NATIONAL OCEANOGRAPHY CENTRE-
FORMER PROUDMAN OCEANOGRAPHIC LABORATORY

CRUISE REPORT NO. 58

RRS JAMES CLARK ROSS

CRUISE JR15003
15 DECEMBER 2015 – 15 JANUARY 2016

Sea Level and Bottom Pressure Measurements in Drake Passage and the Southern Ocean

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2016

DOCUMENT DATA SHEET

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Sea Level and Bottom Presure Measurements in Drake Passage and the Southern Ocean

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ABSTRACT

Bottom Pressure Recorders have been used for making measurements of the strength of the Antarctic Circumpolar Current (ACC) since 1988, initially in the Scotia Sea and then later across Drake Passage between Burwood Bank and Elephant Island. Some of the Bottom Pressure Recorders (BPRs) are combined with Inverted Echo Sounders (IES).

During this cruise, two BPR landers were recovered and two BPR landers were deployed in Drake Passage.

The BPR data is supplemented by Sea Level Recorders, or Tide Gauges, at Stanley (Falkland Islands), King Edward Point (South Georgia), Signy Island, Vernadsky and Rothera Research Station. Of these, the tide gauges at Stanley, Signy, Rothera and Vernadsky were visited and servicing performed to recover data and improve its quality. In addition to this a new Waveguided Radar system was installed at Rothera.

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KEYWORDS	CONTRACT
Bottom Pressure Recorder, Drake Passage, Inverted Echo Sounder, Sea Level, Antarctic Circumpolar Current, Rothera, Stanley, Vernadsky, Faraday, King Edward Point, South Georgia, Signy, Tide Gauge, Sea Level Recorder, Waveguided Radar.	PROJECT NEW142003, Task 2 PRICE

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CRUISE PERSONNEL

NOC Personnel

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Electronic Engineer	Jeffrey Pugh
Instrument Engineer	Emlyn Jones

BAS Personnel

IT Engineer	Johnnie Edmonston
OT Engineer	Paul Morgan

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Chief Officer	Simon Evans?
2nd Officer	Christopher Hipsey?
3rd Officer	Harry Taylor
Radio Officer	Charlie Waddicor
Deck Engineer	Simon Wright
Boatswain	George Stewart

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We would also like to thank the base personnel of the Ukranian Antarctic Research Station at Vernadsky for their continued help in the operation and maintenance of sea level equipment.

OVERVIEW

The remote island stations in the South Atlantic and Southern Ocean provide sea level data which is supplemented by bottom pressure measurements across Drake Passage.

The principal objective is to study variations in the flow of the Antarctic Circumpolar Current (ACC) on long-time and large spatial scales. The sea level station network is also a component of GLOSS (Global Sea Level Observing System).

Bottom Pressure Recorders (BPRs) have been deployed since 1988, initially in the Scotia Sea and then later in the Drake Passage. The data is made available to the international research community through the Permanent Service for Mean Sea Level (PSMSL).

NOC CRUISE OBJECTIVES

1) To service the Sea Level Recorder at Port Stanley, Falkland Islands.
2) To service the Sea Level Recorder at Signy, South Orkney Islands.
3) To service the Sea Level Recorder at Rothera Antarctic Research Station.
4) To install a new Waveguided Radar system at Rothera.
5) To service the Sea Level Recorder at Vernadsky Antarctic Research Station.
6) To recover two BPR landers from Drake Passage.
7) To deploy two BPR landers in Drake Passage.
8) To communicate with the Sonardyne Fetch to check its operational status.

MOBILISATION

We arrived in Stanley on Thursday 14th December 2015 and spent the night in the Malvina hotel, which is very often used these days by BAS to accommodate personnel awaiting mobilisation. In the morning of the following day, 15th December, we moved from the Hotel to the James Clark Ross, which was tied up at FIPASS, Stanley Harbour. Between the 15h December and the beginning of the cruise on 17th December the tide gauge at Stanley was visited to carry out maintenance and to download the data. On 17th, The JCR sailed from Stanley to Mare Harbour for refuelling.

STANLEY SEA LEVEL RECORDER 15-17/12/2015

A number of visits were made to the Stanley Tide Gauge between the 15th and the 17th to perform general maintenance and repair. Photographs were taken of the instrumentation, cables and the cabinets for future reference. The time of the TIDATA II scan was recorded before the data recovered. It had been previously noted that the full tide temperature sensor was not working correctly, so an interface board had been previously prepared to allow all the signals to be swapped over to the 2nd set of operational sensors contained in the 'All in One' gauge. The interface board was installed and the Full, Half and Barometer sensors swapped over. The operation of these sensors were then checked with a Oscilloscope before the SRAM card battery was changed and the logger restarted. The first scan was captured to ensure the correct operation before the communications lead was replace, which then enabled the data to be transmitted over the broadband link in real-time.

Work was also carried out on the second gauge which was connected to a radar sensor and two strain gauge type pressure sensors. An attempt was made to reprogram the existing radar, to produce a 1 minute average value, derived from 60, 1 second readings. Unfortunately this could not be done as it was found that the radar fitted, was running a older version of the firmware which did not have this option enabled. After a brief communication it was decided to send a replacement unit, care of Ross Chaloner in Port Stanley, with the intention of it being fitted once the FIPASS maintenance work had been carried out. In addition to this the full tide pressure sensor was also altered to allow averaging to be done. In this case the sensor is read 6 times over a 30 second window, before the values are averaged. The reason for the 30 second window was to allow the logger enough time to sample the other two sensors as

well as allowing it to perform its own general house-keeping tasks. The half tide pressure sensor sample period remained the same at one spot reading per minute.

Note. The gauge was re-visited on the 14th January after a problem had been identified with the new 'All in One' half tide temperature sensor. As the problem was only associate with half tide sensor it was decided to re-fit the original, operational half tide pressure and temperature sensor that had been previously disconnected. Once this had been performed the sensor were left to run overnight to check that they were functioning correctly.

SIGNY SEA LEVEL RECORDER 21/12/2015

The Signy Tide Gauge was visited by myself and Emlyn Jones. The Base commander acted as our guide showing us the location of the gauge and updated us on the work that had been carried out prior to our arrival. The TIDATA II scan was timed and a record made of the output, the data was then downloaded. It was noticed at this stage that the logger was not running and that the remaining pressure sensor was still not working as had been observed during the last visit.
Initially the signals were looked at using a portable oscilloscope, but no signals were observed. A decision was then make to re-terminate the sensor cable, this involved cutting back about 2 meters of sensor cable, this ensured that the re-made connections would not have previously been exposed to the damp air. The re-made wires were then connected to the terminal strip and again checked with a portable oscilloscope. Unfortunately the results were the same, no signal, a meter was then used to check for continuity between the ground wires and signal wire, again nothing. We can only assume from this that the sensor has either leak or rotted away after being installed, some 25 years ago. With is in mind we suggest that the sensor in the bay be removed and that the tide gauge be decommissioned and also removed. The removal of the Tide Gauge can be done at the next call in 2016/17, but the sensor and cable will need to be removed with the use of divers. A suggestion would be to put in a requested to the Royal Navy that when the HMS Protector next visits Signy that they dive on the sensor and remove it from the concrete block along with the remaining cable.

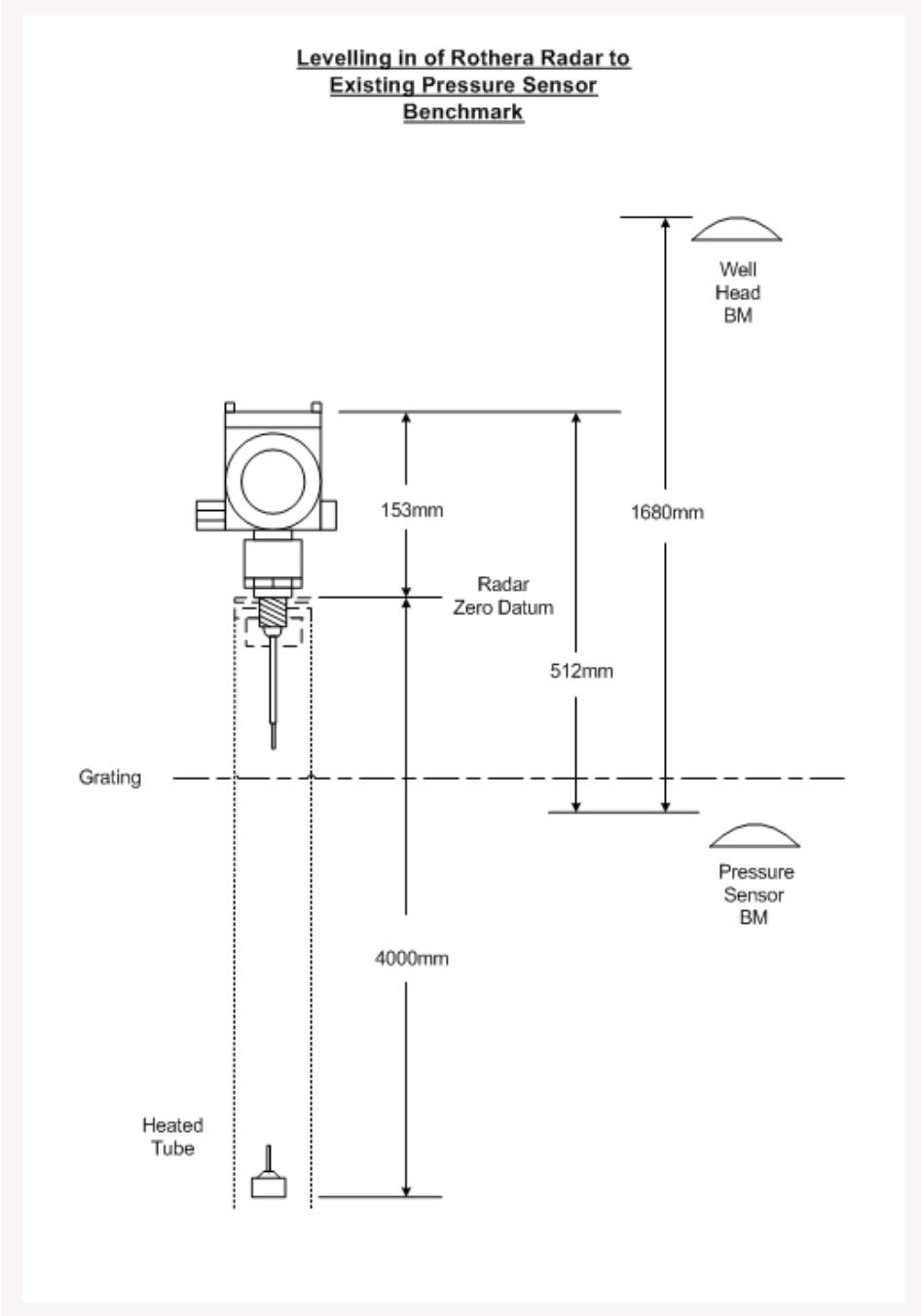
ROTHERA SEA LEVEL RECORDER 28/12/2015 to 02/01/2016

This was the first call of the season to the Rothera base, but as most of the supply's had been containerised we were not required to help out with the unloading of cargo. The gauge was visited first thing by myself and Emlyn Jones, both TIDATA II systems were checked and a record made of the scan time. The gauges were then downloaded, it was at this point that it was noted that TG2 had jumped out of its program, possibly due to a power interruption. After downloading both gauges, they were powered down and SRAM card batteries replaced. Each gauge was then restarted and scan checked for correct operation. During the routine maintenance it was observed that the problem identified previously, with regard to the half tide temperature channel following the pressure was still present. A portable oscilloscope was

used to check the sensor wires in the junction box in the well area. No temperature signal could be seen coming from the half tide sensor itself. Turning the voltage scale up on the oscilloscope allowed us to see small pressure sensor signal which would have been due to pickup/crosstalk from the pressure sensor cable pair running next to the temperature pair. We can assume from this that the half tide temperature sensor is faulty and will need to be replace. This could possible done at the next call in 2016/2017 if time allows.

The small Linux PC had previously stopped working around June of last year, after some investigation with BAS personnel it was found that the power supply and lead acid battery powering the PC were faulty. As an interim solution a uninterrupted PSU was fitted by BAS and arrangements made to have a new replacement PCU12 and battery sent. The battery and the PCU12 were successfully installed and the uninterrupted PSU returned back to BAS.

In addition to the maintenance work being carried out, we also installed an commissioned a new Guided Waveradar system. This consisted of a new logger cabinet and a new heated and insulated stilling well. Tim Jackson from BAS had agreed to help us with the installation but was tied up with cargo duties and the refuelling of the base and was unavailable for the first couple of days. During this time we were able to start the installation in the Pump House, where we mount the new logger cabinet, prepare the cabling and fit and test the new satellite antenna and GPS. On completion of the refuelling Tim was able to assist in the installation of the new stilling well in the Well Area. This did not exactly go to plan as it turned out that the steps/rungs which the stilling well was to be mounted against did not run vertical, after a series of modification to the bracketing we were able to successfully install the new stilling well. The new radar was then mounted in position and wired up to the logger in the Pump House. The system was then checked and tested to ensure that the radar was reading correctly and that the data was being successfully transmitted. It was decided that the heating part of the installation should be checked by the local Rothera electrician before the final connection was made. As of today the gauge has been working very well and has been transmitting averaged 1 minute data back to base every 15 minutes. The radar itself is displaying the distance to the water surface below. But the telemetered data displayed on VLIZ web site is sea level data, which is calculated by subtracting the distance from a known level, in this case 5 meters. The radar has also been levelled into the bench mark on top of the existing pressure sensor metal work. The distance from the benchmark to the zero datum of the radar is 512mm – 153mm = 359mm, see figure below, 'Levelling in of Rothera Radar to Existing Pressure Sensor Benchmark'



VERNADSKY SEA LEVEL RECORDER 04/01/2016

Fortunately the conditions at Vernadsky were very good which allow myself and Emlyn to visit the base to service the tide gauge. The scan time on the Tidata II logger was recorded before the data downloaded. At this point it was observed that the Tidata II logger had jumped out of its program, which could have been due to a power outage. The download took approximately 2 hours, after which the gauge was powered down and the EPROM card replaced. Unfortunately the sensors connected to this logger have been blocked for a number of years and again access is only via diving which unfortunately because of Health and Safety

rules we are unable to do. For this reason an additional logger system was installed a number of years ago with a separate set of sensors that can be accessed for cleaning. This system in located in the Tide Gauge hut and the Ozone loft and was checked to ensure that it was operating correctly. It had been noted that around November 2015 that the date appeared to be corrupted, for this reason a new logger unit was taken out, this was replaced but at the next GPS synchronisation it defaulted back to the corrupted date. The gauge is still working and we are able to use the date from the time of the transmission but a new transmitter (HDR) will be required at the next call in 2016/17 to repair this fault. In addition to this a new drum of cable should be sent out as the existing cable linking the Tide Gauge hut to the Ozone loft is showing signs of ware.

The data for 2014/15 from the chart recorder which the Ukranians maintain for us, was provided along with the Meteorological data and some water samples for the Meteorologist department at BAS.

LANDER INSTRUMENTS DRY TESTS

To establish a common base for calibration, all pressure instruments to be deployed on the landers were set to run simultaneously in the main laboratory on the JCR for a period of about 48 hours. The clocks of all the instruments was reset to ensure agreement with GMT to within approximately 1 second. All the instruments were made to run simultaneously in order to inter-calibrate their pressure, using a high precision barometer as a standard. The comparison period starts at 203000 of the 24-12-2015 and ends at 210000 on the 26-12-2015.

The instruments involved in this calibration are

Instrument	**Type and make**	**Pressure sensor range***	**Pressure sensor accuracy / resolution**	**Bias with respect to barometric pressure (dbar)**	**File****
Barometer	Paroscientific, Inc. Digiquartz Pressure Instrumentation “Model 765-15A Pressure Standard”, S/N 124004. Measures atmospheric pressure and temperature (records only temperature)	0-15 psia (0-10.34214 dbar)	0.08 hPa (0.0008 dbar) / 0.0001% of range	0	DGQ 765\765 I.txt
Pressure Recorder	NOC BPR, D3 RDTG. Digiquartz Pressure sensor S/N DQ 105443	0-10000 psia (0-6895 dbar)	0.01% of range (0.6895 dbar) / 0.045 ppm (0.0003 dbar)	?	BPRs\Dry tests\D3_RDTG_data_download.log
Pressure Recorder	NOC BPR, NBPR1-RL03. Digiquartz Pressure sensor S/N DQ 90803. This BPR was used in the dry tests but the data was not downloaded	0-10000 psia (0-6895 dbar)	0.01% of range (0.6895 dbar) / 0.045 ppm (0.0003 dbar)	--	BPRs\Dry Test\NBPR1_data_download.log
CTD	Sea-Bird Electronics Inc. SBE 37-SMP MicroCAT Conductivity and Temperature Recorder with RS-232 serial interface, internal Memory and integral Pump + pressure sensor. S/N 49454-5600	0-3500 dbar***	0.1% of range (3.5 dbar) / 0.002% of range (0.07 dbar)	?	MicroCATs\Dry Test\5600_24H_Data_Download.asc
CTD	Sea-Bird Electronics Inc. SBE 37-SMP MicroCAT Conductivity and Temperature Recorder with RS-232	0-3500 dbar***	0.1% of range (3.5 dbar) / 0.002% of range (0.07 dbar)	?	MicroCATs\Dry Test\6780_24H_Data_Download.asc

	serial interface, internal Memory and integral Pump + pressure sensor. S/N 49454-6780				

* All output pressures are absolute, except for the SBE37s (see note below).
** Common path: "C:\Users\JPP\Cruises II\James Clark Ross 2015 - JR15003\Data\Deployments"
***When the SBE37 output is given in dbar, the pressure is referred to a standard atmosphere tare of 10.1352972 dbar (however, for reasons that are not explained in the SBE37 manual, when the output is given in psi, the pressure is absolute)

LANDER RECOVERIES AND DEPLOYMENTS

See Appendix 1, which includes all deployment/recovery sheets for details. The plan for this cruise was to recover one shallow lander at Drake North and replace it and recover one shallow lander, at Drake South and replace that. The plan also included communicating with the Sonardyne FETCH unit to check is operational output, including battery levels.

All the landers were successfully recovered and deployed at both the Drake North and South points. We did experience communication problems while talking to the landers which was eventually traced to a faulty Benthos deck box and an intermittent cable between the deck box and the ships hull mounted transducer.

Communications with the Sonardyne Fetch unit was also successful. The battery level reported by the instrument showed that 20% had been consumed leaving 80% remaining. A days worth of data was then acoustical transferred from the Fetch while still on the seabed at at depth of 2000 meters. The download of a days worth of data (2 pages) took approximately 40 seconds, so therefore to downloaded the complete data set, 855 pages, would have taken approximately 2.3 hours and used a significant amount of battery life. For this reason we are recommending that the high speed HPT transducer be either purchased or loaned from Sonardyne which would allow the data to be download upto 6 or 7 times faster and there by reducing the battery consumption. I decision could then be made whether to leave the unit down for an additional 3rd year.

APPENDIX 1 – LANDER DEPLOYMENT/RECOVERY SHEETS

Tide Gauge Protocol Sheet

Deployment

Deployment No	**286**	Ship/Cruise No	**RRS James Clark Ross JR292**	
Deployment date	**29/12/13**		Mooring name	**Drake South (DPS)**
Time on station	**03:00** GMT		Latitude	**-60.85235 (Bridge)** **S60 51.0944 (M-Cal)**
Time into water	**03:14** GMT		Longitude	**-54.72935 (Bridge)** **W54 43.753 (M-Cal)**
Time on the seabed	**03:34** GMT		Depth	**1080m (Swath Corrected** **1163m (M-Cal uncorrected SV=1462.5**

Acoustic Release Information

Type	S/N	Tx	Rx	Release code	Enable code	Release lead S/N	B/W lead S/N	BW (V)	Battery (V)	Current (mA)	BW Polarity Check
XT6001 10”	**49045**	**12.0**	**13.0**	**C**	**-**	**171220 10-08 DOM 2010**	**151210 -14 DOM 2010**	**28.53**			**OK**
XT6001 13” Tube Ext Bat	**59915**	**12.0**	**15.0**	**A**	**E**	**171220 10-12 DOM 2010**	**151210 -11 DOM 2010**	**28.89**	**14.61 (R) 14.63 (O) Ext.**		**OK**

Recovery Equipment Information

Radio Beacon Type	Radio Beacon S/N	Radio Frequency	Release Gate S/N	Flashing Light S/N
RF-700A1 Novatech	**X11**	**154.585 MHz**	**R5288.17**	**No**

Notes

Recovery

Recovery date	**06/01/16**	Ship/Cruise No	**James Clark Ross JR15003**	
Time on station	**15:01:00** GMT		Release transmitted	**16:10:00** GMT **Sent to Both**
Time of release	**16:15:00** GMT		Time on the surface	**16:40:00** GMT

Notes

Communications problem with acoustics, problem traced to a faulty Benthos deck unit (Blue 7000 model)

Configuration Information

Logger

Logger type	**RDTG**	ID Number	**TRL04**	
Sensors	**DQ93161**			
Current (mA)	**0.90**	Battery (V)	**14.69**	
Timebase started at	**23:00:00**	GMT	Start date	**21/12/13**
First scan at	**23:15:00**	GMT	Scan date	**21/12/13**
Sample interval	**15**	minutes		
Last scan time	**16:00:01**	GMT	Scan date	**08/01/16**
Expected scan time	**16:00:00**	GMT	Scan date	08/01/16
Data file name	**Drake South BPR TRL04.log**			

Notes

SBE37-SMP Microcat

Serial Number	**37SMP34870-3025**		Depth rating	**7000 m**
DDMMYY	**29/12/2013**	HHMMSS	**16:00:00**	GMT
StartDDMMYY	**30/12/13**	StartHHMMSS	**06:00:00**	GMT
NAvg	**4**	StoreTime	Y	
Interval	**3600**	Seconds	StartLater	Y

Recovery - use DS command, then stop.

Date	**07/01/2016**	Time	**12:26:28**
GMT Time	**12:23:30**	SampleNum	**172834**
Data file name	**Drake South Microcat 3025.asc**		

Inverted Echo Sounder

IES start date		IES start time		GMT
First CHIRP date		First CHIRP time		GMT
CHIRP interval		minutes	Lockout time	

Sample rate		Samples per datafile		
Start file number		Deployment number		
Comment				
Last IES CHIRP		GMT	CHIRP date	
Number of datafiles		Data file name		

Tide Gauge Protocol Sheet

Deployment

Deployment No	**285**	Ship/Cruise No	**RRS James Clark Ross JR292**	
Deployment date	**25/12/13**		Mooring name	**Drake North (DPN)**
Time on station	**02:10** GMT		Latitude	**-54.98023S (54° 58.8138' S)**
Time into water	**02:23** GMT		Longitude	**-57.98865 W (57° 59.3190' W)**
Time on the seabed	**02:45** GMT		Depth	**1097m**

Acoustic Release Information

Type	S/N	Tx	Rx	Release code	Enable code	Release lead S/N	B/W lead S/N	BW (V)	Battery (V)	Current (mA)	BW Polarity Check
XT6001	**70772**	**12.0**	**10.0**	**D**	**F**						**X**
XT6001	**83746**	**12.0**	**11.5**	**D**	**F**						**X**

Recovery Equipment Information

Radio Beacon Type	Radio Beacon S/N	Radio Frequency	Release Gate S/N	Flashing Light S/N
Benthos 204-RT 6700m	**041**	**154.585 MHz**		**No**

Notes

Recovery

Recovery date	**11/01/16**	Ship/Cruise No	**James Clark Ross JR15003**	
Time on station	**14:00:00** GMT		Release transmitted	**14:14:00** GMT

			To Both
Time of release	**14:17:00** GMT	Time on the surface	**14:46:00** GMT

Notes Again, communication problem with acoustics, fault traced to a intermittent cable between Benthos deck box and hull transducer. Faulty deck box rechecked again, still faulty.

Configuration Information

Logger

Logger type	**RDTG**	ID Number	TRL02	
Sensors	**DQ 43118**			
Current (mA)	**0.90**	Battery (V)	**14.63**	
Timebase started at	**23:15:00**	GMT	Start date	**21/12/13**
First scan at	**23:30:00**	GMT	Scan date	**21/12/13**
Sample interval	**15**	minutes		
Last scan time	**17:44:45**	GMT	Scan date	**12/01/16**
Expected scan time	**17:45:00**	GMT	Scan date	12/01/16
Data file name	**Drake North TRL02.log**			

Notes Scan 106635

SBE37-SMP Microcat Check This one or 5600 came back with Alkaline batteries!!!!!!

Serial Number	37SMP 45824-4583		Depth rating	3500m
DDMMYY	23/12/13	HHMMSS	18:00:00	GMT
StartDDMMYY	24/12/13	StartHHMMSS	23:45:00	GMT
NAvg	4	StoreTime	Y	
Interval	3600	Seconds	StartLater	Yes

Recovery - use DS command, then stop.

Date	**12/01/16**	Time	**12:05:53**
GMT Time	**12:00:00**	SampleNum	**172614**
Data file name	**Drake North Mcat 4583.asc**		

Inverted Echo Sounder

IES start date		IES start time		GMT

First CHIRP date		First CHIRP time		GMT
CHIRP interval		minutes	Lockout time	**0**
Sample rate	**Fast**	Samples per datafile		
Start file number		Deployment number		
Comment				
Last IES CHIRP		GMT	CHIRP date	
Number of datafiles		Data file name		

RBR Instruments (Set PC clock to GMT before setting up instrument, and sync instrument time to PC)

Model Number	Serial Number	Sample Interval (secs)	Start Time	Start Date	Stop Time	Stop Date

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Tide Gauge Protocol Sheet

Deployment

Deployment No	**295**	Ship/Cruise	**James Clark Ross JR15003**	
Deployment date	**06/01/16**		Mooring name	**Drake South**
Time on station	**17:05** GMT		Latitude	**-60 51.1070 Bridge (-60.85157)**
Time into water	**17:12** GMT		Longitude	**-54. 43.7376 Bridge (-54.72892)**
Time on the seabed	**17:35** GMT		Depth	**1180m**

Acoustic Release Information

Type	S/N	Tx	Rx	Release code	Enable code	Release lead S/N	B/W lead S/N	BW (V)	Battery (V)	Current (mA)	BW Polarity Check
XT6000 10”	**63965**	**12:00**	**11:00**	**B**	**-**	**171122 010 -04 DOM 2010**	**151210 -10 DOM 2010**	**+28.1V**	**14.50 (R) 14.52 (O)**		**OK**
XT6001 10”	**69678**	**12:00**	**13.50**	**D**	**F**	**171122 010 -03 DOM 2010**	**190412 /05 DOM 2012**	**+27.9V**			**OK**

Recovery Equipment Information

Radio Beacon Type	Radio Beacon S/N	Radio Frequency	Release Gate S/N	Flashing Light S/N
RF-700 A1 Novatech	**X11**	**154.585**	**71**	**Yes**

Notes

Recovery

Recovery date		Ship/Cruise No		
Time on station	GMT		Release transmitted	GMT
Time of release	GMT		Time on the surface	GMT

Notes

Configuration Information

Logger

Logger type	**RDTG Tube**	ID Number	**D3**	
Sensors	**DQ 105443**			
Current (mA)		Battery (V)	**RD= 14.51V OR=14.51V**	
Timebase started at	**18:00:00**	GMT	Start date	**22/12/15**
First scan at	**18:00:00**	GMT	Scan date	**22/12/15**
Sample interval	**15**	minutes		
Last scan time		GMT	Scan date	
Expected scan time		GMT	Scan date	
Data file name				

Notes

SBE37-SMP Microcat

Serial Number	**37SMP 45824-5600**		Depth rating	**3500 m**
DDMMYY	**03/01/2016**	HHMMSS	**17:48:08**	GMT
StartDDMMYY	**07/01/2016**	StartHHMMSS	**06:00:00**	GMT
NAvg	**4**	StoreTime	Y	
Interval	**3600**	Seconds	StartLater	Y

Recovery - use DS command, then stop.

Date		Time	
GMT Time		SampleNum	
Data file name			

Inverted Echo Sounder

IES start date		IES start time		GMT
First CHIRP date		First CHIRP time		GMT
CHIRP interval		minutes	Lockout time	
Sample rate		Samples per datafile		
Start file number		Deployment number		
Comment				
Last IES CHIRP		GMT	CHIRP date	
Number of datafiles		Data file name		

RBR Instruments (Set PC clock to GMT before setting up instrument, and sync instrument time to PC)

Model Number	Serial Number	Sample Interval (secs)	Start Time	Start Date	Stop Time	Stop Date

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Tide Gauge Protocol Sheet

Deployment

Deployment No	**296**	Ship/Cruise	**James Clark Ross JR15003**	
Deployment date	**11/01/16**		Mooring name	**Drake North**
Time on station	**15:30** GMT		Latitude	**-54 58.817S Bridge (-54.98025)**
Time into water	**15:34** GMT		Longitude	**-57 59.309W Bridge (-57.98855)**
Time on the seabed	**15:51** GMT		Depth	**1204**

Acoustic Release Information

Type	S/N	Tx	Rx	Release code	Enable code	Release lead S/N	B/W lead S/N	BW (V)	Battery (V)	Current (mA)	BW Polarity Check
XT6001	**51370**	**12:00**	**13:00**	**C**	**E**	**171220**	**151210**	**28.5V**	**14.53**		**OK**

10”						**10-08 DOM 2010**	**-14 DOM 2010**		**Batt. Sphere**		
X6001 10”	**49046**	**12:00**	**11.50**	**A**	**E**	**171220 10-12 DOM 2010**	**151210 -11 DOM 2010**	**28.6V**			**OK**

Recovery Equipment Information

Radio Beacon Type	Radio Beacon S/N	Radio Frequency	Release Gate S/N	Flashing Light S/N
Benthos		**154.585 MHz**	**R5288.17**	**Yes**

Notes

Recovery

Recovery date		Ship/Cruise No		
Time on station	GMT		Release transmitted	GMT
Time of release	GMT		Time on the surface	GMT

Notes

Configuration Information

Logger

Logger type	**Sphere**	ID Number	**NBPR Sphere**	
Sensors	**DQ 90803**			
Current (mA)		Battery (V)		
Timebase started at	**19:15:00**	GMT	Start date	**22/12/15**
First scan at	**19:30:00**	GMT	Scan date	**22/12/15**
Sample interval	**15**	minutes		
Last scan time		GMT	Scan date	
Expected scan time		GMT	Scan date	
Data file name				

Notes

SBE37-SMP Microcat HTML version, need V2 of Seaterm

Serial Number	**37SMP53228-6780**	Depth rating	**6885**

DDMMYY	**26/12/15**	HHMMSS	**19:06:21**	GMT
StartDDMMYY	**12/01/16**	StartHHMMSS	**060000**	GMT
NAvg	**?**	StoreTime	Y	
Interval	**3600**	Seconds	StartLater	Y

No stop time programmed

Recovery - use DS command, then stop.

Date		Time	
GMT Time		SampleNum	
Data file name			

Inverted Echo Sounder

IES start date		IES start time		GMT
First CHIRP date		First CHIRP time		GMT
CHIRP interval		minutes	Lockout time	
Sample rate		Samples per datafile		
Start file number		Deployment number		
Comment				
Last IES CHIRP		GMT	CHIRP date	
Number of datafiles		Data file name		

RBR Instruments (Set PC clock to GMT before setting up instrument, and sync instrument time to PC)

Model Number	Serial Number	Sample Interval (secs)	Start Time	Start Date	Stop Time	Stop Date

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Tide Gauge Protocol Sheet

Deployment

Deployment No	**294**	Ship/Cruise	**James Clark Ross JR305**
Deployment date	**17/01/15**	Mooring name	**Drake North Deep (FETCH)**
Time on station	**18:20** GMT	Latitude	**-55.03909 S**
Time into water	**18:26** GMT	Longitude	**-57.94898 W**
Time on the seabed	**18:53** GMT	Depth	**2031 m**

Acoustic Release Information

Type	S/N	Tx	Rx	Release code	Enable code	Release lead S/N	B/W lead S/N	BW (V)	Battery (V)	Current (mA)	BW Polarity Check
FETCH	**ADDR**	**2410**		**UID**	**3353**						

Recovery Equipment Information

Radio Beacon Type	Radio Beacon S/N	Radio Frequency	Release Gate S/N	Flashing Light S/N

Notes

Recovery

Recovery date		Ship/Cruise No		
Time on station	GMT		Release transmitted	GMT
Time of release	GMT		Time on the surface	GMT

Notes

Configuration Information

Logger

Logger type	**FETCH**	ID Number	**226135-002 ADDR 2401 UID 24B8**	
Sensors	**DQ Addr 2410 UUID 3353**			
Current (mA)		Battery (V)		
Timebase started at		GMT	Start date	**15/01/15**
First scan at		GMT	Scan date	**15/01/15**
Sample interval	**15**	minutes		
Last scan time		GMT	Scan date	
Expected scan time		GMT	Scan date	
Data file name				

Notes Communicated successfully 20% battery used. 2 Pages (1 Day) took 40 seconds to download. 855 pages so far need the HPT for fast download.

SBE37-SMP Microcat

Serial Number			Depth rating	
DDMMYY		HHMMSS		GMT
StartDDMMYY		StartHHMMSS		GMT
NAvg		StoreTime		
Interval		Seconds		Y

No stop time programmed

Recovery - use DS command, then stop.

Date		Time	
GMT Time		SampleNum	
Data file name			

Inverted Echo Sounder

IES start date		IES start time		GMT
First CHIRP date		First CHIRP time		GMT
CHIRP interval		minutes	Lockout time	
Sample rate		Samples per datafile		
Start file number		Deployment number		
Comment				
Last IES CHIRP		GMT	CHIRP date	
Number of datafiles		Data file name		

RBR Instruments (Set PC clock to GMT before setting up instrument, and sync instrument time to PC)

Model Number	Serial Number	Sample Interval (secs)	Start Time	Start Date	Stop Time	Stop Date

MCal How-To

Julian Klepacki

Useful information from JR292 Cruise for MCal

The JCR's Benthos UDB9000 PC has now got installed some software for mooring-calibration: MCal. This software effectively allows the ranging and locating of acoustic devices with a graphical interface showing where the device/instrument is located with respect to the ship. It has some NMEA strings fed into the PC via UDP connection and a serial comms connection to the UDB9400 deck-unit.

During JR292 MCal was used in conjunction with a Benthos DS-7000 deck-box (POL) to perform calibrations with Landers. The DS-7000 deck-box was connected into COM1 of the UDB9400 PC and COM1 was selected for the DS-7000 port in the *Deck-Set* dialog. Initial attempts failed to get any results; MCal initialised the deck-box correctly, calibration procedure executed as expected with station-transmissions and replies returned, but the solution presented was not physical indicating a location off the chart somewhere? It was then discovered that *SeedXY* origin was incorrectly selected. Seed-XY was set to '*Cross-hair*', this meant that a cross-hair has to be placed at initial location prior to calibration, otherwise erroneous calculations will result. Likely a cross-hair was placed, at some distant location on the chart. MCal, then takes this as it's initial starting point and calculates incorrectly.

On the final deployment of Lander the MCal procedure was corrected, by placing the SeedXY cross-hair at the ships location at the point of deployment. The ship then circumnavigated around the deployed instrument performing a calibration; MCal was set to *Auto-Transmit* every 100m, stations were placed on transmission and replies returned. After the required number of returned replies, a *Current-Solution* was returned. As more stations were placed during the circumnavigation, the current-solution improved and the *Maximum Allowable RMS Error* (10m) was reduced to increase accuracy. This was limited to ~3m, as reducing further would limit the number of accepted 'replies'. The final solution was recorded for future reference.

MCal had been used with the UDB94000, but ran out of time to perform a completely successful calibration. A document has been created as 'How-To' guide to get up and running with the system. Document has been added to the ships wiki under UDB9400. BAS AME needs to obtain modem/release for trials and familiarisation of the system to provide operation and support properly.

The following document is a basic how-to, to perform a MCal transponder calibration (positioning). It is advised to read through the MCal help information and the UDB deck-box manual for more information. Presented below is the essentials to get the system working and performing a calibration. Document is 'in-progress' and will be developed and fine-tuned as better experience and knowledge is obtained. Please feel free to correct, edit etc. JZK 30/12/2013. jzk@bas.ac.uk

UDB9400

Switch on the UDB9400 Deck unit

Press the *RELEASE* key-pad to enter the release settings screen
Select the appropriate device, i.e. *Benthos FSK* for standard acoustic releases etc.
Change to the Transponder reply frequency (UDB Rx Freq) via the Transponder Settings

Once the UDB has been powered up and correct transponder and reply freq selected, it shouldn't need to be touched, MCal will control, adjust, initialise it etc. Unless you are Releasing, then read the UDB manual for clarity on how to do this.

MCal

Before you actually start to perform a calibration, you need to place a *SeedXY*, this is an initial positioning for calculations and should be representative of location of transponder otherwise large errors result, calculations rejected with failed or erroneous positioning.

SeedXY can be entered manually via placing a *Cross-hair* or automatically via *GPS-Antenna*, using the ships GPS-antenna as the location of initial condition. *SeedXY* source is set in the *Transponder* checklist dialog. If *Cross-Hair* is selected make sure a position is placed before you begin otherwise it will not work properly.

e.g.

Place a waypoint at the last known location of the instrument if recovering. Go into *Nav-Aids* and create a new waypoint and enter the lat, long and depth. You now have a marker for instrument to place the cross-hair on. If deploying, can simply place a cross-hair at the ships location before it moves from station. You can move waypoints by simply editing the lat-long in Nav-Aids dialog.

If you are using GPS-Antenna method, as soon as the calibration is started MCal will place the initial condition effectively where the ship is, as that is where the GPS antenna is. GPS-Antenna method should be suitable for all conditions, as typically ship is not that far away from instrument, especially on deployment.

You need to go through the *Checklist* before you are allowed to perform a calibration. Click on the *Mooring CAL* button to display the checklist. Click on each category and accept/modify to *Tick* category off the checklist.

Files

New Cruise will create a new folder with new session files inside. You are prompted to select/create new folder and subsequent files.
New Session will keep the active folder, but you can enter filename for the new session.
Create a new session at least for all calibrations and save session afterwards to future reference.

MooringCal Job

This is basically header info for the job, add info, as applicable.

Geodetics

Leave this as set. Just, check the tick-box to accept.

Vessel

In here you select aspects of graphics associated with the vessel; trail-markings, pointers etc. Most important thing is the vessel dimensions for GPS etc. These should be defaulted to correct values, but if not a file is saved with the JCR dimensions: *C:\MCal\JCR.ves*. Import the file to get dimensions back.

GPS Heading

Confirm that the NMEA datagrams are coming into the PC. MCal will show if data is detected and what is coming in. If no data, see ICT. NMEA datagrams come in on the UDP port 12000 from the SEAPath. HDT, GGA and VTG datagrams are received.

Deckset

Make sure UDB-9000 is selected as the deck-set, or other supported deck-box.
For UDB9400, Com-port 2 is entered and check in the *settings* that com2 is enabled (selected YES). The UDB9400 has x2 com-ports; com1 and com2. Com1 is for executing commands via a terminal. Com2 is for exchange of commands and data and simulates DS-7000 deck-set in remote mode. Com2 must be enabled for it to work.
If using third-party deck-set, just make sure the com-port in MCal is selected that is connected to deck-set be it com1, com2, com3 or com4 on the MCal PC.
Change the Tx and Rx frequencies to those values working with.
Set the *Power + Init*, mid-range/default should be good enough. Don't want too much power.
Set the *Threshold +Init*, again mid-range/default should be good enough.

You should see the parameters had changed on the UDB9400, or supported deck-box being used to the settings within MCal: UDB Tx freq change and power/threshold (*Advanced Transponder Settings – Change settings*). Only thing that doesn't seem to change is the transponder reply frequency (UDB Rx). For comprehension set the Rx frequency on the UDB manually by going into *Transponder Settings*.

During the *Init* phase you should see communication with the UDB in the *Results* window at the bottom of the dialog. If things change to what you set and comms is seen, all is good.

Transponder

Make sure *Interrogate* and *Reply* correspond to what you have set or is required.
Delay; I think this is TaT, leave it to the set 2.5mS.
SeedZ; This is initial depth, set as expected recorded by the EA/EM.
SeedXY; This is the initial condition talked about at the beginning of document.
Fix-Type; 3-D solves for depth and is good in deep water. 2-D best for shallow where depth is

known.
Average Speed of Sound; Best to enter an accurate average as obtainable. This can have significant effects on solution obtained.

Once the entire checklist has been *ticked*, the *Begin Mooring Cal* button becomes enabled. Click on this and the calibration/control panel is shown.

Transmit Control
Either transmit manually clicking the *Transmit*-button as you wish, or transmit automatically by ticking the *Auto-Transmit* check-box and enter a distance between transmissions. 100m is good for the JCR, this ideally wants to be no shorter than the vessel and minimally 1% of expected range. Every time you transmit you get a *station* that is used as a fix-point for the overall solution. You can change power, threshold etc during cal process if you like.

Current Solution
This is the calculated position. In the list of *stations* you have the replies, there needs to be at least x5 replies before you get an actual position and ranges are specified.
Maximum Allowable RMS Error slider is the accepted error in distance. 10m is a default, but you can reduce this for a better fix ~3m or so. The smaller the allowable error the more selective the process is and more stations are needed for a reliable fix.
Can also change Seeds, Fix and average sound velocity etc during calibration.

Once calibration/positioning completed, press *Done With Mooring* and save session files for future reference etc.

Tools
Pressing on the *Tools* button will allow the displaying of incoming data on the ports, port configurations etc and also other parameters. Only important ones are the ports and *Course/Speed*, where the input source wants to be *GPS SOG*. Otherwise vessel positioning/heading will be incorrect.

APPENDIX 3 – SEA LEVEL RECORDER TECHNICAL INFORMATION WITH REGARD TO EACH INSTALLTION.

STANLEY 15-17/12/2015

The Sea Level Recorder at Stanley consists of three logging systems. Two of these systems are independent of each other, one has a sets of Digiquartz pressure sensors and one with a radar and a set of strain gauge pressure sensors. The third system is an internet connected logger and receives data from both the two independent logging systems. This allows one off the loggers to send data automatically at set periods of time over the broadband, but also allows the second logger to be interrogated/checked and if necessary, allow the data to be downloaded.

The first logging system, Tidata, uses three pressure sensors; a full tide sensor, a half tide sensor and a barometric sensor, which continuously integrates the output frequency and stores this information every fifteen minutes to a SRAM card. . The full tide sensor is mounted such that it is permanently below the water level, even at the extreme low tide event. The half tide sensor is mounted alongside the full tide sensor and is fitted with a feed pipe to the pressure inlet port that is taken from a point at the middle of the tidal range. Thus as the tide falls below this point, the pressure being measured by the sensor should remain constant, with a value equal to the head of water retained in the feed pipe. This then provides a datum level for determining the full tide level. The barometric sensor is used to measure air pressure and temperature. This information is used to correct the full and half tide pressure measurements, removing the barometric influences.

The second measuring system (Waterlog) uses a combination of radar and pressure sensors with the pressure sensors mounted in a similar way to the first system. The radar used is a Waterlog 3611i sensor which uses electromagnetic pulses to determine the distance to the sea surface. The radar is positioned so that it points vertically downwards with an uninterrupted view of the water below, the unit records a spot reading every minute. The full tide pressure sensors takes an average of 6 values over a 30 second period while the half tide sensor records a spot reading every minute. These measurements are then transmitted via the Meteosat satellite communication network and then are available for downloading via the Global Telecommunications System (GTS).

<u>Tidata II Logger</u>
Timebase scan

Expected	Actual
12.45.00 GMT on 15/12/2015	12.43.06 GMT on 15/12/2015

The raw data was downloaded from the memory card and stored as StanleyTG RAW Data 2015.log and StanleyTG Cal Data 2015 .log

Sensors fitted. Old DigiQuartz

Full Tide	DQ 47594
Half Tide	DQ 47598

Barometer DQ 39239

Note. The pressure sensors were swapped over to the spare 'ALL IN ONE' sensor unit which uses the Quartzonix sensors. The new sensors are as follows:

Full Tide QT 99099
Half Tide QT 99450
Barometer QT 97890

Note. On the 14th January 2016 the gauge was revisited as it was found the new Half tide temperature channel was not working correctly. To rectify this the original half tide temperature and pressure were reconnected, so the new arrangement is as follows:

Full Tide QT 99099
Half Tide DQ 47598
Barometer QT 97890

The timebase was restarted at 19.15.00 GMT on the 15th December 2015 time (see above for timing information).

As mention previously both systems are link to the local 'Sure' broadband network which enable them to either transmit near real time data data back to the National Oceanography Centre via a static IP address or allow them to interrogated.

SIGNY 21/12/2015

The Signy tide gauge was installed approximately 27 years ago and consists of a Sea Level Recorder based on the Tidata II logger with two sensors, one reporting pressure and temperature and one barometric data. The pressure and temperature sensor are mounted permanently below the water line and are chained to a concrete block, this is situated some distance from the end of the jetty. Both the pressure and temperature part of the sensor failed a number of years ago.

Signy is a summer only base; as we were visiting quite late the base had already been opened up. NOC personnel arrived on the island along with a number of BAS personnel who were there to refuel the station for the forth coming summer season. We were shown the tide gauge by the base commander and informed of the work carried out so far.

The tide gauge cabinet was opened and it could be seen that the system was still scanning but the program was not running.

<u>Tidata II Logger</u>
Timebase scan

Expected	Actual
13.15.00 GMT on 27/12/2013	13.16.29 GMT on 27/12/2013

The data were downloaded to Signy_Data_2015.log

Sensors fitted	DQ 49602	Full Tide
	Int Temp Sensor	
	DQ 36488	Barometer

After a complete check of the signals it was determined that the sensor had either leaked or rotted away. It is our recommendation that this station be decommissioned and removed. The logging system can be remove at the next call by NOC staff but the sensor in the bay will need to be removed with the help of divers, a possibility is the involve the Royal Navy and request that when HMS Protector is next in that they dive on the sensor.

Tidata II Logger restart
Timebase started at 17.30.00 GMT on 21/12/2015 (See above for timing)
First scan at 17.40.00 GMT

ROTHERA 28/012/2015 – 02/01/2016

The tide gauge at Rothera consists of three pressure sensors, a full tide sensor, a half tide sensor and a barometer. The full tide sensor is positioned to be submerged at all times, whilst the half tide sensor is positioned above the full tide sensor at the middle of the tidal range. The half tide sensor act as a reference point for the full tide sensor and allows accurate surveying of the installation to be undertaken.

The output signals from these sensors are recorded by three independent logging systems. Logger 1 is the main logging system and Logger 2 is a backup system recording the same information as Logger 1. The two systems use a Tidata II logger and store data to a SRAM card. The third Logger records the output from Logger 1 and relays this data in near real time, to the National Oceanography Centre Liverpool using British Antarctic Surveys satellite broadband network.

Sensors fitted	
Full tide	DQ 47942
Half tide	DQ 47452
Barometer	DQ 65487

Logger 1 timebase scan

Expected	Actual
17.15.00 GMT on 28/12/2015	17.14.20 GMT on 28/12/2015

Logger 2 timebase scan

Expected	Actual
17.15.00 GMT on 28/12/2015	17.20.51 GMT on 28/12/2015

The raw data was downloaded to:
TG1_Rothera_Raw_2015.log
TG2_Rothera_Raw_2015.log
TG1_Rothera_Cal_2015.log
TG2_Rothera_Cal_2015.log

New lithium batteries were fitted into the SRAM cards on both Logger 1 and 2, after the data had been downloaded from both. The loggers were then restarted and the first scan captured.

Logger 1 timebase started at 19.00.00 GMT on 28/12/2015 (See above for timing)
First scan at 19.15.00 GMT

Logger 2 timebase started at 19.15.00 GMT on 28/12/2015 (See above for timing)
First scan at 18.15.00 GMT

The stilling well was visually checked and photographs taken of the various items including the cable runs, heaters junction boxes and sensors for future reference.

The problem associated with channel 3 and 4 reporting the same frequencies was also investigated. This looks to be a faulty half tide temperature sensor, it is possible at the next call in 2016/17 to remove the stilling well and replace the sensor.

In addition to the existing tide gauges an additional radar sensor has been added. This is using a VegaFlex81 mounted in a heated and insulated stilling well. The unit was levelled into a known benchmark which is located at the top of the pressure sensor metal work, see above for details. The data is transmitted back using the GOES satellite network and is available via the GTS system and can be viewed on the IOC Sealevel website at:

http://www.ioc-sealevelmonitoring.org/station.php?code=rothe

VERNADSKY 04/01/2016

The tide gauge at Vernadsky consists of three independent systems. The oldest tide gauge is the Munro float tide gauge and chart recorder. This consists of a stilling well and a float that rises and falls with the tide. A line is drawn on chart paper by a pen, recording the tidal variation. The paper is advanced using a mechanical clock mechanism.

The second tide gauge is a Tidata II electronic system that uses digiquartz pressure sensors and stores the data on an EPROM card. The card has the capacity to store four years worth of data.

The third system is a commercial system from OTT that uses strain gauge pressure sensors and transmits the data back via the GOES East satellite.

Upon arrival on the base, we were escorted down to the tide gauge. The OTT system was checked first and found to be working well, except for the problem identified in November 2015 where the time and date were not being recorded correctly. This is currently being investigated as other institutes using this system are also experiencing the same problem. The Tidata II logger was then checked and found that it had jumped out of its program.

Tidata II Logger
Timebase

Date and Time Shown	Actual Logger time
19.16.44 GMT on 04/01/2016	19.23.00 GMT on 04/01/2016

Data downloaded to Vernadsky_2015_16_Data.txt

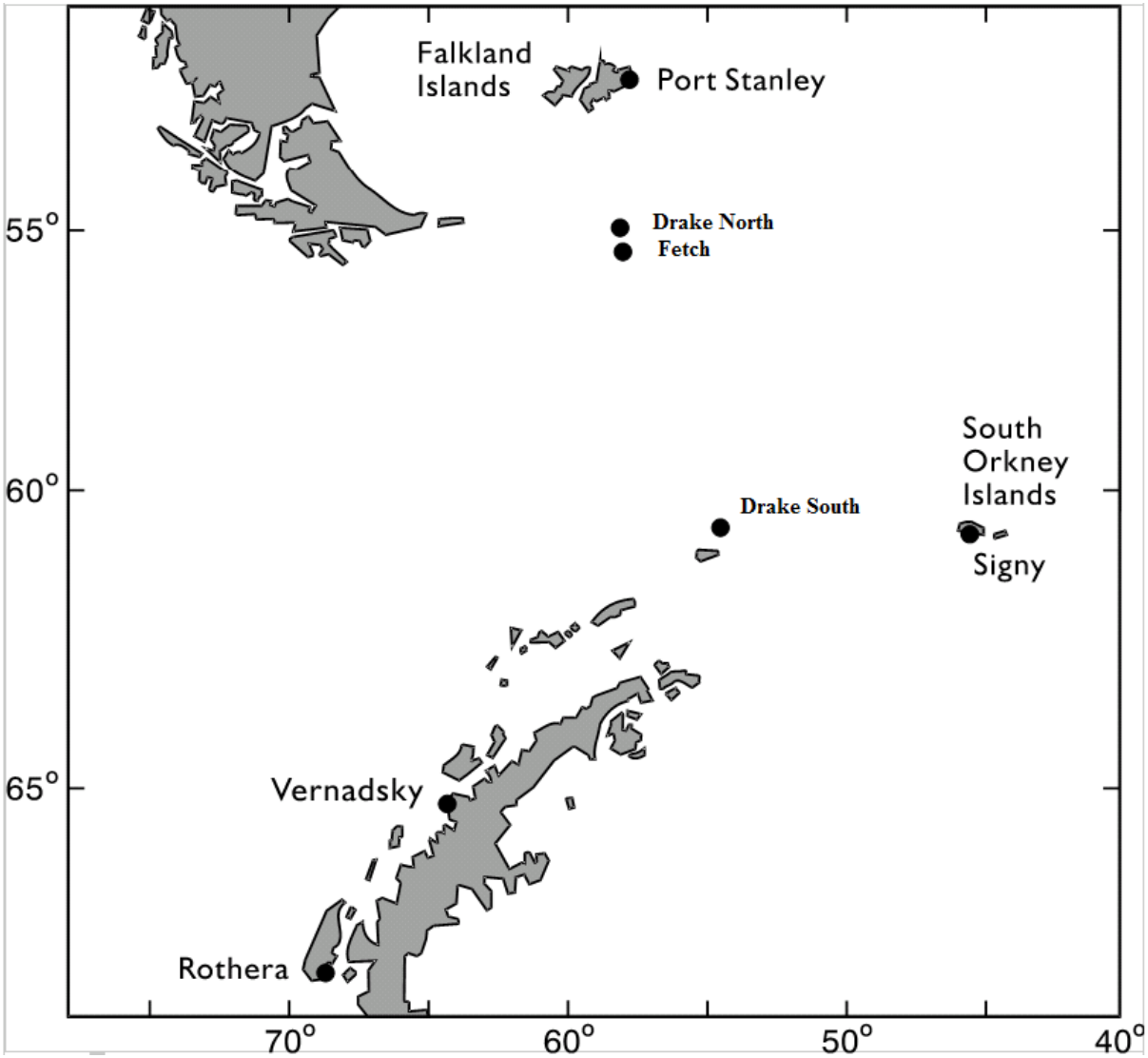
Tidata II Logger retart
Timebase started at 22.00.00 GMT on 04/01/2016
First scan at 22.15.00 GMT

Unfortunately these sensors have been in operation for may years and over time have become blocked. It is unlikely that we will be unable to dive on theses sensors, so for this reason it may be advisable to replace this system with a radar, similar to the one at Rothera. Photographs were taken of a possible location between the existing stilling well and the tide boards. Photographs were also taken of the of the handrail associated with the tide gauge hut, if the OTT system was to be replaced with a Waterlog logger the GOES antenna could easily be mounted on the handrail rather than relying on the long serial lead running up to the Ozone loft. This would then allow the data to be backed up locally as well as allowing sensor averaging to be implemented.

KING EDWARD POINT

There was no visit to KEP this year.

APPENDIX 3 – MAP OF DEPLOYMENT POSITIONS



Drake North (1000M) and the Fetch (2000M) designates the BPR deployment area in Burdwood Bank. Drake South (1000M) designates the BPR deployment area north of Elephant Island.

APPENDIX 4 – BRIDGE LOG

Time, Event, Lat, Lon, Comment, User

21:06:00, 11/01/2016,,-54.66373,-57.98148,Full Away on Passage,bridge
21:00:00, 11/01/2016,,-54.66679,-57.98303,Vsl off DP,bridge
20:52:00, 11/01/2016,051,-54.66680,-57.98304,CTD recovered to deck,bridge
20:44:00, 11/01/2016,051,-54.66680,-57.98309,CTD stopped at 152m, Commence hauling ,bridge
20:41:00, 11/01/2016,051,-54.66678,-57.98305,CTD veering to 140m, EA600 Depth 165m,bridge
20:39:00, 11/01/2016,051,-54.66677,-57.98309,CTD in the water,bridge
20:35:00, 11/01/2016,051,-54.66675,-57.98303,Commence deploying CTD,bridge
20:30:00, 11/01/2016,,-54.66678,-57.98291,Vsl on DP,bridge
20:24:00, 11/01/2016,,-54.67128,-57.97651,Commence slowing down for station,bridge
19:06:00, 11/01/2016,,-54.91791,-57.98590,Full away on passage,bridge
18:58:00, 11/01/2016,,-54.92246,-57.98205,Off DP,bridge
18:53:00, 11/01/2016,050,-54.92246,-57.98207,CTD recovered,bridge
18:33:00, 11/01/2016,050,-54.92244,-57.98245,CTD stopped at 705m,bridge
18:19:00, 11/01/2016,050,-54.92245,-57.98150,CTD deployed,bridge
18:12:00, 11/01/2016,,-54.92230,-57.97907,On DP,bridge
18:06:00, 11/01/2016,,-54.92545,-57.96943,Off passage,bridge
17:48:00, 11/01/2016,,-54.97668,-57.98656,On passage,bridge
17:42:00, 11/01/2016,,-54.97786,-57.98080,Off DP,bridge
17:37:00, 11/01/2016,049,-54.97783,-57.98087,CTD recovered,bridge
17:09:00, 11/01/2016,049,-54.97788,-57.98279,CTD stopped at 1050m,bridge
16:48:00, 11/01/2016,049,-54.97792,-57.98310,CTD deployed,bridge
16:30:00, 11/01/2016,048,-54.97989,-57.97539,Extra BPR recovery failed to release, vessel proceeding towards CTD station,bridge
16:09:00, 11/01/2016,048,-54.97993,-57.97554,Vessel in position attempting to communicate with BPR,bridge
15:53:00, 11/01/2016,,-54.98026,-57.98845,Vessel reloacating to new BPR position,bridge
15:51:00, 11/01/2016,047,-54.98028,-57.98851,BPR on the sea bed final range 1204m,bridge
15:34:00, 11/01/2016,047,-54.98025,-57.98850,BPR deployed,bridge
15:32:00, 11/01/2016,047,-54.98025,-57.98855,Vessel in deployment position ,bridge
15:13:00, 11/01/2016,,-54.97984,-57.97311,Vessel relocating for BPR deployment,bridge
15:11:00, 11/01/2016,046,-54.97983,-57.97308,BPR back on board,bridge
15:08:00, 11/01/2016,046,-54.98007,-57.97310,Commence hauling on line,bridge
15:06:00, 11/01/2016,046,-54.98032,-57.97294,BPR fast on ships line,bridge
15:05:00, 11/01/2016,046,-54.98041,-57.97338,BPR grappled,bridge
14:48:00, 11/01/2016,046,-54.98057,-57.98071,BPR Sighted vessel moving for recovery,bridge
14:18:00, 11/01/2016,046,-54.98052,-57.98079,BPR signal sent, BPR released and rising,bridge
14:00:00, 11/01/2016,046,-54.98052,-57.98078,Vessel Ranging BPR,bridge
13:54:00, 11/01/2016,,-54.98181,-57.98094,Vessel On DP,bridge
13:48:00, 11/01/2016,,-54.99001,-57.97807,Vessel aproaching station,bridge
13:42:00, 11/01/2016,,-55.00495,-57.97981,Vessel FAOP,bridge
13:36:00, 11/01/2016,,-55.00636,-57.97397,Vessel Off station,bridge
13:30:00, 11/01/2016,045,-55.00636,-57.97396,CTD Recovered,bridge
12:52:00, 11/01/2016,045,-55.00667,-57.97826,CTD Stopped at 1655m,bridge
12:24:00, 11/01/2016,045,-55.00662,-57.98196,CTD Veering to 1650m,bridge
12:22:00, 11/01/2016,045,-55.00662,-57.98184,CTD Deployed,bridge
12:12:00, 11/01/2016,,-55.00686,-57.97917,Vessel On DP,bridge
12:06:00, 11/01/2016,,-55.00748,-57.97229,Vessel aproaching station,bridge
11:54:00, 11/01/2016,,-55.03662,-57.95101,Vessel FAOP,bridge

11:48:00, 11/01/2016,,-55.03654,-57.94507,Vessel off station,bridge
11:46:00, 11/01/2016,044,-55.03647,-57.94500,Hydrophone Recovered,bridge
11:20:00, 11/01/2016,044,-55.03637,-57.94491,Hydrophone deployed,bridge
11:18:00, 11/01/2016,,-55.03624,-57.94498,Vessel On DP,bridge
11:12:00, 11/01/2016,,-55.03873,-57.94651,Vessel aprocahing station,bridge
10:54:00, 11/01/2016,043,-55.06767,-57.96617,Vsl off DP,bridge
10:51:00, 11/01/2016,053,-55.06765,-57.96621,CTD Recovered to Deck,bridge
10:02:00, 11/01/2016,043,-55.06851,-57.97536,CTD stopped at 2175m, Commence hauling,bridge
09:26:00, 11/01/2016,043,-55.06925,-57.98256,CTD veering to 2200m, EA600 2240m,bridge
09:22:00, 11/01/2016,043,-55.06927,-57.98253,CTD in the water,bridge
09:17:00, 11/01/2016,043,-55.06924,-57.98254,Commence Deploying CTD,bridge
09:00:00, 11/01/2016,,-55.06922,-57.98253,Vsl on DP assessing weather conditions,bridge
08:36:00, 11/01/2016,,-55.06157,-57.96412,Commence turning on to station,bridge
08:23:00, 11/01/2016,,-55.06472,-58.03430,Vsl leaving Argentine EEZ - restart scientific data collection,bridge
20:31:00, 10/01/2016,,-55.08268,-58.03289,Vsl entering Argentine EEZ - all scientific data collection stopped,bridge
16:18:00, 10/01/2016,,-55.11259,-57.95186,Off DP, hove too for weather,bridge
16:08:00, 10/01/2016,042,-55.11365,-57.95520,CTD recovered,bridge
15:11:00, 10/01/2016,042,-55.11717,-57.96834,CTD stopped at 2680m,bridge
14:26:00, 10/01/2016,042,-55.11985,-57.98106,CTD Veering to 2700m,bridge
14:22:00, 10/01/2016,042,-55.11992,-57.98138,CTD Deployed,bridge
14:06:00, 10/01/2016,,-55.11926,-57.98001,Vessel On DP,bridge
14:00:00, 10/01/2016,,-55.12305,-57.98021,Vessel slowing down for station,bridge
13:42:00, 10/01/2016,,-55.16334,-57.95430,Vessel FAOP,bridge
13:36:00, 10/01/2016,,-55.16574,-57.95098,Vessel off station,bridge
13:28:00, 10/01/2016,041,-55.16603,-57.95129,CTD Recovered,bridge
12:21:00, 10/01/2016,041,-55.16864,-57.96815,CTD Stopped at 3093m,bridge
11:29:00, 10/01/2016,041,-55.16985,-57.98155,CTD Veering to 3100m,bridge
11:20:00, 10/01/2016,041,-55.16991,-57.98250,CTD Deployed,bridge
11:18:00, 10/01/2016,,-55.17010,-57.98095,Vessel On DP,bridge
11:12:00, 10/01/2016,,-55.17118,-57.97592,Vessel Aproaching station,bridge
11:00:00, 10/01/2016,040,-55.19482,-57.95172,Full Away on Passage,bridge
10:48:00, 10/01/2016,040,-55.21591,-57.94174,Vsl off DP,bridge
10:41:00, 10/01/2016,040,-55.21593,-57.94159,CTD recovered to deck,bridge
09:19:00, 10/01/2016,040,-55.21534,-57.96232,CTD stopped at 3917m, Commence Hauling,bridge
08:15:00, 10/01/2016,040,-55.21434,-57.98289,CTD veering to approx 4000m, EA600 Depth 4078m,bridge
08:09:00, 10/01/2016,040,-55.21430,-57.98334,CTD in the water,bridge
08:06:00, 10/01/2016,040,-55.21429,-57.98343,Commence deploying CTD,bridge
07:42:00, 10/01/2016,040,-55.21431,-57.98299,Bracket bent on CTD - D/E to inspect,bridge
07:30:00, 10/01/2016,040,-55.21433,-57.98276,Vsl on DP,bridge
07:24:00, 10/01/2016,040,-55.22181,-57.97756,Commence slowing down to come on station,bridge
05:54:00, 10/01/2016,,-55.51026,-57.98528,On passage,bridge
05:48:00, 10/01/2016,,-55.51651,-57.98219,Off DP,bridge
05:38:00, 10/01/2016,039,-55.51666,-57.98170,CTD recovered,bridge
04:13:00, 10/01/2016,039,-55.51668,-57.98288,CTD stopped at 4195m,bridge
03:05:00, 10/01/2016,039,-55.51675,-57.98237,CTD Veering to 4150m,bridge
03:00:00, 10/01/2016,039,-55.51678,-57.98188,CTD Deployed,bridge
02:48:00, 10/01/2016,,-55.51684,-57.98105,Vessel On DP,bridge
02:42:00, 10/01/2016,,-55.51530,-57.97953,Vessel turning onto station,bridge
01:48:00, 10/01/2016,,-55.67223,-57.91448,Vessel FAOP,bridge

01:42:00, 10/01/2016,,-55.68156,-57.91082,Vessel coming off station, Off DP,bridge
01:31:00, 10/01/2016,038,-55.68173,-57.90931,CTD Recovered,bridge
00:02:00, 10/01/2016,038,-55.68171,-57.90930,CTD Stopped at 4510m,bridge
22:45:00, 09/01/2016,038,-55.68150,-57.90922,CTD veering to approx 4450m, EA600 Depth 4539m,bridge
22:41:00, 09/01/2016,038,-55.68135,-57.90920,CTD in the water,bridge
22:36:00, 09/01/2016,038,-55.68117,-57.90910,Commence deploying CTD,bridge
22:30:00, 09/01/2016,038,-55.68128,-57.90766,Vsl on DP,bridge
22:24:00, 09/01/2016,038,-55.68838,-57.89948,Commence slowing down to come on station,bridge
20:24:00, 09/01/2016,037,-56.05856,-57.67524,Full Away on Passage,bridge
20:12:00, 09/01/2016,037,-56.07552,-57.66561,Vsl off DP,bridge
20:06:00, 09/01/2016,037,-56.07550,-57.66562,CTD recovered to deck,bridge
18:47:00, 09/01/2016,037,-56.07555,-57.66561,CTD stopped at 3840m,bridge
17:40:00, 09/01/2016,037,-56.07556,-57.66563,CTD deployed,bridge
17:30:00, 09/01/2016,,-56.07552,-57.66294,On DP,bridge
17:24:00, 09/01/2016,,-56.08175,-57.65315,Vessel turning onto station,bridge
15:12:00, 09/01/2016,,-56.46071,-57.41090,Vessel on passage,bridge
15:06:00, 09/01/2016,,-56.46766,-57.40673,Off DP,bridge
15:02:00, 09/01/2016,036,-56.46764,-57.40497,APEX float Deployed,bridge
14:56:00, 09/01/2016,035,-56.46757,-57.40330,CTD Recovered,bridge
12:28:00, 09/01/2016,035,-56.46940,-57.42169,CTD Stopped at 3810m,bridge
12:24:00, 09/01/2016,035,-56.46942,-57.42171,CTD Veering to 3700m,bridge
12:18:00, 09/01/2016,035,-56.46943,-57.42161,CTD Deployed,bridge
12:12:00, 09/01/2016,,-56.46895,-57.41857,Vessel On DP,bridge
12:06:00, 09/01/2016,,-56.46944,-57.41177,Vessel turning onto station,bridge
09:42:00, 09/01/2016,034,-56.85161,-57.18944,Full Away on Passage,bridge
09:30:00, 09/01/2016,034,-56.86449,-57.17919,Vsl off DP,bridge
09:19:00, 09/01/2016,034,-56.86388,-57.17776,CTD Recovered to Deck,bridge
08:14:00, 09/01/2016,034,-56.86391,-57.17781,CTD stopped at 3000m, Commence Hauling,bridge
07:19:00, 09/01/2016,034,-56.86392,-57.17785,CTD veering to approx 3000m, EA600 Depth 3056m,bridge
07:14:00, 09/01/2016,034,-56.86392,-57.17780,CTD in the Water,bridge
07:10:00, 09/01/2016,034,-56.86390,-57.17784,Commence Deploying CTD,bridge
07:00:00, 09/01/2016,,-56.86344,-57.17676,On DP,bridge
06:48:00, 09/01/2016,,-56.87772,-57.15918,Vessel turning onto station,bridge
04:30:00, 09/01/2016,,-57.25495,-56.93695,Vessel turned and on passage,bridge
04:18:00, 09/01/2016,,-57.25885,-56.93346,Off DP,bridge
04:13:00, 09/01/2016,033,-57.25887,-56.93346,CTD recovered,bridge
02:47:00, 09/01/2016,033,-57.25883,-56.93343,CTD stopped at 3930m,bridge
01:33:00, 09/01/2016,033,-57.25993,-56.93332,CTD Veering to 3900m,bridge
01:32:00, 09/01/2016,033,-57.25993,-56.93331,CTD Deployed,bridge
01:18:00, 09/01/2016,,-57.25991,-56.93323,Vessel On DP,bridge
01:12:00, 09/01/2016,,-57.25989,-56.93157,Commence aproach to station,bridge
23:00:00, 08/01/2016,032,-57.64117,-56.70121,Full Away on Passage,bridge
22:48:00, 08/01/2016,032,-57.65379,-56.68912,Vsl off DP,bridge
22:40:00, 08/01/2016,032,-57.65375,-56.68915,CTD recovered to deck,bridge
21:29:00, 08/01/2016,032,-57.65372,-56.68914,CTD stopped at 3450m, Commence Hauling,bridge
20:26:00, 08/01/2016,032,-57.65369,-56.68924,CTD veering to approx 3400m, EA600 Depth 3477m,bridge
20:23:00, 08/01/2016,032,-57.65372,-56.68912,CTD in the water,bridge
20:11:00, 08/01/2016,032,-57.65377,-56.68915,Commence deploying CTD,bridge
20:00:00, 08/01/2016,032,-57.65342,-56.68598,Vsl on DP,bridge
19:54:00, 08/01/2016,032,-57.66496,-56.67657,Slowing down to come on

station,bridge
17:54:00, 08/01/2016,,-58.03959,-56.46078,Vessel turned and on passage,bridge
17:43:00, 08/01/2016,031,-58.05023,-56.44734,Float deployed, off DP,bridge
17:39:00, 08/01/2016,030,-58.04991,-56.44671,CTD recovered,bridge
16:06:00, 08/01/2016,030,-58.04996,-56.44659,CTD stopped at 3960m,bridge
14:56:00, 08/01/2016,030,-58.05006,-56.44622,CTD veering to 3950m,bridge
14:53:00, 08/01/2016,030,-58.05007,-56.44594,CTD Deployed,bridge
14:42:00, 08/01/2016,,-58.05018,-56.44454,Vessel On DP,bridge
14:36:00, 08/01/2016,,-58.05377,-56.43781,Commence turn onto station,bridge
12:06:00, 08/01/2016,,-58.51547,-56.16415,Vessel turned and on passage,bridge
12:00:00, 08/01/2016,,-58.52552,-56.15702,Vessel Off DP,bridge
11:49:00, 08/01/2016,029,-58.52454,-56.15430,CTD Recovered,bridge
10:36:00, 08/01/2016,029,-58.52455,-56.15431,CTD stopped at 3770m, Commence Hauling,bridge
09:33:00, 08/01/2016,029,-58.52451,-56.15427,CTD veering to 3800m, EA600 Depth 3818m,bridge
09:31:00, 08/01/2016,029,-58.52454,-56.15433,CTD in the water,bridge
09:24:00, 08/01/2016,029,-58.52456,-56.15432,Commence deploying CTD,bridge
07:24:00, 08/01/2016,,-58.52458,-56.15432,Waiting on DP for weather conditions to improve ,bridge
07:06:00, 08/01/2016,,-58.52343,-56.15065,Vsl on DP, assessing weather conditions,bridge
07:00:00, 08/01/2016,,-58.52964,-56.14037,Commence slowing down to come on station,bridge
06:12:00, 08/01/2016,,-58.68361,-56.06324,Vessel turned and on passage,bridge
06:00:00, 08/01/2016,,-58.68330,-56.05408,New station position received, Off DP ,bridge
05:12:00, 08/01/2016,,-58.68165,-56.05386,On DP, assessing conditions for CTD deployment,bridge
05:06:00, 08/01/2016,,-58.68822,-56.04355,Commence turn onto station,bridge
03:12:00, 08/01/2016,,-59.00099,-55.85969,Vessel turned and proceeding on passage,bridge
03:04:00, 08/01/2016,,-58.99981,-55.85799,Vessel Off DP,bridge
02:55:00, 08/01/2016,028,-58.99980,-55.85799,CTD recovered,bridge
01:31:00, 08/01/2016,028,-58.99983,-55.85811,CTD stopped at 3755m,bridge
00:12:00, 08/01/2016,028,-58.99884,-55.86169,CTD Veering to 3700m,bridge
00:06:00, 08/01/2016,028,-58.99718,-55.85729,CTD Deployed,bridge
00:00:00, 08/01/2016,,-59.00691,-55.84974,Vessel On DP,bridge
22:18:00, 07/01/2016,027,-59.32485,-55.65745,Full Away off Station,bridge
22:12:00, 07/01/2016,027,-59.33323,-55.65159,Vsl off DP,bridge
22:04:00, 07/01/2016,027,-59.33320,-55.65125,CTD Recovered to Deck,bridge
20:47:00, 07/01/2016,027,-59.33317,-55.65119,CTD stopped at 3740m, Commence hauling,bridge
19:44:00, 07/01/2016,027,-59.33315,-55.65124,CTD veering to approx 3600m, EA600 Depth 3792m,bridge
19:42:00, 07/01/2016,027,-59.33315,-55.65121,CTD in the water,bridge
19:34:00, 07/01/2016,027,-59.33322,-55.65119,Commence deploying CTD,bridge
19:30:00, 07/01/2016,027,-59.33406,-55.64888,Vsl on DP,bridge
19:24:00, 07/01/2016,027,-59.34587,-55.64047,Commence slowing down to come on station,bridge
17:42:00, 07/01/2016,,-59.66298,-55.45686,off station on passage,bridge
17:36:00, 07/01/2016,,-59.66734,-55.44764,Off DP,bridge
17:32:00, 07/01/2016,026,-59.66695,-55.44552,Float deployed,bridge
17:25:00, 07/01/2016,025,-59.66675,-55.44447,CTD recovered,bridge
16:01:00, 07/01/2016,025,-59.66674,-55.44445,CTD stopped at 3660m,bridge
14:56:00, 07/01/2016,025,-59.66576,-55.44241,CTD Veering to 3600m,bridge
14:54:00, 07/01/2016,025,-59.66568,-55.44222,CTD Deployed,bridge
14:48:00, 07/01/2016,,-59.66572,-55.44203,Vessel On DP,bridge
12:42:00, 07/01/2016,,-60.00575,-55.22821,Vessel Off DP,bridge

12:34:00, 07/01/2016,024,-60.00578,-55.22820,CTD Recovered,bridge
11:18:00, 07/01/2016,024,-60.01116,-55.22994,CTD stopped at 3501m,bridge
10:19:00, 07/01/2016,024,-60.01120,-55.22999,CTD veering to approx 3520m, EA600 Depth 3537m,bridge
10:16:00, 07/01/2016,024,-60.01122,-55.22998,CTD in the water,bridge
10:11:00, 07/01/2016,024,-60.01117,-55.22993,Commence Deploying CTD,bridge
10:06:00, 07/01/2016,024,-60.01125,-55.22976,Vsl on DP,bridge
08:12:00, 07/01/2016,023,-60.16645,-55.13685,Vsl off DP,bridge
08:05:00, 07/01/2016,023,-60.33329,-55.03127,CTD Recovered to Deck,bridge
06:46:00, 07/01/2016,023,-60.33332,-55.03130,CTD stopped at 3425m,bridge
05:48:00, 07/01/2016,023,-60.33311,-55.03125,CTD deployed,bridge
05:36:00, 07/01/2016,,-60.33235,-55.02708,On DP,bridge
03:36:00, 07/01/2016,,-60.66632,-54.82806,Off DP,bridge
03:35:00, 07/01/2016,022,-60.66637,-54.82753,ARGO float deployed,bridge
03:19:00, 07/01/2016,021,-60.66661,-54.82482,CTD recovered,bridge
02:00:00, 07/01/2016,021,-60.66659,-54.82484,CTD Stopped at 3080m,bridge
01:04:00, 07/01/2016,021,-60.66666,-54.82481,CTD Veering to 2600m,bridge
01:02:00, 07/01/2016,021,-60.66667,-54.82484,CTD Deployed,bridge
01:00:00, 07/01/2016,021,-60.66668,-54.82479,CTD Repaired,bridge
23:06:00, 06/01/2016,021,-60.66573,-54.82309,Repairs conducted on CTD,bridge
23:00:00, 06/01/2016,,-60.66542,-54.82328,Vessel On DP,bridge
22:06:00, 06/01/2016,,-60.79898,-54.74290,Off DP,bridge
21:56:00, 06/01/2016,020,-60.79945,-54.74241,CTD Recovered to Deck,bridge
20:58:00, 06/01/2016,020,-60.79946,-54.74243,CTD stopped at 2620m, Commence Hauling,bridge
20:11:00, 06/01/2016,020,-60.79940,-54.74241,CTD veering to 2300m, EA600 Depth 2539m,bridge
20:08:00, 06/01/2016,020,-60.79940,-54.74238,CTD in the water,bridge
20:05:00, 06/01/2016,020,-60.79942,-54.74241,Commence Deploying CTD,bridge
19:54:00, 06/01/2016,020,-60.79912,-54.74244,Vsl on DP,bridge
19:30:00, 06/01/2016,019,-60.83311,-54.72194,Vsl off DP,bridge
19:23:00, 06/01/2016,019,-60.83319,-54.72167,CTD recovered to deck,bridge
18:38:00, 06/01/2016,019,-60.83318,-54.72167,CTD at 1705m,bridge
18:07:00, 06/01/2016,019,-60.83305,-54.72191,Veering CTD,bridge
18:05:00, 06/01/2016,019,-60.83298,-54.72200,CTD deployed,bridge
17:54:00, 06/01/2016,019,-60.83244,-54.72208,On DP,bridge
17:36:00, 06/01/2016,018,-60.85180,-54.73068,Off DP,bridge
17:12:00, 06/01/2016,018,-60.85160,-54.72905,BPR released, sinking,bridge
17:08:00, 06/01/2016,018,-60.85157,-54.72892,Vessel in position for BPR deployment,bridge
16:58:00, 06/01/2016,018,-60.84971,-54.72251,Vessel relocating to deployment site for BPR,bridge
16:57:00, 06/01/2016,017,-60.84986,-54.72307,BPR landed on deck,bridge
16:56:00, 06/01/2016,017,-60.85008,-54.72372,BPR lifted clear of the water,bridge
16:54:00, 06/01/2016,017,-60.85042,-54.72478,BPR grappled,bridge
16:42:00, 06/01/2016,017,-60.85012,-54.71691,BPR sighted on the surface, commence moving vessel up ,bridge
16:29:00, 06/01/2016,017,-60.85012,-54.71692,Transponder back on deck,bridge
16:25:00, 06/01/2016,017,-60.85013,-54.71691,Transponder in the water,bridge
16:22:00, 06/01/2016,017,-60.85013,-54.71690,BPR rising,bridge
16:02:00, 06/01/2016,017,-60.85013,-54.71691,Vessel stopped at a safe distance ,bridge
15:50:00, 06/01/2016,017,-60.85082,-54.72146,Vessel moving astern to safe distance,bridge
15:49:00, 06/01/2016,017,-60.85100,-54.72266,Transponder clearof the water,bridge
15:40:00, 06/01/2016,017,-60.85100,-54.72264,Transponder in the water,bridge

15:24:00, 06/01/2016,017,-60.85101,-54.72263,Release command sent, awaiting change in range,bridge
15:18:00, 06/01/2016,017,-60.85100,-54.72265,BPR contacted using ships transducer,bridge
15:09:00, 06/01/2016,017,-60.85098,-54.72263,Hydrophone clear of the water,bridge
14:57:00, 06/01/2016,017,-60.85098,-54.72265,Hydrophone in the water,bridge
14:24:00, 06/01/2016,017,-60.85008,-54.71749,355m from BPR sight - No response,bridge
14:00:00, 06/01/2016,017,-60.84991,-54.71600,700m from BPR sight - No response,bridge
13:48:00, 06/01/2016,017,-60.85022,-54.71035,Moving to range BPR,bridge
13:44:00, 06/01/2016,016,-60.85023,-54.71007,CTD Recovered,bridge
13:16:00, 06/01/2016,016,-60.85011,-54.70994,CTD stopped at 963m,bridge
12:59:00, 06/01/2016,016,-60.84889,-54.70738,CTD Veering to 980m,bridge
12:55:00, 06/01/2016,016,-60.84876,-54.70715,CTD Deployed,bridge
12:48:00, 06/01/2016,,-60.84921,-54.70807,Vessel On DP,bridge
11:48:00, 06/01/2016,,-60.98115,-54.62992,Vessel Off DP,bridge
11:43:00, 06/01/2016,015,-60.98112,-54.62992,CTD recovered to deck,bridge
11:21:00, 06/01/2016,015,-60.98111,-54.62991,CTD stopped at 570m,bridge
11:11:00, 06/01/2016,015,-60.98112,-54.62988,CTD Veering to 500m,bridge
11:00:00, 06/01/2016,015,-60.98114,-54.62987,Commence Deploying CTD,bridge
10:12:00, 06/01/2016,015,-60.98167,-54.63034,Vsl on DP,bridge
09:42:00, 06/01/2016,014,-61.04977,-54.58821,Vsl of DP,bridge
09:33:00, 06/01/2016,014,-61.04998,-54.58778,CTD Recovered to Deck,bridge
09:19:00, 06/01/2016,014,-61.04997,-54.58780,CTD stopped at 350m, Commence Hauling,bridge
09:12:00, 06/01/2016,014,-61.04991,-54.58787,CTD veering to approxiamately 350m, EA600 Depth 367m,bridge
09:08:00, 06/01/2016,014,-61.04993,-54.58785,CTD in the Water,bridge
09:03:00, 06/01/2016,014,-61.04989,-54.58824,Commence Deploying CTD,bridge
08:48:00, 06/01/2016,014,-61.04995,-54.58944,Vsl on DP,bridge
14:02:00, 02/01/2016,,-67.99476,-68.39437,Vessel Off DP,bridge
13:58:00, 02/01/2016,013,-67.99446,-68.39509,Glider Recovered,bridge
13:47:00, 02/01/2016,,-67.99312,-68.39341,Vessel on DP,bridge
13:48:00, 28/12/2015,012,-67.57305,-68.13664,Science time stops start standby for arrvial Rothera,bridge
13:15:00, 28/12/2015,012,-67.58116,-68.15625,Box corer recovered,bridge
13:03:00, 28/12/2015,012,-67.58091,-68.15604,Box corer clear of seabed,bridge
13:00:00, 28/12/2015,012,-67.58090,-68.15608,Box corer on seabed 392m,bridge
12:50:00, 28/12/2015,012,-67.58090,-68.15604,Box corer veering to 392m,bridge
12:48:00, 28/12/2015,012,-67.58089,-68.15605,Box Corer deployed,bridge
12:06:00, 28/12/2015,011,-67.58393,-68.13610,Box Corer recovered to deck,bridge
11:52:00, 28/12/2015,011,-67.58389,-68.13612,Box Corer clear of seabed,bridge
11:51:00, 28/12/2015,011,-67.58390,-68.13611,Box Corer on Seabed,bridge
11:42:00, 28/12/2015,011,-67.58391,-68.13615,Box Corer Veering to 388m,bridge
11:38:00, 28/12/2015,011,-67.58391,-68.13613,Box Corer Deployed,bridge
11:19:00, 28/12/2015,010,-67.58393,-68.13614,Box Corer recovered to deck,bridge
11:18:00, 28/12/2015,010,-67.58393,-68.13614,Box Corer clear of seabed,bridge
11:17:00, 28/12/2015,010,-67.58393,-68.13613,Box Corer on Seabed at 390m,bridge
11:00:00, 28/12/2015,010,-67.58393,-68.13615,Box Corer Veering to 382m,bridge
10:58:00, 28/12/2015,010,-67.58393,-68.13612,Commence deploying box

corer,bridge
10:39:00, 28/12/2015,009,-67.58390,-68.13611,CTD recovered to deck,bridge
10:14:00, 28/12/2015,009,-67.58390,-68.13614,CTD stopped at 378m, Commence hauling,bridge
10:06:00, 28/12/2015,009,-67.58391,-68.13611,CTD veering to approx 370m, EA600 Depth 378m,bridge
10:03:00, 28/12/2015,009,-67.58389,-68.13613,CTD in the water,bridge
10:01:00, 28/12/2015,009,-67.58395,-68.13608,Commence deploying CTD,bridge
09:54:00, 28/12/2015,,-67.58557,-68.13471,Vsl on DP,bridge
09:30:00, 28/12/2015,008,-67.57334,-68.13839,Glider sinking clear of vsl, vsl off DP,bridge
09:15:00, 28/12/2015,008,-67.57450,-68.13879,Glider Deployed,bridge
05:24:00, 28/12/2015,,-67.57331,-68.13256,Vsl on DP,bridge
08:42:00, 27/12/2015,007,-66.84843,-70.15964,Vsl off DP,bridge
08:23:00, 27/12/2015,007,-66.84844,-70.15966,Box Corer recovered to deck,bridge
08:04:00, 27/12/2015,007,-66.84950,-70.16108,Box Corer clear of the seabed,bridge
08:01:00, 27/12/2015,007,-66.84950,-70.16108,Box Corer on the seabed,bridge
07:42:00, 27/12/2015,007,-66.85002,-70.16081,Box Corer in the water,bridge
07:40:00, 27/12/2015,007,-66.85001,-70.16080,Commence deploying Box Corer,bridge
07:36:00, 27/12/2015,007,-66.85007,-70.16072,Vsl on DP,bridge
07:24:00, 27/12/2015,006,-66.84671,-70.16414,Vsl off DP,bridge
07:18:00, 27/12/2015,006,-66.84721,-70.16335,CTD recovered to deck,bridge
06:46:00, 27/12/2015,006,-66.84972,-70.17100,CTD stopped at 555m,bridge
06:36:00, 27/12/2015,006,-66.85022,-70.17352,Veering CTD to aprox 555m,bridge
06:32:00, 27/12/2015,006,-66.85040,-70.17450,CTD deployed,bridge
05:54:00, 27/12/2015,006,-66.85132,-70.17960,On DP,bridge
04:42:00, 27/12/2015,,-66.84880,-70.33432,Vessel proceeding East for new station position,bridge
04:18:00, 27/12/2015,,-66.84760,-70.33839,Vessel stopped to assess ice movement ,bridge
19:00:00, 25/12/2015,005,-64.47223,-64.86498,Off DP,bridge
18:12:00, 25/12/2015,005,-64.47947,-64.84433,Glider returns to the surface in position 64 27.542S 64 50.791W,bridge
16:16:00, 25/12/2015,005,-64.47946,-64.84435,Commence deep dive,bridge
16:00:00, 25/12/2015,005,-64.47889,-64.84738,Glider deployed,bridge
15:55:00, 25/12/2015,005,-64.47887,-64.84742,Pre launch check finished ,bridge
15:10:00, 25/12/2015,005,-64.48246,-64.84302,Commence pre deployment checks on glider 2,bridge
14:54:00, 25/12/2015,004,-64.48266,-64.84405,Glider Recovered,bridge
14:42:00, 25/12/2015,,-64.48225,-64.84523,Vessel On DP,bridge
12:00:00, 25/12/2015,,-64.54050,-65.93894,Vessel Off DP,bridge
11:54:00, 25/12/2015,,-64.54042,-65.93747,Vessel On DP ,bridge
09:06:00, 25/12/2015,,-64.50904,-64.84795,Vsl off DP,bridge
08:35:00, 25/12/2015,003,-64.50898,-64.84791,Box Corer recovered to deck,bridge
08:09:00, 25/12/2015,003,-64.50898,-64.84790,Box Corer on the seabed, Wireout 597m, Commence hauling,bridge
07:48:00, 25/12/2015,003,-64.50898,-64.84790,Box Corer in the water,bridge
07:42:00, 25/12/2015,003,-64.50899,-64.84789,Commence Deploying Box Corer,bridge
07:15:00, 25/12/2015,002,-64.50898,-64.84788,CTD recovered to deck,bridge
06:46:00, 25/12/2015,002,-64.50899,-64.84787,CTD stopped at 580m,bridge
06:30:00, 25/12/2015,002,-64.50897,-64.84788,CTD deployed,bridge
06:25:00, 25/12/2015,002,-64.50897,-64.84790,CLAM system problem resolved commence deploying CTD,bridge
06:01:00, 25/12/2015,002,-64.50897,-64.84792,Awaiting problem with CLAM system for CTD deployment,bridge

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05:11:00, 25/12/2015,001,-64.50897,-64.84792,Glider on the surface in
position 64 30.184S 064 50.930W,bridge
04:40:00, 25/12/2015,001,-64.50900,-64.84794,Starting 100m dive,bridge
04:29:00, 25/12/2015,001,-64.50887,-64.84852,Glider deployed,bridge
03:00:00, 25/12/2015,001,-64.50777,-64.84275,On DP,bridge
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GLOSSARY

ACCLAIM	-	Antarctic Circumpolar Current Levels from Altimeter and Island Measurements
ADC	-	Analogue to Digital Converter
BPR	-	Bottom Pressure Recorder
EPROM	-	Erasable Programmable Memory
GMT	-	Greenwich Mean Time
GPS	-	Global Positioning System
GTS	-	Global Telecommunications System
GOES	-	Geostationary Operational Environmental Satellite system
HDR	-	High Data Rate Satellite Transmitter (OTT)
IES	-	Inverted Echo Sounder
IOC	-	Intergovernmental Oceanographic Commission of UNESCO
Logosens	-	OTT sensor logger
Meteosat	-	Weather and Climate Satellite Network run by EUMETSAT
POL	-	Proudman Oceanographic Laboratory
SLR	-	Sea Level Recorder
SRAM	-	Static Random Access Memory
TDS	-	Triangle Digital Services
Tidata II	-	Tide Gauge Logging System using the TDS microcomputer