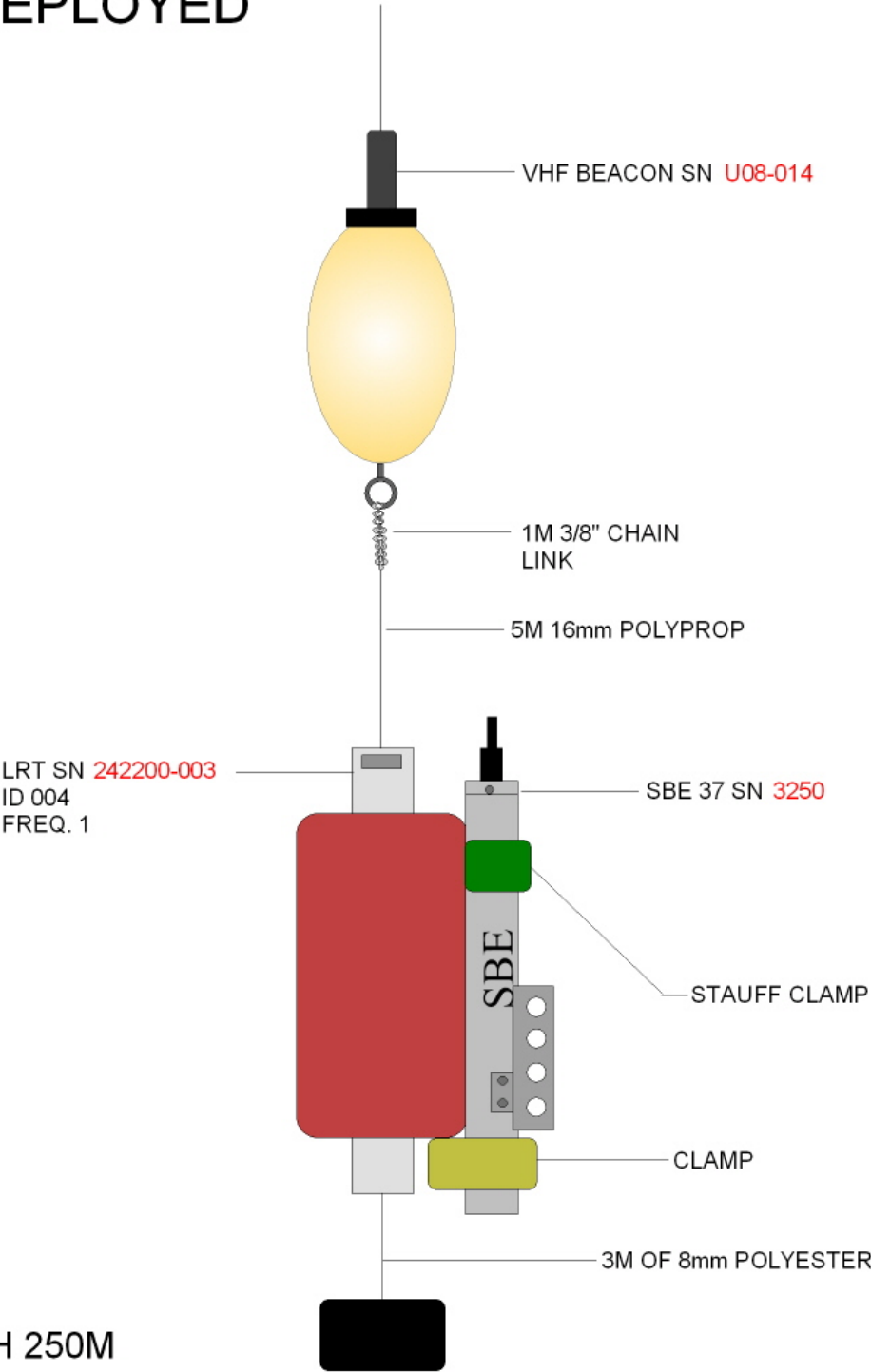
EBM2  
AS DEPLOYED  
P343  
2006



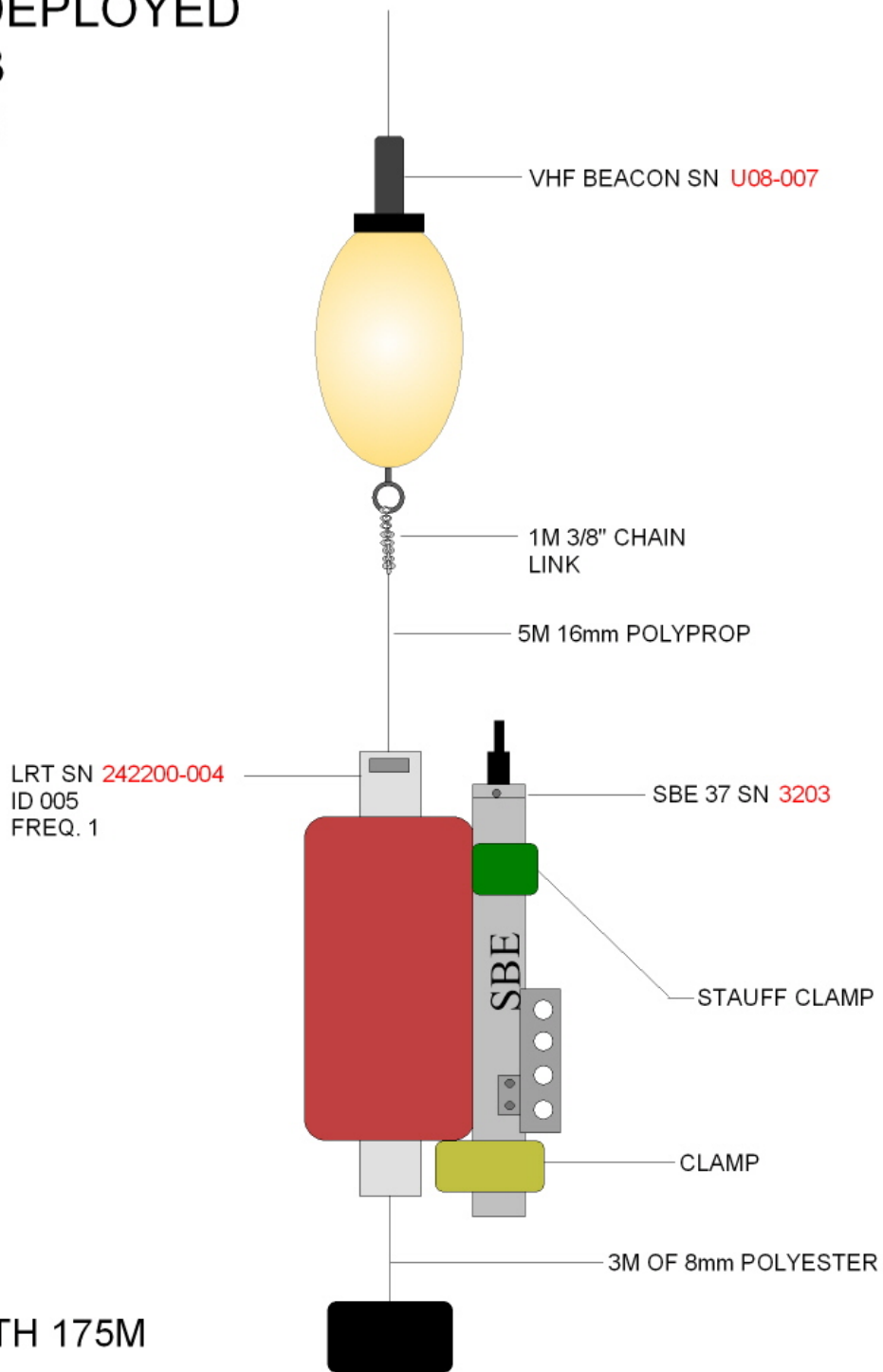
EBM3  
AS DEPLOYED  
P343  
2006



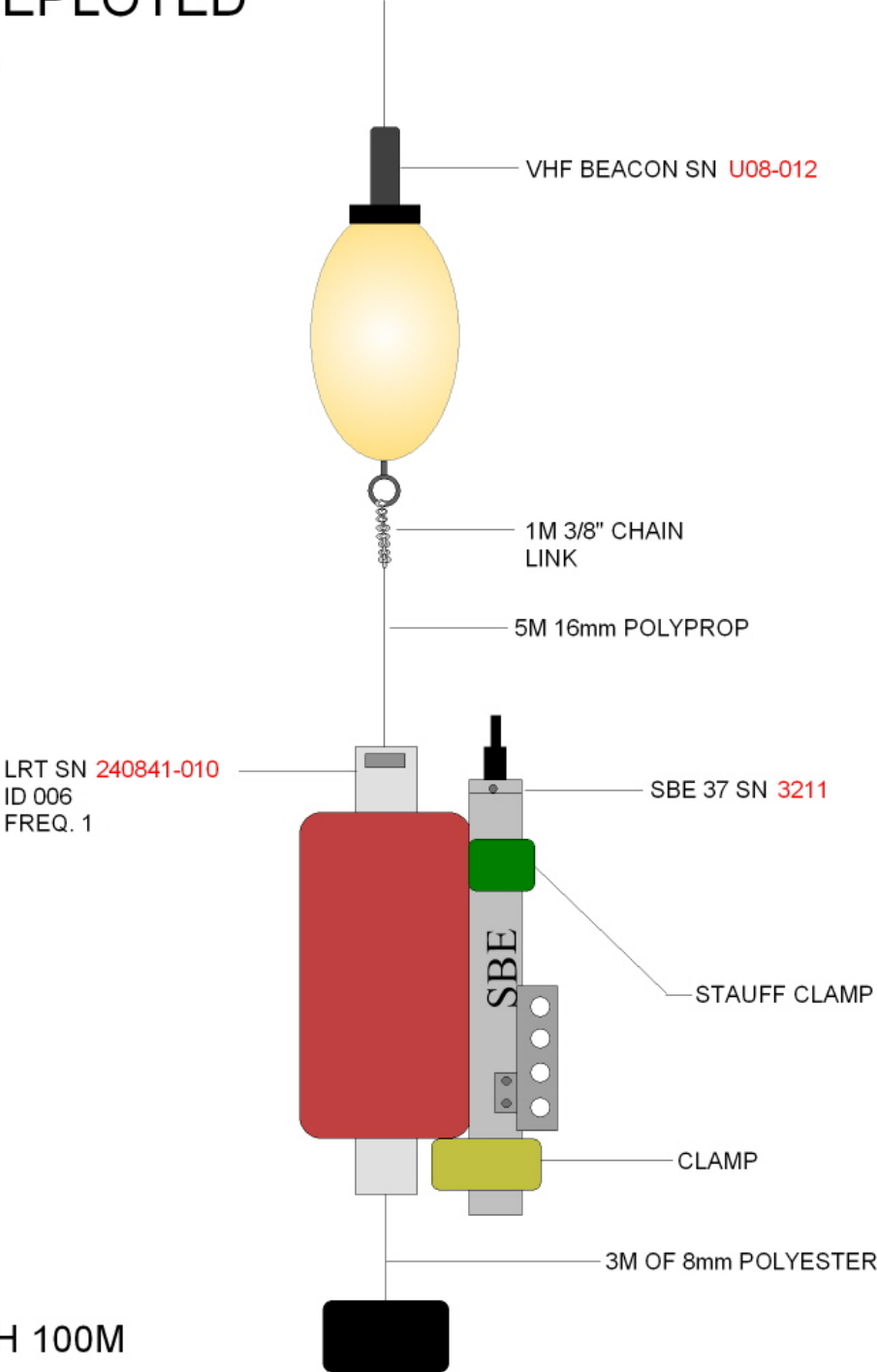
EBM4  
AS DEPLOYED  
P343  
2006



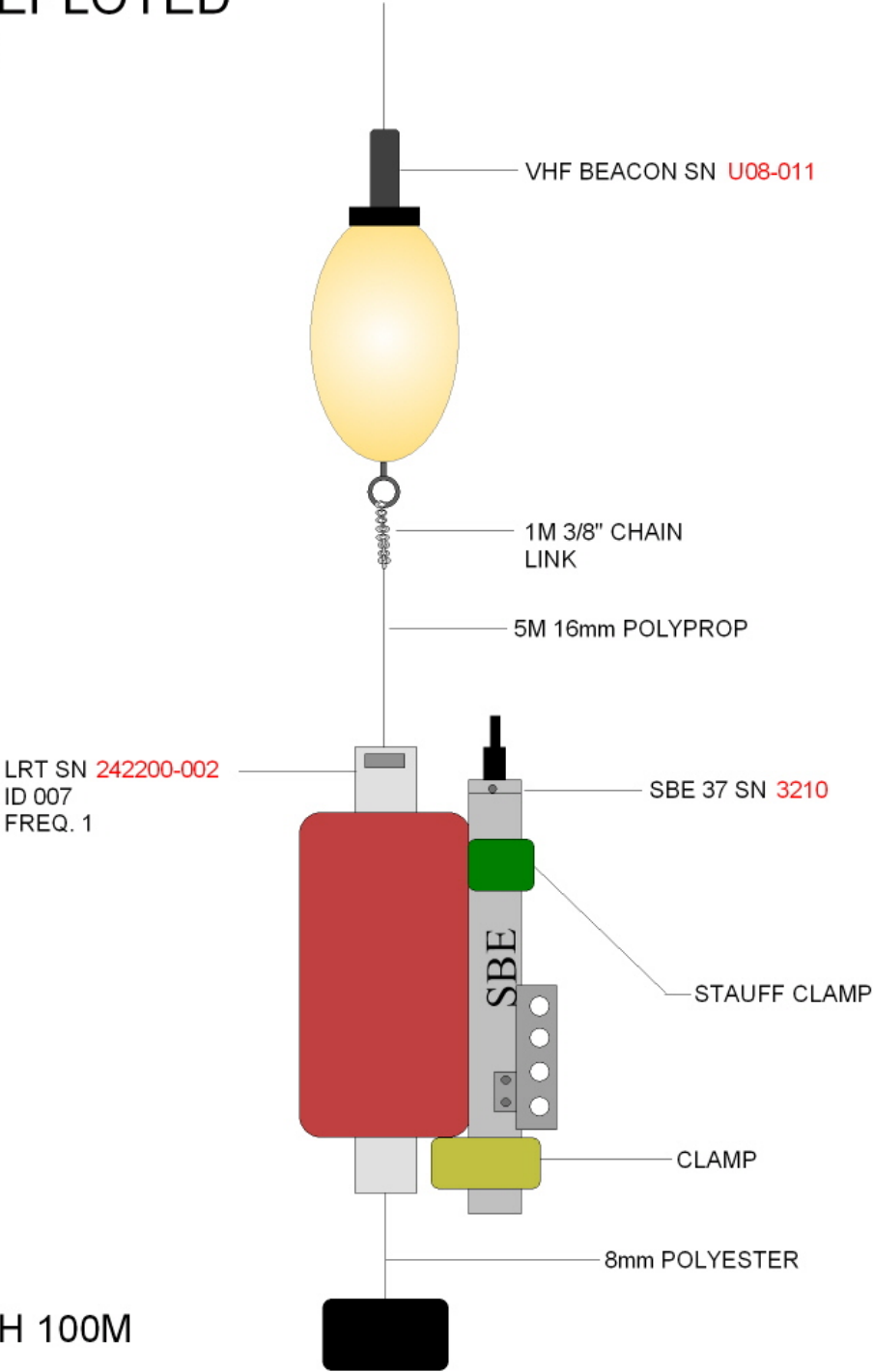
EBM5  
AS DEPLOYED  
P343  
2006



EBM6  
AS DEPLOYED  
P343  
2006



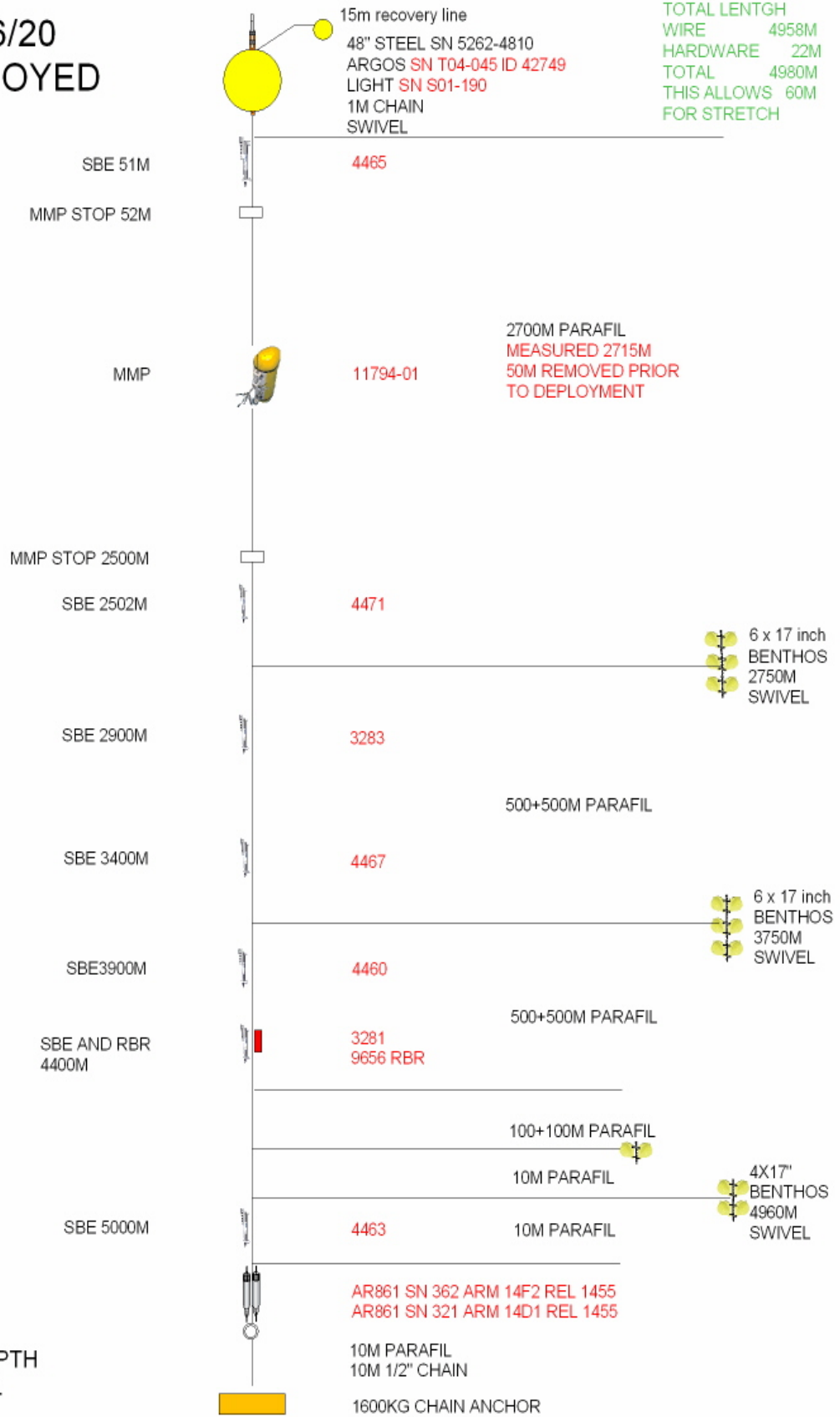
EBM7  
AS DEPLOYED  
P343  
2006





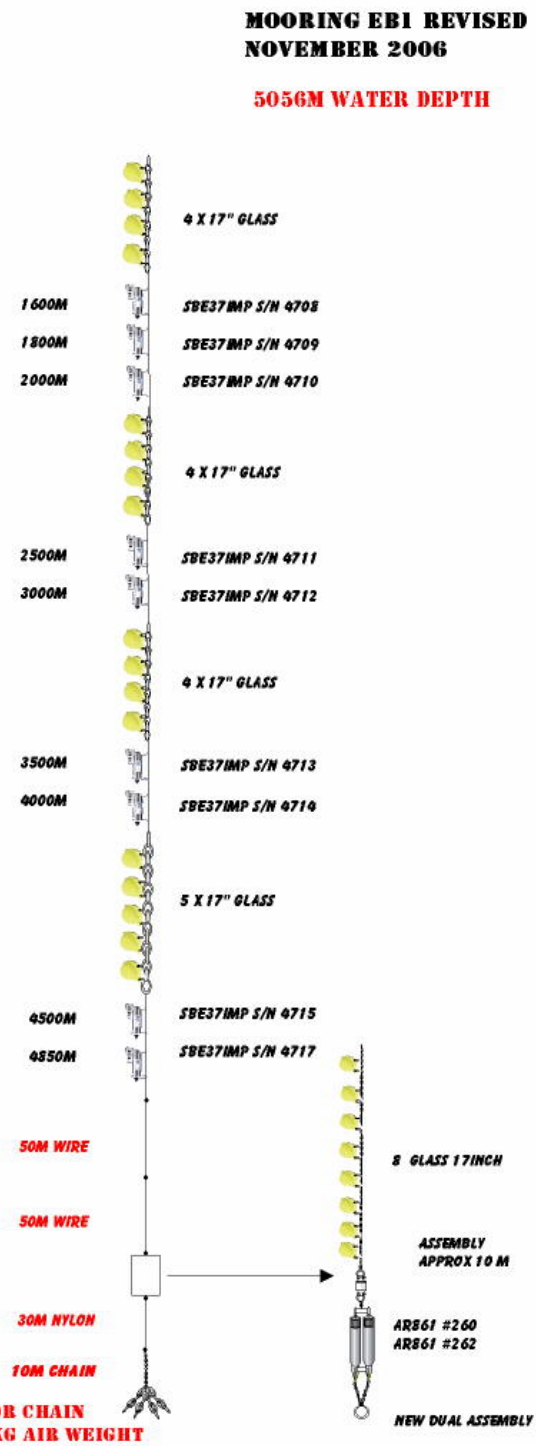
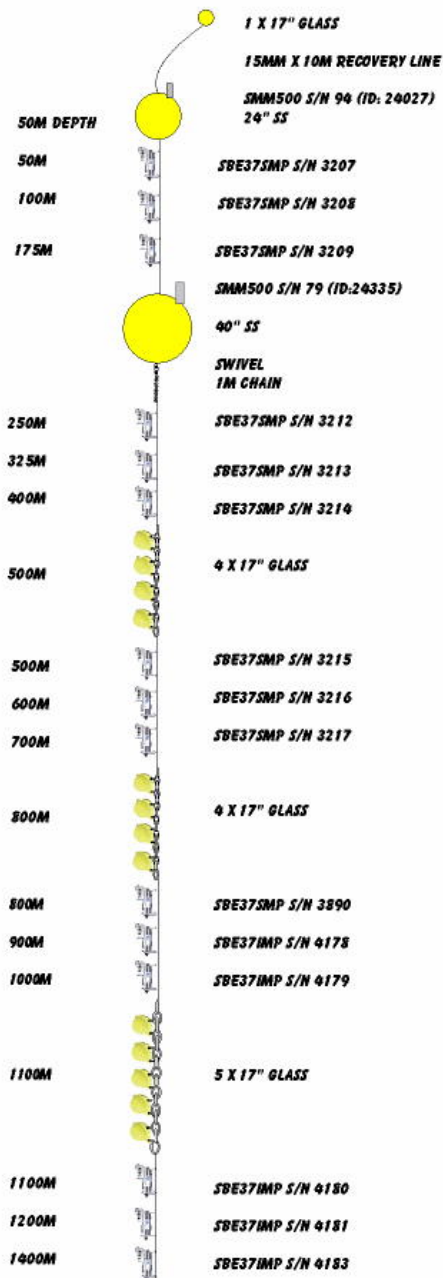
***P345 : Moorings Recovered***

EB2 2006/20  
AS DEPLOYED  
D304  
2006



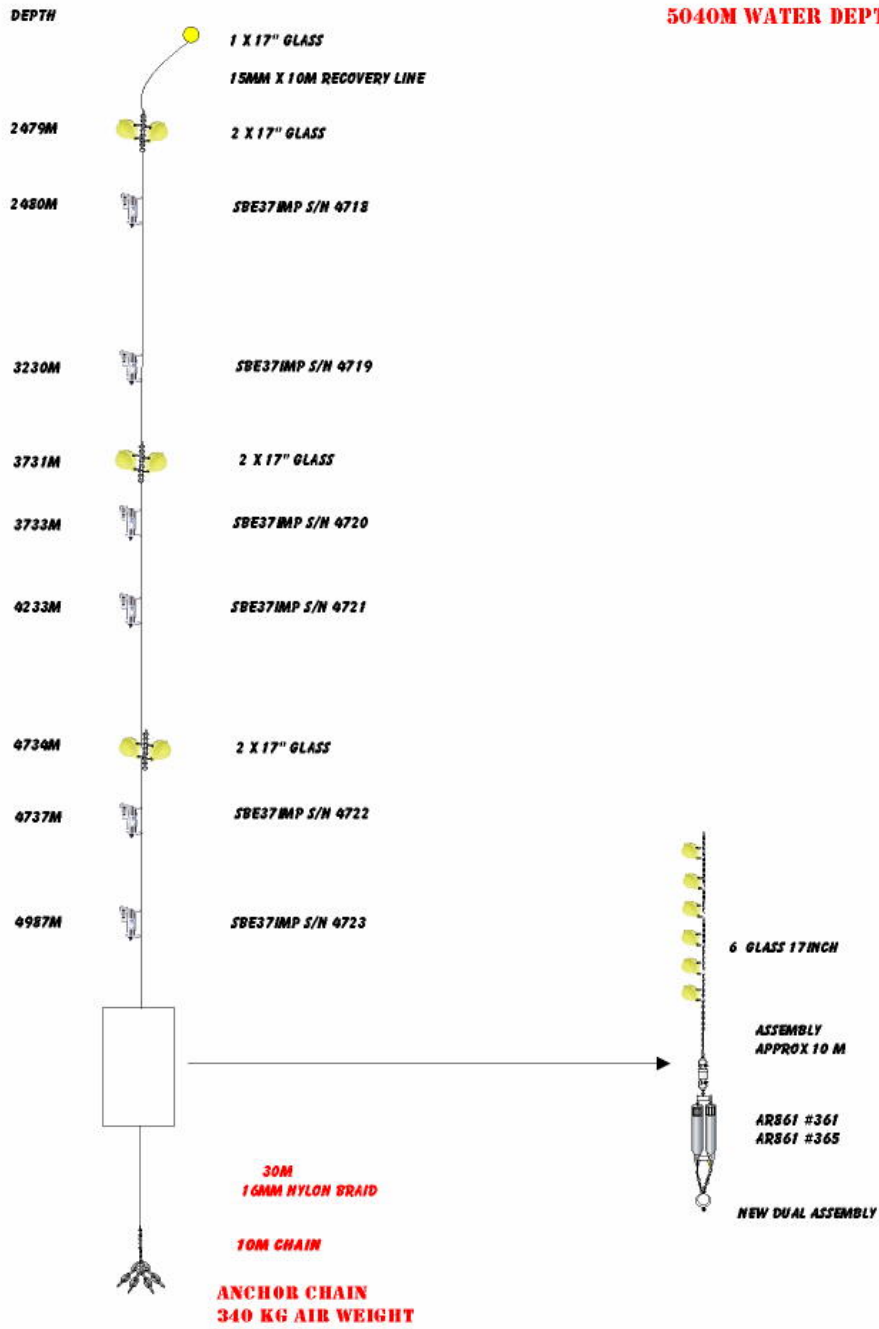
WATER DEPTH  
5090M COR.

# P345 : Moorings Deployed



**MOORING EB2 REVISED  
NOVEMBER 2006**

**5040M WATER DEPTH**



## Appendix D : Data recovered start and end times

Instrument record start and stop dates listed by mooring and instrument type. Times in GMT taken from the first and last times in the .use files.

eb1\_5\_200654/microcat

sn	press	year	month	day	year	month	day
3890	101.4	2006	05	19	2006	10	10
4178	136.0	2006	05	19	2006	10	10
4179	242.8	2006	05	19	2006	10	10
4180	318.1	2006	05	19	2006	10	10
4181	394.0	2006	05	19	2006	10	10
4183	469.9	2006	05	19	2006	10	10
4708	549.2	2006	05	19	2006	10	10
4709	652.6	2006	05	19	2006	10	10
4710	754.6	2006	05	19	2006	10	10
4711	856.5	2006	05	19	2006	10	10
4712	960.2	2006	05	19	2006	10	10
4713	1062.3	2006	05	19	2006	10	10
4714	1166.1	2006	05	19	2006	10	10
4715	1321.6	2006	05	19	2006	10	10
4716	1423.4	2006	05	19	2006	10	10
4717	1628.4	2006	05	19	2006	10	10
4718	1834.0	2006	05	19	2006	10	10
4719	2026.4	2006	05	19	2006	10	10
4720	2263.4	2006	05	19	2006	10	10
4721	2770.4	2006	05	19	2006	10	10
4722	3264.0	2006	05	19	2006	10	10
4723	3837.9	2006	05	19	2006	10	10
4724	4347.8	2006	05	19	2006	10	10
4725	5015.9	2006	05	19	2006	10	10

eb2\_5\_200620/microcat

sn	press	year	month	day	year	month	day
3281	4563.7	2006	06	01	2006	12	02
3283	2991.1	2006	06	01	2006	12	02
4460	4029.4	2006	06	01	2006	12	02
4463	5147.2	2006	06	01	2006	12	02
4465	124.2	2006	06	01	2006	12	02
4467	3504.0	2006	06	01	2006	12	02
4471	2701.2	2006	06	01	2006	12	02

eb2\_5\_200620/rbr

sn	press	year	month	day	year	month	day
3956	4582	2006	06	01	2006	12	02

eb2\_5\_200620/mmp: 165 profiles from 100db 2500db

sn	press	year	month	day	year	month	day
1179401	100- 2500	2006	06	01	2006	12	02

ebh5\_3\_200610/microcat

sn	press	year	month	day	year	month	day
3207	46.3	2006	06	04	2006	10	06
3208	93.0	2006	06	04	2006	10	06
3209	160.9	2006	06	04	2006	10	06
4473	237.3	2006	06	04	2006	10	06

ebh4\_3\_200611/microcat

sn	press	year	month	day	year	month	day
3212	316.6	2006	05	13	2006	10	06
3213	398.3	2006	05	13	2006	10	06
3214	505.6	2006	05	13	2006	10	06
3215	604.8	2006	05	13	2006	10	06
3216	720.3	2006	05	13	2006	10	06
3217	826.5	2006	05	13	2006	10	06

ebhi\_2\_200616/microcat

sn	press	year	month	day	year	month	day
3479	4000	2006	05	16	2006	10	09

NB Bad pressure record

ebhi\_2\_200616/arg

sn	press	year	month	day	year	month	day
322	3478	2006	05	16	2006	10	09

ebhi\_2\_200616/idr

sn	press	year	month	day	year	month	day
1103034	100	2006	05	16	2006	10	09

ebhi\_2\_200616/nor

sn	Press	year	month	day	year	month	day
1415	3443	2006	05	16	2006	10	03

ebhi\_2\_200616/rcm11

sn	Press	year	month	day	year	month	day
450	3426	2006	05	16	2006	10	09

ebhi\_2\_200616/S4

sn	Press	year	month	day	year	month	day
35612571	3428	2006	05	16	2006	10	09

eb12\_1\_200513/seagauge

sn	press	year	month	day	year	month	day
0417	3062	2005	04	07	2005	12	05

eb11\_1\_200517/seagauge

sn	press	year	month	day	year	month	day
0419	5198	2005	04	10	2006	02	12
0420	5198	2005	04	10	2006	03	07

## **Appendix E : Instrument Setup Details (P343 & P345)**

### **EBH4**

Water depth: 1000m

SBE37 microcat CTD unit, serial number **4470**  
Depth: 600m  
Sample interval: 1800 seconds  
Start date: 07 10 2006 (DDMMYYYY)  
Start time: 08 00 00 (HHMMSS GMT)

SBE37 microcat CTD unit, serial number **4799**  
Depth: 700m  
Sample interval: 1800 seconds  
Start date: 07 10 2006 (DDMMYYYY)  
Start time: 08 00 00 (HHMMSS GMT)

SBE37 microcat CTD unit, serial number **4800**  
Depth: 800m  
Sample interval: 1800 seconds  
Start date: 07 10 2006 (DDMMYYYY)  
Start time 08 00 00 (HHMMSS GMT)

### **EBHi**

Water depth: 4500m

SBE37 microcat CTD unit, serial number **3253**  
Depth: 3500m  
Sample interval: 1800 seconds  
Start date: 09 10 2006 (DDMMYYYY)  
Start time: 15 00 00 (HHMMSS GMT)

SBE37 microcat CTD unit, serial number **4472**  
Depth: 4000m  
Sample interval: 1800 seconds  
Start date: 09 10 2006 (DDMMYYYY)  
Start time: 15 00 00 (HHMMSS GMT)

SBE37 microcat CTD unit, serial number **4475**  
Depth: 4500m  
Sample interval: 1800 seconds  
Start date: 09 10 2006 (DDMMYYYY)  
Start time: 15 00 00 (HHMMSS GMT)

### **EBL1**

Water depth:

SBE26 BPR unit, serial number **0420**  
Depth: 5090 approx  
Tide interval: 15 minutes

Wave burst every N tide measurements: 9999  
Wave samples per burst: 68  
No. of 0.25 sec periods to integrate waves: 33  
Date of deployment: 12 10 2006 (DDMMYYYY)  
Instrument started: 16 02 45 (HHMMSS GMT)

SBE26 BPR unit, serial number **0419**

Depth: 5090 approx  
Tide interval: 15 minutes  
Wave burst every N tide measurements: 9999  
Wave samples per burst: 68  
No. of 0.25 sec periods to integrate waves: 33  
Date of deployment: 12 10 2006 (DDMMYYYY)  
Instrument started: 15 45 33 (HHMMSS GMT)

### **EBM1**

Water depth: 500m approx

SBE37 microcat SMP CTD unit, serial number **3481**

Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### **EBM2**

Water depth: 400m

SBE37 microcat SMP CTD unit, serial number **3273**

Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### **EBM3**

Water depth: 325m approx

SBE37 microcat IMP CTD unit, serial number **4469**

Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### **EBM4**

Water depth: 250m

SBE37 microcat CTD unit, serial number **3250**

Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### **EBM5**

Water depth: 175M



SBE37 microcat CTD unit, serial number **3203**  
Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### EBM6

Water depth: 100m approx

SBE37 microcat CTD unit, serial number **3211**  
Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS GMT)

### EBM7

Water depth: 50m approx

SBE37 microcat CTD unit, serial number **3210**  
Sample interval: 1800 seconds  
Start date: 06 10 2006 (DDMMYYYY)  
Start time: 00 00 00 (HHMMSS)

### Argo

Argos ID number: **3474D26**  
Apex float number: **2646**  
Float activation time: 18:59 06102006 (HH:MM GMT DDMMYYYY)  
Expected dive time: 01:00 07102006 (HH:MM GMT DDMMYYYY)  
Deployment time: 20:22 06102006 (HH:MM GMT DDMMYYYY)  
Deployment lat: 27N 52.00  
Deployment lon: 13W 30.96

### EBL2

SBE26 BPR unit, serial number **0400**  
Depth: 3000 approx  
Tide interval: 15 minutes  
Wave burst every N tide measurements: 9999  
Wave samples per burst: 68  
No. of 0.25 sec periods to integrate waves: 33  
Date of deployment: 16 10 2006 (DDMMYYYY)  
Instrument started: 07 09 30 (HHMMSS GMT)

### EB1

Water depth: 5060m approx

SBE37 microcat IMP CTD unit, serial number **4183**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4708**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4711**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4712**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4713**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4714**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4715**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4717**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4709**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4710**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4181**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4178**

Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4180**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4179**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3890**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3217**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3207**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3208**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3209**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3212**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3213**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)  
Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3214**  
Sample interval: 1800 seconds  
Start date: 01 12 2006 (DDMMYYYY)

Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3215**

Sample interval: 1800 seconds

Start date: 01 12 2006 (DDMMYYYY)

Start time: 10 00 00 (HHMMSS GMT)

SBE37 microcat SMP CTD unit, serial number **3216**

Sample interval: 1800 seconds

Start date: 01 12 2006 (DDMMYYYY)

Start time: 10 00 00 (HHMMSS GMT)

## **EB2**

Water depth: 5060m approx

SBE37 microcat IMP CTD unit, serial number **4719**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4718**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4723**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4722**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4721**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

SBE37 microcat IMP CTD unit, serial number **4720**

Sample interval: 1800 seconds

Start date: 02 12 2006 (DDMMYYYY)

Start time: 09 00 00 (HHMMSS GMT)

## Appendix F : P343 and P345 Mooring Recovery Log Sheets

### RAPID MOORINGS

### CRUISE P343

MRG ID: EBH5

Eastern Atlantic 26N

### RECOVERY

UKORS ID 2006/10

**LATITUDE** 27° 54.54

**DATE**

**LONGITUDE** 13° 21.72

Friday 6/10/2006

**NOTE ALL TIMES RECORDED IN GMT**

**COMMENCE TIME** 12:55

**COMPLETION TIME** 13.19

ITEM	SER NO	COMMENT	TIME
RECOVERY FLOAT	n/a	17" GLASS SPHERE	
RECOVERY LINE	n/a	15M POLYPROP ROPE	
MAIN BUOYANCY	4002-40	40" STEEL	12:59
ARGOS BEACON	T06-041	PTT 59620	
LIGHT	H01 024		
CHAIN	n/a	2m 5/8" Galvanized	
SWIVEL	n/a		
SBE 37	3207	SMP	13:07
SBE 37	3208	SMP	13:09
SBE 37	3209	SMP	13:12
SBE 37	4473	IMP	13:16
6 OFF GLASS SPHERES	n/a		13:18
SWIVEL	n/a		13:18
ACOUSTIC RELEASE	359	AR861 clean-slightly shinny	13:19

**MOORING METHOD** FREEFALL DEPLOYMENT

#### COMMENTS

Top sphere surfaced 10 m port mid ships

4 pack appears stb midships- quickly measured to port side

**RAPID MOORINGS****CRUISE P343**

MRG ID: EBH4

Eastern Atlantic 26N

**RECOVERY****UKORS ID 2006/11****LATITUDE** 27° 50.95**DATE****LONGITUDE** 13° 32.21

Friday 05/10/2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 14:17**COMPLETION TIME** 14:55

<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>	<b>TIME</b>
RECOVERY FLOAT	n/a	17" GLASS SPHERE	14:23
RECOVERY LINE	n/a	15M POLYPROP ROPE	14:23
BILLINGS FLOAT	n/a	4 PACK	14:24
LIGHT BEACON	S01-180	With Flag	14:24
CHAIN	n/a	1m of 3/8"	14:25
SWIVEL (ceramic)	n/a		14:25
2 OFF FLOATS	n/a	TRIMSYN	14:25
SBE 37	3212		14:25
2 OFF FLOATS	n/a	TRIMSYN	14:28
SBE 37	3213		14:28
2 OFF FLOATS	n/a	TRIMSYN	14:35
SBE 37	3214		14:35
2 OFF FLOATS	n/a	TRIMSYN	14:41
SBE 37	3215		14:41
2 OFF FLOATS	n/a	TRIMSYN	14:49
SBE 37	3216		14:49
SBE 37	3217		14:55
2 OFF FLOATS	n/a	17" GLASS	14:55
SWIVEL(Titanium)	n/a		14:55
CHAIN	n/a	1m of 1/2"	14:55
ACOUSTIC RELEASE	262	AR861	14:55

**MOORING METHOD** FREEFALL DEPLOYMENT**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
ebhi\_2\_2006/16Eastern Atlantic  
26N**RECOVERY****UKORS**  
**ID 2006/11****LATITUDE** 24 57.29N**DATE: 9/10/06****LONGITUDE** 21 15.6W**DAY: Monday****NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 12.54****COMPLETION TIME 13.26**

ITEM	SER NO	COMMENT	TIME
Billing float	SN T05-077		12.54
12' glass			
4x17' GLASS			
Nortek	1415		12.57
RCM11	450		12.57
S4	35612571		12.57
Sontek	D322		12.57
4x17' glasses			
Idronaut CTD	1103034		13.03
2x17' glasses			
SBE	3479		13.14
SBE	3480		13.24
4x17' glass			
ACOUSTIC RELEASE	AR 861 SN 317 ARM 14CD REL 1455		13.26
ANCHOR			

**MOORING****METHOD**

FREEFALL DEPLOYMENT

**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EB1\_2006Eastern Atlantic  
26N**RECOVERY****UKORS  
ID 2006/19****LATITUDE** 23 48.92N**DATE****LONGITUDE** 24 05.73W

10/10/2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 8.46****COMPLETION TIME 11.50**

ITEM	SER NO	COMMENT	TIME
Recovery line			09.40
24' steel sphere with Argos	SN T04-044 ID 46243		09.40
SBE	3890		09.43
SBE	4178		09.45
48' Steel with Argos	SN 5218 -4801 SN 256		09.53
SBE	4179		09.54
SBE	4180		09.58
SBE	4181		10.01
SBE	4183		10.03
SBE	4708		10.05
SBE	4709		10.07
SBE	4710		10.09
SBE	4711		10.11
SBE	4712		10.13
SBE	4713		10.14
SBE	4714		10.23
12x17' glass swivel			10.27
SBE	4715		10.19
SBE	4716		10.30
SBE	4717		10.33
SBE	4718		10.37
SBE	4719		10.40
SBE	4720		10.43
SBE	4721		11.04
SBE	4722		11.12
10x17' glass swivel			
SBE	4723		11.24
SBE	4724		11.32
SBE	4725		11.42
8x17' glass swivel			11.47
ACOUSTIC RELEASE	AR 861 SN 496 ARM 15A5		11.49
ACOUSTIC RELEASE	AR 661 SN 162 ARM A351 REL A354		11.49
ANCHOR			

**MOORING  
METHOD**

FREEFALL DEPLOYMENT

**COMMENTS**





**RAPID MOORINGS****CRUISE P343**MRG ID:  
ebl1\_1\_2005/17Eastern Atlantic  
26N**RECOVERY****UKORS  
ID 2005/17****LATITUDE** 23 48.63N**DATE 11/10/06****LONGITUDE** 24 6.33W**DAY  
Wednesday****NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 07.08****COMPLETION TIME 09.31**

<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>	<b>TIME</b>
Billing float 3 sphere type with VHF	SN T01-144		09.10
Recovery line			
6x17' Spheres			09.24
ACOUSTIC RELEASE	REL 365 SBE 26 419 and 420		09.30
Tripod assembly	2xSBE26		09.30

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
ebl2\_1\_2005/13Eastern Atlantic  
26N**RECOVERY****UKORS  
ID 2005/13****LATITUDE** 26 50.73N**DATE****LONGITUDE** 16 32.02W

16/10/06

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 7.12**COMPLETION TIME** 7.18

<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>	<b>TIME</b>
Billing float 4 sphere type with VHF novatech light			7.13
Recovery line 17' glass			7.12
6x17' Spheres			7.15
ACOUSTIC RELEASE			7.17
Tripod assembly	2xSBE26 417 and 418		7.17

**COMMENTS**

<b>RAPID MOORINGS</b>		<b>CRUISE P345</b>		<b>MRG ID:</b>	EB2
Eastern Boundary		<b>RECOVERY</b>		<b>UKORS ID</b>	2006/20
<b>LATITUDE</b>	N 23° 53.6'			<b>DATE</b>	2/12/06
<b>LONGITUDE</b>	W 24 3.13'			<b>DAY</b>	Saturday
<b>NOTE ALL TIMES RECORDED IN GMT</b>					
<b>COMMENCE TIME</b>	1240	Depth 5037m uncorrected		<b>Protocol taken by:</b>	Stuart Cunningham
<b>COMPLETION TIME</b>	15:08				
<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>		<b>TIME</b>	
Recovery float	n/a	Onboard		1243	
48" steel float	n/a				
Argos beacon	Nt04-045	I			
Light Beacon	SO1-190				
SBE	4465	clean		1253	
MMP stop					
MMP	11794-01	Heavy damage – see comment			
MMP stop					
SBE	4471			1425	
6x17" glass spheres					
SBE	3283			1420	
SBE	4467			?	
6x17" glass spheres				1457	
SBE				1454	
SBE + RBR	3281 9656			?	
2x17" glass spheres				1459	
4x17" glass spheres				1503	
SBE	4463			1506	
Acoustic release	362			1508	
Acoustic release	321			1808	
<b>Recovery Method</b>	Port side to wind and swell, recovered over port side. Drifting downwind/swell. Heavy rolling. Release at 1217, on surface 1218 ~300m ahead. Recovered as 3 lines from 2400m, where there is significant wire damage. Initial thoughts were that the MMP had imploded as damage looked similar to MAR MMP. However, inspection of remains did not show evidence of glass powder which was found throughout remains of MAR MMP. Maybe the MMP was destroyed by contact with the ship during recovery, and this perhaps also caused the damage to the parafil which was shredded. MMP operated until day of recovery.				
<b>COMMENTS</b>					

## Appendix G : P343 and P345 Mooring Deployment Log Sheets

### RAPID MOORINGS

### CRUISE P343

MRG ID:  
EB1\_2006

Eastern Atlantic  
26N

DEPLOYMENT

UKORS  
ID 2006/41

LATITUDE N 23 52.07

DATE

LONGITUDE W 24 10.40

12/10/2006

NOTE ALL TIMES RECORDED IN GMT

COMMENCE TIME 09.58

COMPLETION TIME 13.08

ITEM	SER NO	COMMENT	TIME
Recovery line			09.58
24' steel sphere with Argos	T04-004 ID.46243		09.58
SBE	4181		09.58
SBE	4717		10.04
SBE	4718		10.08
48' Steel with Argos	256 ID. 42748	LIGHT SN. J12-028	10.15
SBE	4719		10.18
SBE	4795		10.22
SBE	4720		10.25
SBE	4797		10.28
SBE	4721	2 X 17" GLASS CLAMPED HERE	10.35
SBE	4722	2 X 17" GLASS CLAMPED HERE	10.42
SBE	4711	2 X 17" GLASS CLAMPED HERE	10.47
SBE	4473	2 X 17" GLASS CLAMPED HERE	10.53
SBE	4712		10.55
SBE	4723	4 X 17" GLASS CLAMPED HERE	11.05
SBE	4180		11.08
SBE	4183	2 X 17" GLASS CLAMPED HERE	11.15
SBE	4708	2 X 17" GLASS CLAMPED HERE	11.20
SBE	4709	2 X 17" GLASS CLAMPED HERE	11.26
SBE	4710	2 X 17" GLASS CLAMPED HERE	11.32
6x17' glass swivel			11.37
SBE	3213		11.41
SBE	3208		12.07
4x17' glass swivel			12.13
SBE	4713		12.17
SBE	4714		12.26
SBE	4715		12.34
SBE	4716		12.40
4x17' glass swivel			12.48
DUAL RELEASES	AR 861 SN 496 AR 861 SN 317	ARM 15A5 REL 1555 ARM 14CD REL 1455	12.48
10M ROPE			12.50
ANCHOR	1900KG		13.08

MOORING  
METHOD

FREEFALL DEPLOYMENT

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EB2\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/42****LATITUDE** N 23 49 63**DATE****LONGITUDE** W 24 7 46

11/10/2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 10.39****COMPLETION TIME 13.30**

ITEM	SER NO	COMMENT	TIME
Recovery line			10.39
48' steel sphere with Argos	SN 256 ID 42748		10.40
Light	SN J12-028		10.40
SBE	3212		10.40
MMP Stop			10.40
MMP	11672-01	CTD SN 41CP-0705	11.49
MMP Stop			11.50
12x17' glass			11.53
SBE	3209		11.53
SBE	3207		12.08
4x17' glass			12.11
SBE	4796		12.23
SBE	4179		12.39
SBE & RBR	3890 9657		12.58
SBE	4178		13.10
8x17' glass			13.12
ACOUSTIC RELEASE	AR861 SN 262		13.13
ACOUSTIC RELEASE	AR861 SN 324		13.13
30M ROPE			13.15
ANCHOR	1600KG		13.28

**MOORING****METHOD**

FREEFALL DEPLOYMENT

**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBH4\_4\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/43****LATITUDE** 27 51'05N**DATE****LONGITUDE** 13 32'35W

7/10/2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 8:07**COMPLETION TIME** 8:34

ITEM	SER NO	COMMENT	TIME
Billing float with light	S01-180		8:08
17' glass	RECOVERY		8:08
Ceramic swivel			8:08
SBE	4470		8:08
SBE	4799		8:09
SBE	4800		8:12
2x17' glass			8:12
Titanium swivel			8:12
ACOUSTIC RELEASE	RT861 SN 323 ARM REL		8:12
ANCHOR	600KG		8:34

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBHi\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/44****LATITUDE** N 24 57 15**DATE****LONGITUDE** W 21 15 46

Mon 9/10/2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 14.26****COMPLETION TIME 14.58**

ITEM	SER NO	COMMENT	TIME
Billing float with light	SN T05-077		
12' glass			
2x17' glass			
SBE	3253		
2x17' glass			
SBE	4472		
SBE	4475		
4x17' glass			
ACOUSTIC RELEASE	RT861 SN 282	ARM 14BA REL 1455	
ANCHOR	600KG		

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**



**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBL1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/45****LATITUDE** N 23 53.49**DATE 12/10/06****LONGITUDE** W 24 5.14**DAY****NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 19.15****COMPLETION TIME 19.20**

ITEM	SER NO	COMMENT	TIME
Billing float 3 sphere type with VHF and light	SN 408-009 vhf SN H01-008 light		19.15
Recovery line			19.15
6x17' Spheres			19.19
DUAL RELEASES	861 SN 359 661 SN 162		19.19
Tripod assembly	2xSBE26	0419 AND 0420 6885M RATED	19.19
ANCHOR	SINGLE WHEEL		19.20

**MOORING  
METHOD**

FREEFALL DEPLOYMENT

**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBL2\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS**  
**ID 2006/46****LATITUDE** N 27 16 79**DATE 16/10/06****LONGITUDE** W 15 25 21**DAY****NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME 7.35****COMPLETION TIME 7.39**

<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>	<b>TIME</b>
Billing float 3 sphere type with VHF and light	SN S01-181 LIGHT SN T01-144 VHF		7.35
Recovery line			7.35
6x17' Spheres			7.36
ACOUSTIC RELEASE	SN 324		7.38
Tripod assembly	SN 400	SBE 26 4127M RATED	7.38
ANCHOR	280KG	SINGLE WHEEL	7.39

**MOORING  
METHOD**

FREEFALL DEPLOYMENT

**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM1\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS**  
**ID 2006/47****LATITUDE** 27 53'70N**DATE****LONGITUDE** 13 24'44W

05-10-2006

NOTE ALL TIMES RECORDED IN GMT

**COMMENCE TIME** 19:00**COMPLETION TIME** 19:11

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-013		19:05
LRT	SN 240841-009		19:05
SBE	37 SN 3481		19:05
STAUFF Clamp			19:05
Clamp			19:05
ANCHOR			19:11

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**Water depth: 515  
m (uncorrected)

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM2\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS**  
**ID 2006/48****LATITUDE** 27 54'02N**DATE****LONGITUDE** 13 23'43W

05-10-2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 19:20**COMPLETION TIME** 19:25

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-010		19:20
LRT	SN 242200-001		19:20
SBE	37 SN 3273		19:20
STAUFF Clamp			19:22
Clamp			19:22
ANCHOR			19:24

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM3\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/49****LATITUDE** 27 54'39N**DATE****LONGITUDE** 13 22'33W

05-10-2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 19:36**COMPLETION TIME** 19:40

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-008		19:36
LRT	SN 240841-006		19:36
SBE	37 SN 4469		19:36
STAUFF Clamp			19:36
Clamp			19:36
ANCHOR			19:39

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**Water depth: 331 m  
(uncorrected)

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM4\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/50****LATITUDE** 27 54'52N**DATE****LONGITUDE** 13 21'95W

05-10-2006

NOTE ALL TIMES RECORDED IN GMT

**COMMENCE TIME 19.44****COMPLETION TIME 19.46**

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-014		19:44
LRT	SN 242200-003		19:44
SBE	37 SN 3250		19:44
STAUFF Clamp			19:44
Clamp			19:44
ANCHOR			19:46

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**Water depth: 253 m  
(uncorrected)

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM5\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/51****LATITUDE** 27 54'67N**DATE****LONGITUDE** 13 21'53W

05-10-2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 19:51**COMPLETION TIME** 20:16

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-007		20:14
LRT	SN 242200-004		20:14
SBE	37 SN 3203		20:14
STAUFF Clamp			20:14
Clamp			20:14
ANCHOR			20:16

**MOORING****METHOD** FREEFALL DEPLOYMENT

**COMMENTS** 19:52: Release went out of the buoyancy.  
The whole EBM5 taken out of the water.  
The release has been fixed again to the buoyancy.  
20:16: New try, send again and worked.  
Water depth: 150 m (uncorrected)

**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM6\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/52****LATITUDE** 27 55'20N**DATE****LONGITUDE** 13 19'92W

05-10-2006

**NOTE ALL TIMES RECORDED IN GMT****COMMENCE TIME** 20:34**COMPLETION TIME** 20:36

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-011		20:34
LRT	SN 240841-010		20:34
SBE	37 SN 3211		20:34
STAUFF Clamp			20:34
Clamp			20:34
ANCHOR			20:36

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**Water depth: 100 m  
(uncorrected)



**RAPID MOORINGS****CRUISE P343**MRG ID:  
EBM7\_1\_2006Eastern Atlantic  
26N**DEPLOYMENT****UKORS  
ID 2006/53****LATITUDE** 27 54'48N**DATE****LONGITUDE** 13 13'58W

05-10-2006

NOTE ALL TIMES RECORDED IN GMT

**COMMENCE TIME 21.33****COMPLETION TIME 21.33**

ITEM	SER NO	COMMENT	TIME
VHF Beacon	SN U08-012		21:33
LRT	SN 242200 - 002		21:33
SBE	37 SN 3210		21:33
STAUFF Clamp			21:33
Clamp			21:33
ANCHOR			21:33

**MOORING****METHOD** FREEFALL DEPLOYMENT**COMMENTS**Water depth; 70 m  
(uncorrected)

<b>RAPID MOORINGS</b>		<b>CRUISE P345</b>		MRG ID:	EB2
Eastern Boundary		<b>DEPLOYMENT</b>		<b>UKORS ID</b>	
<b>LATITUDE</b>	N 23° 52.1'	<b>DATE</b>	2/12/06		
<b>LONGITUDE</b>	W 24 10.3'	<b>DAY</b>	Saturday		
<b>NOTE ALL TIMES RECORDED IN GMT</b>					
<b>COMMENCE TIME</b>	0800	Depth 5061m uncorrected	<b>Protocol taken by:</b>	Stuart Cunningham	
<b>COMPLETION TIME</b>	0952				
ITEM	SER NO	COMMENT	TIME		
Glass pickup float					
15m polyprop recovery line					
2xglass parallel					
SBE37	4718		0807		
SBE37	4719		0836		
2xglass					
SBE37	4720		0850		
SBE37	4721		0904		
2xglass					
SBE37	4722		0921		
SBE37	4723		0931		
2x20m polyester					
6xglass					
Swivel					
Acoustic release	361		0938		
Acoustic release	365				
30m nylon braid (or polyester)					
10m chain					
anchor		340kg			
Released at			095210		
<b>COMMENTS</b>	1001 ranging to release. Both OK, decending at 70m/min. On seabed at 1055				

<b>RAPID MOORINGS</b>		<b>CRUISE P345</b>		<b>MRG ID:</b>	EB1
Eastern Boundary		<b>DEPLOYMENT</b>		<b>UKORS ID</b>	
<b>LATITUDE</b>	N 23° 46.6'	<b>DATE</b>		1/12/06	
<b>LONGITUDE</b>	W 24 13.2'	<b>DAY</b>		Friday	
<b>NOTE ALL TIMES RECORDED IN GMT</b>					
<b>COMMENCE TIME</b>	08:20	Water depth 5080m uncorrected		<b>Protocol taken by:</b>	Stuart Cunningham
<b>COMPLETION TIME</b>	11:49				
<b>ITEM</b>	<b>SER NO</b>	<b>COMMENT</b>	<b>TIME</b>		
Glass pickup float					
15m polyprop recover line					
24" steel sphere		1m chan below			
SBE37	3207	Put on at 100m. Removed, wire wound back to 50m	0833		
Argos Beacon	094				
Light					
SBE37	3208		0835		
SBE37	3209		0839		
40" Steel sphere			0844		
Argos Beacon	079	ld 24335			
Light					
SBE37	3212		0848		
SBE37	3213		0852		
SBE37	3214		0855		
4x17" glass			0901		
SBE37	3215		0901		
SBE37	3216		0905		
SBE37	3217		0908		
4x17" glass			0913		
SBE37	3890		0913		
SBE37	4178		0917		
SBE37	4179		0920		
5x17" glass			0926		
SBE37	4180		0926		
SBE37	4181		0928		
SBE37	4183		0833		
4x17" glass			0939		
SBE37	4708		0943		
SBE37	4709		0947		
SBE37	4710		0952		
4x17" glass			0958		
SBE37	4711		1004		
SBE37	4712		1014		
4x17" glass			1023		
SBE37	4713		1029		
SBE37	4714		1040		
5x17" glass			1053		
SBE37	4715		1053		

SBE37	4717		1115
Adjustment wire		50m + 50m	
8x17" glass			1127
Acoustic release	260	swivel immediately above release	
Acoustic release	262		
30m Nylon		black braid	
10m chain		w/d 5056m u/c	114827
anchor			

**COMMENTS** Removed 3 adjuster lengths (total of 50m) from below SBE37 4717. Anchor release 114827, 23° 48.6'N, 24° 8.9'W, w/d 5056m u/c. Top buoy under at 1218.