

Cruise Report
JR162 (23 – 28 December 2006)

South Orkneys to South Georgia
Continuous Plankton Recorder and Western core box acoustic survey.

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Cruise Outline

JR162 took place between 23rd and 28th December 2006. The aims of the cruise were to run the continuous plankton recorder (CPR) between the South Orkneys and South Georgia, and run the western core box acoustic survey for the second time during the 2006/07 Antarctic Season. All timings are given in GMT (local time = GMT – 3)

1. Continuous Plankton Recorder (CPR)

The CPR is an instrument that filters plankton from the water over long distances (up to 500 nautical miles) on a moving filter band of silk (270 micron mesh size). The filter silk band is wound through the CPR on rollers turned by gears, which are powered by an impeller. Once in the laboratory the silk is divided into blocks of 10 nautical miles of towing, and an analysis of the presence and abundance of phytoplankton and zooplankton is made.

The CPR was successfully deployed to the North of the South Orkney Islands (60°30.4' S; 44°54.7' W) on 23/12/06 at 2105. It was towed for a distance of 488 nautical miles, and recovered to the north of South Georgia (53.20.9'S; 39.31.4'W) at 1148 on 25/12/06 (Figure 1). The sample taken was preserved in formalin (as required for further analysis by the Sir Alistair Hardy Foundation for Ocean Science), and the CPR was reloaded. Arrangements were made the transfer of the CPR to the Ernest Shackleton for further deployment during the 2006/07 Antarctic season.

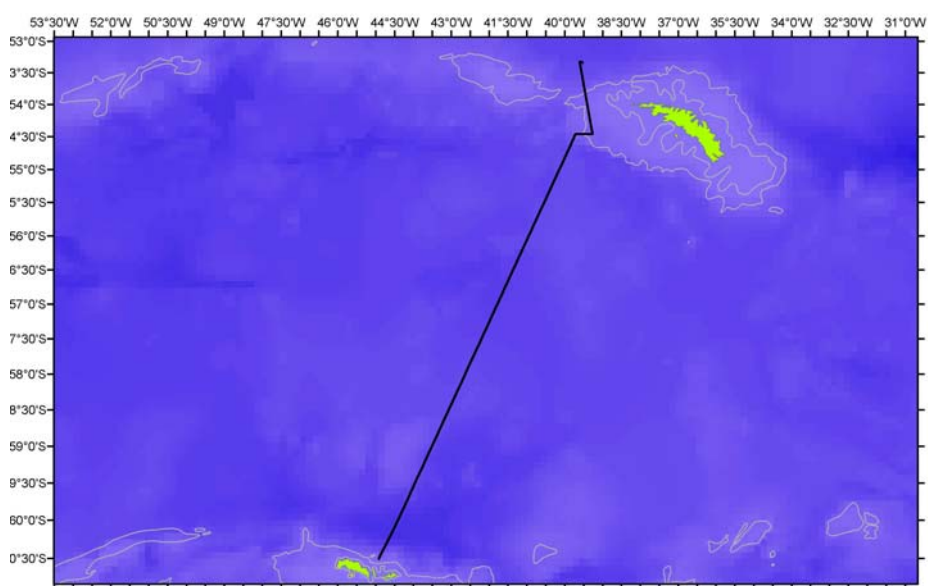


Figure 1: Continuous Plankton Recorder transect, South Orkneys to South Georgia.

2. Western Core Box acoustics

The western core box acoustic survey takes place in waters to the north of South Georgia and consists of eight semi-randomly spaced transects running in a north-south direction (Figure 2). The survey provides an estimation of krill biomass and has been running since 1994.

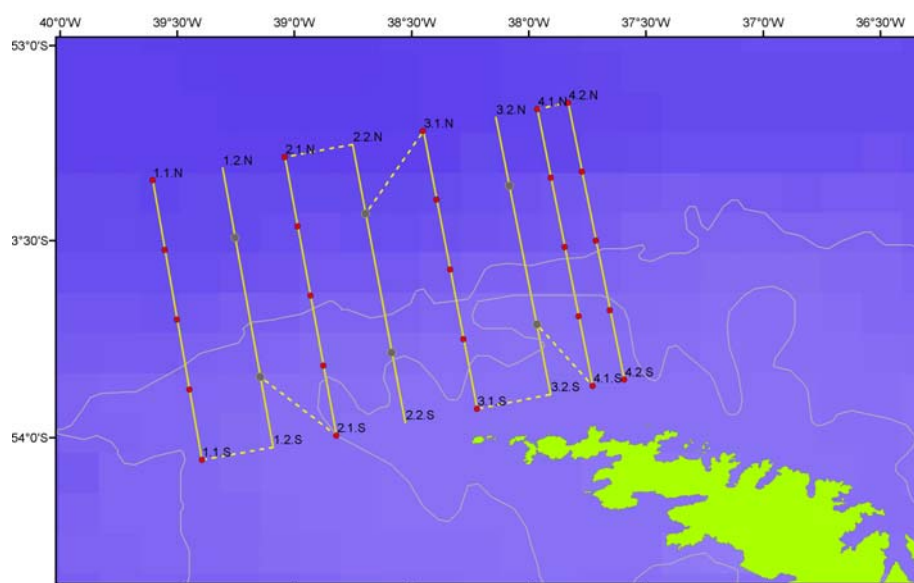


Figure 2: Location of standard western core box acoustics survey transects. Red circles show locations of XBT deployments and grey circles show locations of CTD drops.

The acoustic survey began at 0700 hrs on 25 December 2006, commencing at the southwestern end of the survey box (W1.1). With wind speeds of 30-35 knots (Beaufort scale: force 7), there was a heavy swell, and it was considered unsafe to deploy any XBTs on this leg of the transect. Also, due to the weather conditions, it was difficult to hold the speed at a steady 10 knots, with the ship travelling at speeds between 9 and 11 knots. Due to heavy rolling of the ship, the decision was taken by the captain to hove-to at the end of the first transect (1120). As the weather situation did not improve throughout the day, the second transect of the pair (W1.2) was not run. CTDs were not deployed during JR162.

Plans were made to run the second pair of transects (W2.1 and 2.2) beginning at 0900 on the 26/12/06. Heavy swell again meant that it was not possible to run W2.1, and W2.2 did not commence until 1756, running north to south. As the first leg of the

transect was not completed, XBTs were run every 10 miles during the second leg of the survey. Due to swell, the ship maintained a speed of around 11 knots throughout W2.2, and the transect was completed by 2145.

W3.1 and W3.2 commenced as planned at 0700 hrs on 27/12/06. The weather was finally kind to us, with calm seas and bright sunshine, and the ship was able to proceed at a steady speed of 10 knots. W3.1 began from the southern end of the transect with XBTs successfully deployed every 10 miles. W3.1 ended at 1119 and W3.2 began at 1230, running from north to south. On completion of W3.2 at 1647 the decision was made to continue on to transect 4.1, to make the most of the time available, and take advantage of the very good weather conditions.

Transect 4.1 began at 1724 on 27/12/06, with a view of South Georgia in the mist and sunny skies, running south to north and ending at 2144. Transect 4.2 began at 0700 on 28/12/06, running north to south towards South Georgia. Weather conditions were good with sunny skies and blue seas. XBTs were deployed every 10 miles on both W4.1 and W4.2. The acoustic survey was completed at 1120 on 28/12/06, and a course set for Bird Island.

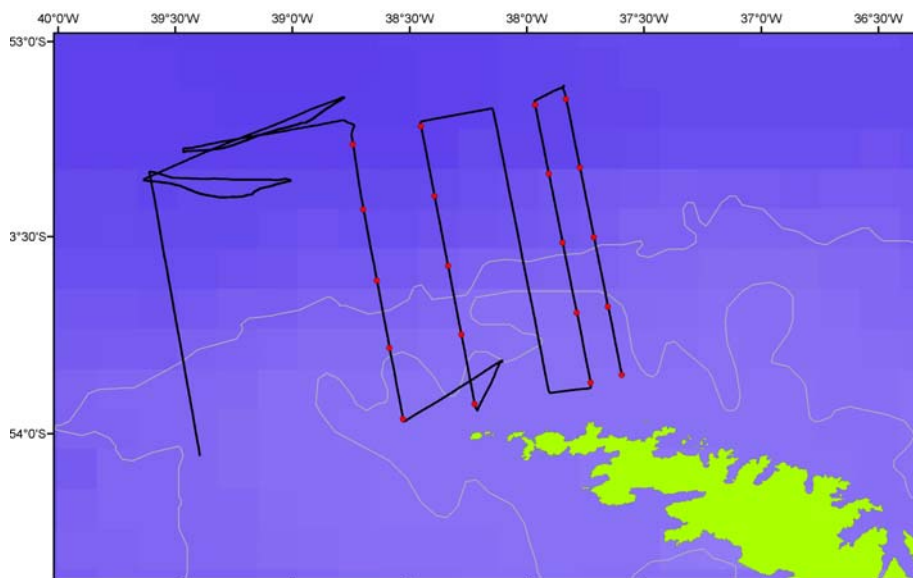


Fig 3: Cruise track JR162 (0700 25 December 2006 to 1120 28 December 2006). Red dots indicate location of XBT deployments.

3. Problems encountered during the acoustic survey

Problems with the GPT

Initially the EK60 could not connect to the GPT. This was resolved by turning the switch off and back on again...

Problems with the EK60 – ‘cannot meet ping interval required’.

This problem first appeared at 0827 hrs on 25/12/06 (possibly coinciding with entry into deeper waters?). In an attempt to rectify this, the bottom detection was set at zero for all 3 frequencies, which had previously solved the problem during testing on 24/12/06. The problem persisted, and the software manuals were consulted, but to no avail. The display on the SSU began to show pings at 4-second intervals (had previously been pinging at the requisite 2 seconds), so was checked. Time usage on EA600 was found to be set to ‘calculated’, and EK60 was set as ‘TX pulse’ (probably due to user error). These were swapped round, and the problem apparently resolved.

Acknowledgements

Many thanks to Captain Gerry Burgan and his team onboard RRS James Clark Ross. Thanks also to Mark Preston and Doug Willis who provided ETS and ITS support respectively.

Appendices

I. CPR Log

Time	Latitude	Longitude	Comment
25/12/2006 11:48	-53.34819	-39.52506	CPR recovered after 488 mile tow. W7. Sea 3.0m.
25/12/2006 11:45	-53.34632	-39.53477	Commence recovery of CPR
25/12/2006 11:23	-53.34036	-39.60659	Course altered 100 degrees T (3 miles). W7 sea 3.0m
25/12/2006 04:33	-54.46493	-39.27022	Course altered 350 degrees T (69 miles).W7. Sea 3.0 m
25/12/2006 03:19	-54.46611	-39.71568	Course altered 090 degrees T (16 miles). NW7. Sea 2.5m.
23/12/2006 21:05	-60.50609	-44.91135	CPR fully deployed. Line out to 60m
23/12/2006 21:04	-54.46611	-39.71568	CPR deployed. Heading 025 degrees T (400miles). Weather NE4. Sea 1.5m

II. XBT Log

Time	XBT Serial no.	File no.	Latitude	Longitude	Salinity	Successful?	Comment
28/12/2006 11:20	326738	T5_00058.rdf	-53.85106	-37.59515	33.754	Y	W4.2 XBT 5. End of core box.
28/12/2006 10:16	326742	T5_00057.rdf	-53.678	-37.65348	33.7816	Y	W4.2 XBT 4.
28/12/2006 09:11	326735	T5_00056.rdf	-53.50201	-37.71322	33.7835	Y	W4.2 XBT 3.
28/12/2006 08:05	326739	T5_00055.rdf	-53.32432	-37.77306	33.8368	Y	W4.2 XBT 2.
28/12/2006 07:00	326743	T5_00054.rdf	-53.14884	-37.8323	33.8415	Y	W4.2 XBT 1. Northern end of transect.
27/12/2006 21:44	326736	T5_00053.rdf	-53.16397	-37.96442	33.8322	Y	W4.1 XBT 5.
27/12/2006 20:39	326740	T5_00052.rdf	-53.33994	-37.90593	33.8346	Y	W4.1 XBT 4
27/12/2006 19:34	326744	T5_00051.rdf	-53.51607	-37.84654	33.8067	Y	W4.1 XBT 3.
27/12/2006 18:29	326780	T5_00050.rdf	-53.69339	-37.78617	33.8242	Y	W4.1 XBT 2. Very shallow (110m).
27/12/2006 17:24	326776	T5_00049.rdf	-53.87033	-37.72747	33.8334	Y	Southern end of W4.1. Very shallow (120m)
27/12/2006 11:19	326772	T5_00048.rdf	-53.21887	-38.45038	33.8218	Y	W3.1 XBT 5 (northern end of transect)
27/12/2006 10:14	326779	T5_00047.rdf	-53.3964	-38.39253	33.8654	Y	W3.1 XBT 4
27/12/2006 09:08	326775	T5_00045.rdf	-53.57532	-38.33472	33.8319	Y	W3.1 XBT 3
27/12/2006 08:04	326771	T5_00043.rdf	-53.74915	-38.27822	33.8217	Y	shallow water (200m). W3.1 XBT 2
27/12/2006 07:00	326778	T5_00042.rdf	-53.92476	-38.22089	33.8492	Y	Southern end of W3.1. Very shallow (100m)
26/12/2006 21:45	326774	T5_00041.rdf	-53.963	-38.52646	33.8262	Y	W2.2 XBT 5 (south end of transect)
26/12/2006 20:46	326770	T5_00039.rdf	-53.78369	-38.58392	33.8453	Y	W2.2 XBT 4. Shallow water (200m)
26/12/2006 19:49	326777	T5_00038.rdf	-53.61183	-38.63804	33.8391	Y	W2.2 XBT 3
26/12/2006 18:50	326773	T5_00036.rdf	-53.43113	-38.69503	33.8491	Y	W2.2. XBT 2.
26/12/2006 17:58	326769	T5_00034.rdf	-53.2657	-38.73958	33.8572	Y	W2.2 XBT 1 (north end of transect)

III. EK60 settings (25 December 2006)

Frequency	kHz	38 kHz	120 kHz	200 kHz
Transducer type		ES38	ES120-7	ES200-7
Transducer serial no				
GPT serial no		009072033fa5	00907203422d	009072033f91
Trans draft		0	0	0
Comments				
Environmental parameters				
Water temperature	°C	1	1	1
Salinity	psu	34	34	34
Sound velocity*	m/s	1453	1453	1453
Absorption coefficient*	dB/km	10.07	26.27	39.8
Echosounder parameters				
Ping rate	Sec	2-2.5	2-2.5	2-2.5
Transmit power	W	2000	500	300
Pulse length	msec	1.024	1.024	1.024
Bandwidth	kHz	2.425	3.026	3.088
Sample interval	m	256	256	256
Transducer gain	dB	24.07	21.38	22.03
Sa Correction	dB	-0.63	-0.39	-0.31
2-way Beam Angle	°	-20.7	-20.7	-19.6
3 dB Along Beam Angle	°	6.96	7.48	6.44
3 dB Athwart Beam Angle	°	6.88	7.48	6.43
Along offset angle	°	-0.02	-0.12	0.17
Athw offset angle	°	0	-0.07	-0.24
		14/10/2006	15/10/2006	14/10/2006

IV. Acoustics Log

Time	Latitude	Longitude	Event	Comment
28/12/2006 11:20	-53.85106	-37.59515	End of Transect W4.2	End of WCB. Off to Bird Island.
28/12/2006 10:58	-53.792	-37.61465	marks in top 20m	
28/12/2006 09:47	-53.59832	-37.68042	various marks	surface to 60m
28/12/2006 09:39	-53.57672	-37.68798	marks at 60m	
28/12/2006 09:19	-53.57672	-37.68798	rising line in 38 KHz from 180m	rises to 40m by 0923
28/12/2006 08:59	-53.46993	-37.72441	marks surface to 45m	
28/12/2006 08:49	-53.44264	-37.73326	marks 10-30m	
28/12/2006 08:48	-53.43985	-37.7342	marks 25-50m	
28/12/2006 08:42	-53.4238	-37.73976	marks at 65-85m	
28/12/2006 08:40	-53.41854	-37.74162	marks at 45-60m	
28/12/2006 08:17	-53.35646	-37.76228	lots of marks in top 60m	strongest on 200 kHz. persists until 0830
28/12/2006 08:04	-53.32164	-37.77395	Mark at surface to 20m	
28/12/2006 07:56	-53.3001	-37.78122	mark at 10-30m	
28/12/2006 07:52	-53.28937	-37.78492	Large mark to 60m	
28/12/2006 07:43	-53.26529	-37.79327	mark at 80-120m	
28/12/2006 07:31	-53.23294	-37.80361	mark at 70-100m	
28/12/2006 07:10	-53.17604	-37.82263	Lots of scatter below 165m	strong on 120 KHz
28/12/2006 07:00	-53.14884	-37.8323	Start of Transect W4.2	Another bright day for the

				final part of the WCB.
27/12/2006 21:44	-53.16397	-37.96442	End of Transect W4.1	
27/12/2006 21:20	-53.18089	-37.95862	layer at 140m rising to 80m in 120 kHz band	
27/12/2006 21:11	-53.17604	-37.82263	mark at 110-135m	strong on 120 KHz
27/12/2006 21:06	-53.26787	-37.9297	long thin mark at 30-40m	
27/12/2006 21:03	-53.27602	-37.92697	wide mark at 50m depth	
27/12/2006 20:59	-53.28681	-37.9236	long thin mark at 90-115m	
27/12/2006 20:53	-53.30273	-37.91859	long thin mark 50-80m	
27/12/2006 20:24	-53.37994	-37.89217	Large mark at 40-100m	
27/12/2006 19:49	-53.47525	-37.86054	wide mark descending from 40m (38 kHz)	consistent wide slope - looks a bit like false bottom though water here is deep
27/12/2006 18:54	-53.37994	-37.89217	very large swarm in top 60m	surface layer persists until around 20.20
27/12/2006 18:40	-53.66344	-37.79698	Marks on the bottom (depth around 100m)	
27/12/2006 17:58	-53.77817	-37.75865	Mark at surface to 20m. Various marks at around 50m	strongest on 200 KHz
27/12/2006 17:24	-53.87033	-37.72747	Start of Transect W4.1	
27/12/2006 16:47	-53.8898	-37.90695	End of Transect W3.2	Still sunny! continuing to W4.1
27/12/2006 16:00	-53.7594	-37.95024	Lots of marks in top 40m (especially 200 kHz)	persists until end of transect (and beyond)
27/12/2006 15:00	-53.59496	-38.00516	Lots of stuff in the surface layer (top 25m)	persists for some time - & lots of prions seen. coincident with entry to shelf waters.
27/12/2006 13:23	-53.33001	-38.09203	Mark surface to 90m	various marks in top 100m
27/12/2006 12:43	-53.22043	-38.1281	Mark from surface to 50m	Lots of fur seals in the water to port side
27/12/2006 12:30	-53.18407	-38.14125	Start of transect W3.2	Weather good - proceeding 10 knots
27/12/2006 11:21	-53.21618	-38.45126	End of Transect W3.1	
27/12/2006 10:39	-53.3288	-38.41437	Lots of stuff on 120khz at 120m and below	persists for some time. Mark rises to 100m at 1054 then drops again.
27/12/2006 10:26	-53.36389	-38.40315	layer of marks 60-80m	persists for some time
27/12/2006 10:03	-53.42657	-38.38289	mark at 80-105m	
27/12/2006 09:38	-53.4947	-38.36087	marks at surface to 40m	
27/12/2006 09:23	-53.53513	-38.34808	mark at 20-70m	
27/12/2006 09:13	-53.56212	-38.33904	marks at 30-40m	
27/12/2006 08:57	-53.60519	-38.32518	marks at 40-60m	
27/12/2006 07:04	-53.91362	-38.22488	Large M-shaped mark at 20-40m	
27/12/2006 07:00	-53.92476	-38.22089	Start of Transect W3.1	commencing at 10 knots. Weather good. Willis Islands seen.
26/12/2006 21:45	-53.963	-38.52646	End of W2.2	
26/12/2006 20:30	-53.7351	-38.59903	mark at 75-100m	
26/12/2006 20:01	-53.64803	-38.62656	marks at 20-60m	
26/12/2006 19:59	-53.64198	-38.6284	marks at 40-55m and 120-140m	
26/12/2006 19:45	-53.59977	-38.64188	small marks at 15-30m	
26/12/2006 19:24	-53.59977	-38.64188	Large marks at surface to 50m	

26/12/2006 18:13	-53.41464	-39.58205	long thin mark at 40-90m	
26/12/2006 17:56	-53.963	-38.52646	Start of Transect W2.2	Running at 11.5 Kts due to swell. Transect W2.1 not run due to heavy swell therefore XBTs will be deployed on this leg instead.
25/12/2006 11:23	-53.3393	-39.60677	End of Transect W1.1	Weather not improving - no XBTs run. W1.2 not run. Breaking off for Christmas Day.
25/12/2006 10:54	-53.41464	-39.58205	long thin mark top 40m	
25/12/2006 10:36	-53.46301	-39.56809	long thin mark at 60m	
25/12/2006 10:33	-53.47105	-39.56597	long thin mark at 15-30m	
25/12/2006 10:09	-53.53728	-39.54753	marks at 40-60m	
25/12/2006 09:16	-53.67491	-39.50533	'cannot meet ping interval required' error still appearing. Checked SSU	Time usage for EA600 changed to TX pulse (from calculated); EK60 changed to calculated (from TX pulse). seems to have resolved problem...
25/12/2006 08:32	-53.79907	-39.46826	Mark at 40-100m descending then rising	
25/12/2006 08:29	-53.80764	-39.46569	mark at 140m	
25/12/2006 08:24	-53.8222	-39.4613	'cannot meet ping interval required' error appearing.	Bottom detection set to zero for all 3 frequencies. This resolved problem yesterday.
25/12/2006 08:11	-53.8587	-39.45062	comment from Bridge	Speed varying between 9-11kts due to swell. Attempting to hold at 10kts.
25/12/2006 07:00	-54.05321	-39.39318	Start of WCB W1.1	Lots of swell. Winds 30-35 kts. XBT1 not deployed due to sea conditions
25/12/2006 06:44	-54.05321	-39.39318	end of test recording	test data prior to start of WCB W1.1