

DF-98 ROAVERRS TECHNICAL CRUISE REPORT  
SEDIMENT TRAP RECOVERY/DEPLOYMENT CRUISE  
ROSS SEA ANTARCTICA  
R/V N.B. PALMER (DEC. 20, 1997 to JAN. 10, 1998)

by

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**S-216A Cruise Participant:** Robert B. Dunbar (S-216A Group leader and 97-09 cruise Chief Scientist), David A. Mucciarone, Mike Lutz, Kristin Ludwig (all from Stanford University), Harry D. Rowe (Rice University), Jennifer Villinski (University of Indiana), Mick Peeters, and Leonardo Langone from Programma Nazionale di Ricerche in Antartide, Istituto di Geologia Marina (IGM)

**Logistics and Objectives:**

I departed Nashville (BNA) at 1520 on 12/09/97 and arrived in San Francisco (SFO) at 1932 to meet with Rob Dunbar at Stanford University and to take care final employment details of my new position at Stanford University. Rob and I departed SFO on 12/11/97 and met up with other members of the NBP 97-09 science party from S-216A, B, and C at LAX. We departed LAX at 2230 and arrived in Christchurch, NZ (CHC) at 1205 on 12/13/97. EWC gear was issued at 1430 on 12/13/97 at the CDC.

The following day (12/14/97) we checked in at the CDC at 1300 and departed for McMurdo Station (MCM) via LC-130 at 1620. We arrived in MCM at 0030 on 12/15/97 and checked in to the MMI and Hotel California. At 1000 on 12/17/97 key personnel arrived on board the R/V Nathaniel B. Palmer to assist with the ship off-load, staging of supplies, and instrument/laboratory setup. The remainder of the science party arrived on the NBP on 12/19/97. The NBP departed the ice edge at the head of McMurdo Sound just after 0015 on 12/20/97, Approximately 24 hours ahead of schedule. Science operations began shortly after leaving the ice edge.

Even with the few days we had before the cruise, we put the time to good work by setting up the total dissolved inorganic carbon (TDIC) stripper for  $\delta^{13}\text{C}$ , filter system for total particulate organic carbon (TPOC) for  $\delta^{13}\text{C}$ . The stripping apparatus, similar to the one used on NBP96-06 last year was modified to exclude the elemental analyzer. Colm Sweeney from LDEO remained on board after the JGOFS NBP97-08 cruise to train Kristin on the discrete TDIC system which uses a UIC Coulometrics coulometer set-up, and to run the underway  $\text{pCO}_2$  system, underway TDIC unit, and underway nutrient analyzer. Lastly, we were able to stow and stage all of the mooring gear on the ship.

**Summary of Field Operations:**

Chief Scientist for cruise 97-09 and Group leader for S-216A was Robert Dunbar. The cruise began on 12/20/97 at 0030 from McMurdo Sound ice edge. Cruise 97-09 lasted 22 days, consisted of 119 stations (see Fig 1), which included the servicing of 4 mooring (see Fig. 2). The cruise on the RVIB N.B. Palmer ended in McMurdo at 1830L on 1/10/98.

Bag drag for me was 2230 on 1/11/98 with check-in at 0900 on 1/09/98. The LC-130 departed McMurdo at 1200 and arrived in Christchurch, NZ at 2110 on 1/09/97. On 1/10/97, I departed CHCH at 1420 and arrived in Houston (IAH) at 1835 on 1/10/97..

**RVIB N.B. Palmer 97-09 Cruise:**

My main objective on the RVIB N.B. Palmer 97-09 cruise was to service four moorings in the southwestern Ross Sea. In addition to these responsibilities I set up the TDIC stripper system for  $\delta^{13}\text{C}$  and

to provide technical support as needed. After being trained at Rice University, Harry Rowe became the primary technician operating the stripper apparatus, he also filtered for  $\delta^{15}\text{N}$  nitrates and particulate organic mater for  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ . Leo Langone was on board from 12/20/97 until 2000L, 12/22/97 to assist in the turnaround of Mooring Adelie (A). Rob Dunbar and Mick Peeters assisted with all mooring operations, Kristin Ludwig ran the discrete TDIC, Jennifer Villinski filtering, and Mike Lutz pore waters and TDIC stripping with H. Rowe.

#### *Mooring Operation:*

#### **Mooring Adelie (Recovery)**

Our first mooring operation was Mooring Adelie (A). The recovery of the joint Stanford University/IGM *Mooring Adelie* north of Ross Island on 12/20/97 at 0340 GMT (12/20/97 @ 1540L) located at 76° 41.084'S 168° 59.208'E, water depth 819 m (Fig. 2). Interrogation, release and recovery of the mooring took place without the use of the Zodiac. The releases were a bit difficult to communicate with because of ship fantail position with respect to the mooring location. The mooring was recovered in a relatively normal manner, recovered at the top buoy and not the top most 2 pack of floats because of the break-away link.

Both top and bottom OSU Tracer-15 sediment trap worked perfectly stopping as planned at cup 14. The top (only) transmissometers stopped collecting data after 11 months. Uppermost InterOcean S4 current meter worked as programmed as did both the Aanderaa top RCM8 and bottom RCM7 current meter. Both the SBE SeaCat CTD and CT units worked as did both InterOcean 1090ED acoustic releases. The mooring was equipped with two OSU Tracer-15 sediment traps, one Aanderaa RCM8 current meter with a transmissometers, one RCM7 current meter, two SeaBird Electronics (SBE) SeaCat one 16-04 CT and one 16 CTD units, two InterOcean 1090ED acoustic releases, two 3 pack and five 3 pack Billings Floats packages, and one 30" steel Billings Buoy.

#### **Mooring Adelie (Deployment)**

We deployed *Mooring Adelie* in approximately the same location north of Ross Island on 12/21/97 at 1345 GMT (12/22/97 @ 0145L) at 76° 42.357'S 169° 01.340'E, water depth 822 m (echo depth = 848 m) (Fig. 2). With the exception of one modification the mooring was deployed as recovered. The bottom SBE 16-04 CT unit was moved from below the bottom OSU Tracer15 sediment trap to directly below the uppermost InterOcean S4 current meter.

#### **Mooring Chinstrap (Recovery)**

Our second mooring operation was Mooring Chinstrap (C). The recovery of this mooring was a bit challenging because of the pack ice coverage. We began the recovery activities on December 23, 1997 @ 1640 GMT (12/24/97 @ 0540L) located at 76° 20.400'S 165° 03.220'E, water depth 825 m (deployed on 12/23/96 @ 1135 GMT) (Fig. 2). Interrogation, release and recovery of the mooring again took place without the use of the Zodiac. The EdgeTech release worked great. After working out the set and drift of the pack ice the captain was able to position the NBP to drift over and past the mooring. Using the ranging information from the release and echo sounder we were able to release the mooring approximately 75 ft from the NBP. This was necessary given the density of the pack ice. The seas were calm enough to recover the mooring from the top float without putting stress on the breakaway link.

There were mixed performances from the mooring equipment. The top OSU Tracer-15 sediment trap worked perfectly stopping as planned at cup 14. The bottom OSU Tracer15 sediment trap stopped at cup 9. The uppermost InterOcean S4 current meter worked as programmed as did the lone Aanderra RCM7. The Aanderaa Acoustic RCM9 did not work as well. The bottom Aanderaa RCM8 did not record current meter data because the mooring line tangled in the unit. Although the temperature and salinity data was useful. The top SBE 16-04 CT unit failed due to water intrusion, but the bottom SBE 16-04 CT unit worked as programmed. The EdgeTeck 8202 acoustic release worked very well. There were some minor problems with the mooring line, some abrasion and broken thimbles. The mooring was equipped

with two OSU Tracer-15 sediment traps, one each Aanderaa RCM7, RCM8, and RCM9 current meters with the latter two units equipped with CT sensors, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, one EdgeTech 8202 acoustic releases, two 3 pack and one 3 pack Billings Floats package attached to one of the two 30" steel Billings Buoys.

### **Mooring Chinstrap (Deployment)**

We deployed *Mooring Chinstrap* on 12/25/97 at 1750 GMT (12/26/97 @ 0650L) at 76° 20.460'S 165° 01.778'E, water depth 827 m (857 echo) (Fig. 2). The mooring was equipped with two OSU Tracer-15 sediment traps, three Aanderaa current meters (one RCM 9 with CT sensors, one RCM8 with CT sensors, and one RCM7), one InterOcean S4 current meter, one SeaBird Electronics (SBE) SeaCat one 16-04 CT units, one EdgeTech 8202 acoustic release, three 3 pack Billings Floats, and two 30" steel Billings Buoy. Adjustments were made to the mooring line configuration. The loan SBE 16-04 CT unit was relocated to just below the uppermost InterOcean S4 current meter. The single 3 pack of Billings Floats were detached from the bottom Billings Buoy and placed down line to 300 m above the bottom OSU Tracer15 sediment trap.

### **Mooring Gentoo**

The next deployment was a new mooring called *Gentoo* installed on 12/23/96 at 0146 GMT (12/23/96 @ 1446L) and located at 76° 20.244'S 172° 58.758'E, water depth 620 m (Fig. 2). The mooring is equipped with two McLane 78G-13 sediment traps, four InterOcean S4 current meters, one Aanderaa RCM8 current meter, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, one EdgeTech 8202 acoustic release, eight 3 pack Billings Floats, and one 30" steel Billings Buoy.

### **Mooring Emperor**

The last mooring we deployed was a new installation called *Mooring Emperor* located along the Ross Ice Shelf on 01/07/97 at 0755 GMT (01/07/97 @ 2055L) 76° 58.912'S 171° 58.745'E, water depth 675 m (Fig.2). *Mooring Emperor* is located west of *Mooring F*. The mooring was equipped with one McLane 78G-13 sediment trap at the bottom, two InterOcean S4 current meters, two Aanderaa RCM8 current meters, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, one EdgeTech 8202 acoustic release, six 3 pack Billings floats, and one RDI ADCP in a 50" syntactic foam buoy.

### **Mooring Fairy (Stanford/IGM)**

We deployed *Mooring F* along the Ross Ice Shelf on 12/26/96 at 0745 GMT (12/27/96 @ 2045L) approximately 2.39 nm north at 77° 58.294'S 178° 02.274'W, water depth 698 m (Fig. 2) on NBP96-06. *Mooring Fairy* and is a joint US/Italian mooring with both programs providing instrumentation for the mooring. The mooring is equipped with one McLane 78G-13 sediment trap at the top and one Tucci 24 cup sediment trap at the bottom, two Aanderaa RCM7 current meters, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, two EdgeTech 8202 acoustic release, seven Benthos type 17" floats, two 24" Resinex buoys, and one RDI ADCP in a 50" syntactic foam buoy. This mooring will be serviced by the M/V *Italica* supervised by Leonardo Langone of IGM.

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### **JOINT SANFORD/IGM MOORING ADELIE RECOVERY STATISTICS: (December 20, 1997 @ 0300 GMT)**

Information on the mooring equipment recovered for *Mooring Adelie*. The mooring recovery was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). The release and recovery of the mooring was done from the ship. A Zodiac was not launched to assist with the recovery effort. There were some difficulties with the mooring recovery. The main one was trying to grab the top buoy from the fantail of the NBP. A pole with a quick click connector at the end was used to attach the buoy to the crane hook. Because of the breakaway link we began the recovery effort with the 30" buoy.

There was also difficulty communicating with the InterOcean 1090ED acoustic releases from the NBP. Eventually good communications were established and the mooring released. Otherwise, the mooring recovery went very well. Below is a detailed outline of the recovery effort.

Release code sent from ship @	1600L/(0300Z 12/20/97)
Top 30" Billings steel buoy on deck @	1658
Top OSU Tracer15 sediment trap on deck @	1720
Uppermost Double 3 pack Billings float on deck @	1730
Uppermost InterOcean S4 current meter on deck @	1730
Top Aanderaa RCM8 w/ transmissometer on deck @	1748
Top SBE SeaCat 16 CTD unit on deck @	1758
Bottom five 3 pack Billings floats on deck @	1805
Bottom OSU Tracer15 sediment trap on deck @	1810
Bottom SBE SeaCat 16-04 CT unit on deck @	1817
Bottom Aanderaa RCM7 w/o transmissometer on deck @	1817
Dual InterOcean 1090ED acoustic releases on deck @	1819L(0519Z 12/20/97)

InterOcean 1090ED Release Command Codes *Mooring Adelie*:

S/N 0652600 (TOP)		S/N 0828007 (BOTTOM)	
Release command	ABEG	Release command	BEFH
Enable command	CDE	Enable command	DEF
Rearm command	CDEH	Rearm command	DEFH

Old Mooring Adelie Location:	76° 41.084'S 168° 59.208'E
Water Depth:	819 meters
Date/Time (GMT)	12/29/96 @ 1755

### Results of the mooring instrumentation and servicing.

The performance of this mooring is about as good as it gets, all of the instruments worked as programmed. The only exception was the transmissometer on the upper Aanderaa RCM8 which stopped due to insufficient battery power after approximately 11 months. Note that the OSU Tracer15 sediments were the refurbished traps and not the original OSU Tracer15 traps which are now located on Chinstrap. All floats, line, and mooring hardware were in good condition.

The download of data and instrument preparation were handled by IGM and Stanford. The mooring was redesigned slightly and is discussed in the following deployment section.

### OSU Tracer15 Trap Recovery Performance: (TOP).

Trap Cups Expected/Recovered:	14/14
Recovery Filename:	TOP-A97.REC (Appendix B)
TattleTale Interface Serial Number:	1319-5
Battery Condition:	8.27 VDC (3-Micro 9v alkaline) 3.27 VDC (1-RAM 3v lithium) 17.63 VDC (4-Motor 9v alkaline)
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.
Sediment Trap Sampling:	Samples transferred into 500 ml Nalgene Bottles.
Trap History:	As follows:

\*\*\* DATA RECOVERY ENTRY INFORMATION FROM TOP TATTLE TALE \*\*\*

CUP	EVENT	DATE	TIME	TURN	MOTOR	LOGIC	ROT	TEMP
1	0	01/29/96	04:55:00	-	18.23	9.21	-	-
2	1	01/16/97	05:55:27	34.4	15.74	8.05	230	6551.5
3	2	02/01/97	05:56:00	33.7	15.92	7.98	136	6551.5
4	3	02/15/97	06:00:49	33.6	15.90	7.92	46	6551.5
5	4	03/01/97	05:57:06	34.0	15.78	7.91	316	6551.8
6	5	03/15/97	06:01:55	33.8	15.63	7.86	226	6551.7
7	6	04/01/97	05:56:04	34.1	15.57	7.81	133	6551.7
8	7	05/15/97	05:56:37	34.9	15.45	7.72	43	6551.7
9	8	07/15/97	05:59:19	36.6	15.37	7.67	316	6551.5
10	9	09/15/97	06:04:10	37.5	15.35	7.60	223	6551.5
11	10	11/01/97	06:02:38	37.3	15.28	7.54	133	6551.5
12	11	11/15/97	05:58:58	36.8	15.24	7.52	39	6551.5
13	12	12/01/97	05:59:34	37.3	15.22	7.54	309	6551.5
14	13	12/15/97	06:04:26	38.2	15.12	7.51	219	6551.5

OSU Tracer15 Trap Recovery Performance: **(BOTTOM)**.

Trap Cups Expected/Recovered: 14/14  
 Recovery Filename: BOT-A97.REC (Appendix B)  
 TattleTale Interface Serial Number: 1328-9  
 Battery Condition: 8.23 VDC (3-Micro 9v alkaline)  
 3.07 VDC (1-RAM 3v lithium)  
 17.47 VDC (4-Motor 9v alkaline)  
 Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.  
 Sediment Trap Sampling: Samples transferred into 500 ml Nalgene bottles.  
 Trap History: As follows

\*\*\* DATA RECOVERY ENTRY INFORMATION FROM BOTTOM TATTLE TALE \*\*\*

CUP	EVENT	DATE	TIME	TURN	MOTOR	LOGIC	ROT	TEMP
1	0	01/29/96	04:55:00	-	18.23	9.21	-	-
2	1	01/16/97	05:53:14	30.2	15.84	7.96	0	6551.8
3	2	02/01/97	05:53:43	31.1	15.72	7.92	273	6551.8
4	3	02/15/97	05:58:29	31.4	15.59	7.86	180	6551.8
5	4	03/01/97	05:54:43	31.2	15.59	7.81	93	6551.8
6	5	03/15/97	05:59:29	32.0	15.49	7.79	151	6551.8
7	6	04/01/97	06:02:08	32.1	15.45	7.76	266	6551.8
8	7	05/15/97	06:02:39	32.5	15.28	7.66	172	6551.8
9	8	07/15/97	05:56:46	33.3	15.20	7.56	93	6551.8
10	9	09/15/97	06:01:34	34.4	15.10	7.51	151	6551.8
11	10	11/01/97	05:59:59	35.6	14.91	7.49	266	6551.8
12	11	11/15/97	06:04:50	35.8	14.71	7.46	176	6551.8
13	12	12/01/97	06:05:25	35.8	14.58	7.43	86	6551.8
14	13	12/15/97	06:01:44	35.9	14.58	7.45	356	6551.8

InterOcean S4 current meter 7.82 VDC (6 Electrochem 3.9v D-cell lithium)

SBE SeaCat 16-04 CT top unit 7.50VDC (6 Alkaline D-cells)

SBE SeaCat 16-04 CTD bottom unit	5.6VDC micro lithium battery 7.50VDC (6 Alkaline D-cells) 5.4VDC micro lithium battery
Aanderra RCM8 top current meter	7.39VDC Type 3382 lithium
Aanderra RCM7 bottom current meter	7.39VDC Type 3382 lithium
Acoustic Releases recovery information:	TOP (Cindy) 2 pk 7.62 VDC BOTTOM (Luisa) 2 pk 7.26 VDC; 4 pk 7.28 VDC
Battery Type:	Electrochem 3.9v D-cell lithium

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### **MOORING ADELIE DEPLOYMENT STATISTICS: (December 21, 1997 @ 1245 GMT)**

Information on the mooring equipment deployed for *Mooring Adelie*. The mooring deployment was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). Preparation of all equipment was a joint effort between Stanford and IGM. There was a slight modification to the mooring array. The bottom SBE 16-04 CT unit was moved from below the bottom OSU Tracer15 sediment trap to just below the uppermost InterOcean S4 current meter. There were no problems preparing the mooring and individual instruments on this array for deployment. A detailed outline on the deployment is listed below.

Top 2-3 pack Billing's floats in water @	0015L/(1115Z 12/21/97)
Top InterOcean S4 current meter in water @	0016
Top SBE 16-04 CT unit in water @	0016
Middle 30" Steel Billing's buoy in water @	0021
Top OSU Tracer15 sediment trap in water @	0031
Top Aanderaa RCM8 w/ transmissometer in water @	0034
Top SBE 16 CTD unit in water @	0034
Bottom 5-3 pack Billing's floats in water @	0101
Bottom OSU Tracer15 sediment trap in water @	0134
Bottom Aanderaa RCM7 in water @	0135
Dual InterOcean 1090ED acoustic releases in water @	0141
Anchor released @	0145L (1245Z 12/21/97)

### **OSU Tracer15 Sediment Trap Deployment Statistics: (TOP).**

Trap Cups Deployed:	15
Deployment Filename:	TOP-A97.DEP (Appendix C)
TattleTale Interface Serial Number:	1328-9
Battery Condition:	9.30 VDC (3-Micro 9v alkaline) 3.07 VDC (1-RAM 3v lithium) 18.85 VDC (4-Motor 9v alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.
Trap deployment program:	Same as Bottom trap, see below

### **OSU Tracer15 Sediment Trap Deployment Statistics: (BOTTOM).**

Trap Cups Programmed:	15
Recovery Filename:	BOT-A97.DEP (Appendix C)
TattleTale Interface Serial Number:	1319-5

Battery Condition: 9.38 VDC (3-Micro 9v alkaline)  
 3.27 VDC (1-RAM 3v lithium)  
 18.90 VDC (4-Motor 9v alkaline)

Tests performed: Motor - OK; Interface - OK

Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.

Trap deployment program: Same as Top and as follows

**Mooring Adelle Top and Bottom Sediment Trap Deployment date- 21 December 1997 at 1245 GMT, and Programming. OSU Tracer15 Sediment Traps trap begin and end with a cup (#1 & #15) under funnel.**

**OSU Tracer15 sediment trap program:**

<b>Duration</b>	<b>GMT Time</b>	<b>GMT Date</b>	<b>Event #</b>	<b>Cup#</b>
13 Days	1245	21 December 1997	Event 0	Cup 1
13 Days	0600	03 January 1998	Event 1	Cup 2
16 Days	0600	16 January 1998	Event 1	Cup 3
14 Days	0600	01 February 1998	Event 2	Cup 4
14 Days	0600	15 February 1998	Event 3	Cup 5
14 Days	0600	01 March 1998	Event 4	Cup 6
17 Days	0600	15 March 1998	Event 5	Cup 7
44 Days	0600	01 April 1998	Event 6	Cup 8
61 Days	0600	15 May 1998	Event 7	Cup 9
62 Days	0600	15 July 1998	Event 8	Cup 10
47 Days	0600	15 September 1998	Event 9	Cup 11
14 Days	0600	01 November 1998	Event 10	Cup 12
16 Days	0600	15 November 1998	Event 11	Cup 13
14 Days	0600	01 December 1998	Event 12	Cup 14
? Days	0600	15 December 1998	Event 13	Cup 15

**SeaBird SeaCat 16 and 16-04 CT units:**

BOTTOM SBE 16-04 S/N: 1507 (IGM)  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Memory battery: 5.8 VDC (lithium)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/21/97 @ 03:30:00

TOP SBE 16 S/N: 1506 (IGM)  
 Battery condition: 8.5 VDC (6 alkaline D-cells)  
 Memory battery: 5.2 VDC (lithium)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/21/97 @ 03:30:00

**Aanderaa RCM7 and RCM8 current meters:**

RCM8 w/ transmissometer S/N: 11162 (IGM) TOP  
 Battery condition: 7.39 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/29/96 @ 20:00:00

RCM7 S/N: 11199 (IGM) BOTTOM  
 Battery condition: 7.36 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes

GMT Start: 12/29/96 @ 20:00:00

**InterOcean S4 current meters:**

#1 S4 S/N: 08291860  
Battery condition: 7.73 VDC (6 lithium D-cells)  
Sampling interval: 1minute every 15 minutes  
GMT Start: 12/21/97 @ IMMEDIATELY

**InterOcean 1090ED acoustic releases:**

Acoustic Releases: S/N 0652600 (Cindy) 2 pk 7.74 VDC (TOP)  
S/N 0828007 (Luisa) 2 pk 7.80VDC; 4 pk 7.84 VDC (BOTTOM)  
Battery Type: Electrochem 3.9 VDC D-cell lithium

**Adelie Mooring Hardware Statistics:**

Two 3 pack floats	=	1 m
Top InterOcean S4 current meter S/N 08291860 (-4 lbs./-1.82 kg)	=	0.46 m
Bottom SBE SeaCat 16-04 CT unit S/N 1507 (-32 lbs./-14.55 kg)	=	0.84 m
Top 30" steel float (+369 lbs./-167.73 kg)	=	0.762 m
Top OSU Tracer15 w/ pendant S/N 1319-5 (-60 lbs./-27.3 kg)	=	25.0 m
-Above top of cone = 21.5 m, below top of cone 3.5 m		
Top Aanderaa RCM8 current meter w/ transmissometer S/N 11162 (-50 lbs./22.73 kg)	=	0.52 m
Top SBE SeaCat 16 CTD unit S/N 1506 (-32 lbs./-14.55 kg)	=	0.84 m
Five 3 pack floats (+330 lbs./150 kg)	=	2.5 m
Bottom OSU Tracer15 w/ pendant S/N 1319-5 (-60 lbs./-27.3 kg)	=	25.0 m
-Above top of cone = 21.5 m, below top of cone 3.5 m		
Bottom Aanderaa RCM7 S/N 11199 (-50 lbs./22.73 kg)	=	0.52 m
Top InterOcean 1090ED acoustic release S/N0652600 (-20 lbs/9.1 kg)	=	0.62 m
Bottom InterOcean 1090ED acoustic release S/N0828007 (-20 lbs/9.1 kg)	=	0.62 m
Galvanized 1/2" anchor chain	=	3.0 m
Anchor 1800 lb./818.2 kg	=	1 m

All rope is: 687- Meters 11 mm single braid Duron w/ 1/2" nylon thimbles  
Hardware: 10- 1/2" galvanized chain shackles (floats)  
5- 1/2" stainless steel anchor shackles  
3- 5/8" galvanized anchor shackles  
01- 5/8" Stainless steel eye and jaw swivel  
04- 3/8" stainless steel chain shackles (CTD meters)  
01- 1/2" galvanized chain, 3 meters long  
02- 5/8" stainless steel sediment trap shackle  
02- 5/8" stainless steel anchor shackle  
02- 5/8" stainless steel chain shackle  
01- 1" galvanized shackle  
01- 1" stainless steel shackle  
02- 1" InterOcean acoustic release bushings

InterOcean 1090ED Release Command Codes *Mooring A'*:

S/N 0652600 (TOP)		S/N 0828007 (BOTTOM)	
<b>Release command</b>	<b>ABEG</b>	<b>Release command</b>	<b>BEFH</b>
<b>Enable command</b>	<b>CDE</b>	<b>Enable command</b>	<b>DEF</b>
<b>Rearm command</b>	<b>CDEH</b>	<b>Rearm command</b>	<b>DEFH</b>

**Mooring Adelle Location:** 76° 42.357'S 169° 01.340'E  
**Water Depth:** 822 meters  
**Date/Time (GMT)** 12/21/97 @ 1245

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**CHINSTRAP RECOVERY STATISTICS: (December 23, 1997 @ 1640 GMT)**

Information on the mooring equipment recovered for *Mooring Chinstrap*. The mooring recovery was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). The release and recovery of the mooring was done from the ship. A Zodiac was not launched to assist with the recovery effort. There were some difficulties determining when to release the mooring because of pack ice coverage but this did not hinder the recovery operation. A pole with a quick click connector at the end was used to attach the upper floats buoy to the crane hook. Sea state permitted a recovery in this manner with no threat to the breakaway link. The mooring line was tangled on deployment and created only a small problem during the recovery. A line clamp was used until the mooring line was untangled. Because of the breakaway link we began the recovery effort with the 30" buoy. Below is a detailed outline of the recovery effort.

The top OSU Tracer-15 sediment trap worked perfectly stopping as planned at cup 14. The bottom OSU Tracer15 sediment trap stopped at cup 9. Failure was due to mechanical failure in the cam slide actuator. This problem was rectified prior to deployment. The uppermost InterOcean S4 current meter worked as programmed as did the lone Aanderra RCM7. The Aanderaa Acoustic RCM9 did not work as well, as of this report the current meter data was questionable, the conductivity measurement out of range, but temperature data useful. The bottom Aanderaa RCM8 did not record current meter data because the mooring line tangled in the unit. Although the temperature and salinity data was useful. The result of the mooring line entanglement was a bent shaft. This shaft was straightened out and repainted. The top SBE 16-04 CT unit failed due to water intrusion, origin of leak not determined. Unit will be sent back to SBE for repair. The bottom SBE 16-04 CT unit worked as programmed. The EdgeTech 8202 acoustic release worked well. There were some minor problems with the mooring line, some abrasion and broken thimbles. The mooring was equipped with two OSU Tracer-15 sediment traps, one each Aanderaa RCM7, RCM8, and RCM9 current meters with the latter two units equipped with CT sensors, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, one EdgeTech 8202 acoustic releases, two 3 pack and one 3 pack Billings Floats package attached to one of the two 30" steel Billings Buoys.

Release code sent from ship @	0540L/(1640Z 12/23/97)
Uppermost Double 3 pack Billings float on deck @	0551
Uppermost InterOcean S4 current meter on deck @	0552
Top 30" Billings steel buoy on deck @	0600
Top OSU Tracer15 sediment trap on deck @	0621
Top Aanderaa RCM9 w/ CT sensors on deck @	0629
Top Aanderaa RCM7 on deck @	0629
Top SBE SeaCat 16-04 CT unit on deck @	0630
BottomTop 30" Billings steel buoy w/ single 3 pack Billings float on deck @	0634
Bottom OSU Tracer15 sediment trap on deck @	0659
Bottom SBE SeaCat 16-04 CT unit on deck @	0707
Bottom Aanderaa RCM8 w/ CT sensors on deck @	0707
Single EdgeTech 8202 acoustic release on deck @	0710L(1810Z 12/23/97)

EdgeTech 8202 Release Command Codes for *Mooring Chinstrap*:

S/N 021618  
 Command A (Release) 626654

Command B (Disable A) 610540  
 Command C (Enable A & B) 610563  
 Command D (Disable B) 610601

Old Mooring Location: 76° 20.400'S 165° 03.220'E  
 Water Depth: 825 meters  
 Date/Time (GMT) 12/23/96 @ 1135

**Results of the mooring instrumentation and servicing.**

Mixed performance of the instruments on this mooring made it time consuming to prepare for redeployment. The bottom OSU Tracer15 stopped at cup 9 due to mechanical failure has been the same trap that has failed since its first deployment in 1/90. I am optimistic that it has a good chance to work successfully this season.

The download of data and instrument preparation were handled by Stanford. The mooring was redesigned slightly and is discussed in the following deployment section.

**OSU Tracer15 Trap Recovery Performance: (TOP).**

Trap Cups Expected/Recovered: 14/14  
 Recovery Filename: TOP-C97.REC (Appendix B)  
 TattleTale Interface Serial Number: 1330-11  
 Battery Condition: 8.29 VDC (3-Micro 9v alkaline)  
 3.31 VDC (1-RAM 3v lithium)  
 17.93 VDC (4-Motor 9v alkaline)  
 Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.  
 Sediment Trap Sampling: Samples transferred into 500 ml Nalgene Bottles.  
 Trap History: As follows:

\*\*\* DATA RECOVERY ENTRY INFORMATION FROM TOP TATTLE TALE \*\*\*

CUP	EVENT	DATE	TIME	TURN	MOTOR	LOGIC	ROT	TEMP
1	0	01/16/97	05:55:27	34.4	15.74	8.05	230	6551.5
2	1	02/01/97	05:56:00	33.7	15.92	7.98	136	6551.5
3	2	02/15/97	06:00:49	33.6	15.90	7.92	46	6551.5
4	3	03/01/97	05:57:06	34.0	15.78	7.91	316	6551.8
5	4	03/15/97	06:01:55	33.8	15.63	7.86	226	6551.7
6	5	04/01/97	05:56:04	34.1	15.57	7.81	133	6551.7
7	6	05/15/97	05:56:37	34.9	15.45	7.72	43	6551.7
8	7	07/15/97	05:59:19	36.6	15.37	7.67	316	6551.5
9	8	09/15/97	06:04:10	37.5	15.35	7.60	223	6551.5
10	9	11/01/97	06:02:38	37.3	15.28	7.54	133	6551.5
11	10	11/15/97	05:58:58	36.8	15.24	7.52	39	6551.5
12	11	12/01/97	05:59:34	37.3	15.22	7.54	309	6551.5
13	12	12/15/97	06:04:26	38.2	15.12	7.51	219	6551.5

**OSU Tracer15 Trap Recovery Performance: (BOTTOM).**

Trap Cups Expected/Recovered: 14/9 (failed due to mechanical malfunction).  
 Recovery Filename: BOT-C97.REC (Appendix B)

TattleTale Interface Serial Number: 1320-2  
 Battery Condition: 8.00 VDC (3-Micro 9v alkaline)  
 3.21 VDC (1-RAM 3v lithium)  
 15.12 VDC (4-Motor 9v alkaline)  
 Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.  
 Sediment Trap Sampling: Samples transferred into 500 ml Nalgene bottles.  
 Trap History: As follows

\*\*\* DATA RECOVERY ENTRY INFORMATION FROM BOTTOM TATTLE TALE \*\*\*

CUP	EVENT	DATE	TIME	TURN	MOTOR	LOGIC	ROT	TEMP
1	0	01/16/97	05:53:31	28.4	7.56	8.76	212	6551.8
2	1	02/01/97	05:53:58	28.6	7.63	8.75	302	6551.8
3	2	02/15/97	05:58:42	28.5	7.56	8.74	28	6551.8
4	3	03/01/97	05:54:54	29.2	7.50	8.73	118	6551.8
5	4	03/15/97	05:59:38	28.8	7.51	8.72	212	6551.8
6	5	04/01/97	06:02:14	28.8	7.51	8.72	306	6551.8
7	6	05/15/97	06:02:42	29.5	7.44	8.70	32	6551.8
8	7	07/15/97	05:56:47	30.0	7.44	8.70	129	6551.8
9	8	09/15/97	06:01:32	161.5	7.41	8.69	223	6551.8
10	9	11/01/97	06:01:00	161.5	6.31	8.69	262	6551.8
11	10	11/15/97	06:06:52	161.5	6.20	8.69	262	6551.8
12	11	12/01/97	06:08:28	161.5	6.07	8.69	262	6551.8
13	12	12/15/97	06:05:48	161.5	5.93	8.68	262	6551.8

InterOcean S4 current meter 7.81 VDC (6 Electrochem 3.9v D-cell lithium)  
 SBE SeaCat 16-04 CT top unit 8.7VDC (6 Alkaline D-cells)  
 0.0VDC micro lithium battery (flooded pressure case)  
 SBE SeaCat 16-04 CT bottom unit 7.50VDC (6 Alkaline D-cells)  
 5.4VDC micro lithium battery  
 Aanderra RCM9 top current meter 7.94VDC Type 3614 alkaline  
 Aanderra RCM8 bottom current meter 7.34VDC Type 3382 lithium  
 Aanderra RCM7 top/middle current meter 7.34VDC Type 3382 lithium  
 EdgeTech 8202 acoustic Release: 8.33, 14.99, 21.76 VDC alkaline pack

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**MOORING CHINSTRAP DEPLOYMENT STATISTICS: (December 25, 1997 @ 1750 GMT)**

Information on the mooring equipment for *Mooring Chinstrap*. The mooring deployment was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). Preparation of all equipment was a joint effort of S-216A. The SeaBird SeaCat 16-04 CT units and Aanderra RCM8 and RCM9 current meters (w/ pressure and conductivity sensors) instruments are now one year old. The Aanderra RCM7 current meter is a loaner instrument to test the RCM9 and since the performance of the instrument was questioned it will be used for another year. This continued use was approved by Aanderra. There were some problems and difficulties preparing the mooring and individual instruments on this array. The bottom OSU Tracer15 sediment trap required a lot of servicing. The carousel cam guide was

filed to allow better carousel operation. The motor in the pressure case was replaced because of stripped gears. The failure occurred during one of the carousel tests. Continued failure of this unit probably contributed to the failure of this component. A number of wire became disconnected during the service and needed to be repaired. The pressure case stays need to be replaced. Lastly, the TattleTale3 needed to be replaced because the motor voltage reading was incorrect. The mooring line required two repairs, one thimble replacement and approximately 1m of line cut and spliced. Two steel buoys were used again on this mooring making the flotation arrangement on this mooring different than the other moorings. The steel floats were used due to the lack of glass flotation spheres and need to remain above their crush depth threshold. This flotation arrangement created a large gap (500 m) between the bottom flotation package and the bottom interments. A single 3 pack of Billings floats (originally attached to the bottom buoy) was relocated 200 m down the line. detailed outline on the deployment is listed below.

Top 2-3 pack Billing's floats in water @	0510/(1610Z 12/25/97)
Top InterOcean S4 current meter in water @	0511
Top SBE 16-04 CT unit in water @	0511
Middle 30" Steel Billing's buoy in water @	0525
Top OSU Tracer15 sediment trap in water @	0535
Top Aanderaa RCM9 current meter w/ P and C sensors in water @	0540
Top Aanderaa RCM7in water @	0540
Bottom 30" Steel Billing's buoy w/ 1-3 packs Billing's floats in water @	0551
Bottom OSU Tracer15 sediment trap in water @	0629
Bottom Aanderaa RCM8 w/ P and C sensors in water @	0637
EdgeTech 8202 dual channel acoustic release in water @	0644
Anchor released @	0650L (1750Z 12/25/97)

**OSU Tracer15 Sediment Trap Deployment Statistics: (TOP).**

Trap Cups Deployed:	15
Deployment Filename:	TOP-C97.DEP (Appendix C)
TattleTale Interface Serial Number:	1330-11 (new TT interface)
Battery Condition:	9.37 VDC (3-Micro 9v alkaline) 3.31 VDC (1-RAM 3v lithium) 18.91 VDC (4-Motor 9v alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.
Trap deployment program:	Same as Bottom trap, see below

**OSU Tracer15 Sediment Trap Deployment Statistics: (BOTTOM).**

Trap Cups Programmed:	15
Recovery Filename:	TOP-C97.REC (Appendix C)
TattleTale Interface Serial Number:	1329-2 (1320 TT replaced due to bad motor voltage readings)
Battery Condition:	9.30 VDC (3-Micro 9v alkaline) 2.98 VDC (1-RAM 3v lithium) 18.81 VDC (4-Motor 9v alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.
Trap deployment program:	Same as Top and as follows

**Mooring Chinstrap Top and Bottom Sediment Trap Deployment date- 25 December 1997 at 1750 GMT, and Programming. OSU Tracer15 Sediment Traps trap begin and end with a cup (#1 & #15) under funnel.**

**OSU Tracer15 sediment trap program:**

<b>Duration</b>	<b>GMT Time</b>	<b>GMT Date</b>	<b>Event #</b>	<b>Cup#</b>
09 Days	1750	25 December 1997	Event 0	Cup 1
13 Days	0600	03 January 1998	Event 1	Cup 2
16 Days	0600	16 January 1998	Event 2	Cup 3
14 Days	0600	01 February 1998	Event 3	Cup 4
14 Days	0600	15 February 1998	Event 4	Cup 5
14 Days	0600	01 March 1998	Event 5	Cup 6
17 Days	0600	15 March 1998	Event 6	Cup 7
44 Days	0600	01 April 1998	Event 7	Cup 8
61 Days	0600	15 May 1998	Event 8	Cup 9
62 Days	0600	15 July 1998	Event 9	Cup 10
47 Days	0600	15 September 1998	Event 10	Cup 11
14 Days	0600	01 November 1998	Event 11	Cup 12
16 Days	0600	15 November 1998	Event 12	Cup 13
09 Days	0600	01 December 1998	Event 13	Cup 14
? Days	0600	10 December 1998	Event 14	Cup 15

**SeaBird SeaCat 16-04 CT units:**

SBE 16-04 S/N: 1615016-2258 (**FLOODED CASE SENT TO SBE FOR REPAIR**)  
 Battery condition:  
 Memory battery:  
 Sampling interval:  
 GMT Start:

TOP SBE 16-04 S/N: 1615016-2099  
 Battery condition: 9.1 VDC (6 alkaline D-cells)  
 Memory battery: 5.4 VDC (lithium)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/25/97 @ 16:00:00

**Aanderaa RCM7, RCM8, and RCM8 current meters:**

RCM9 w/ P and C sensors S/N: 70 TOP  
 Battery condition: 9.61 VDC (Type 3614 alkaline)  
 Sampling interval: 30 minutes  
 GMT Start: 12/25/97 @ 13:30:00

RCM7 S/N: 11548 MIDDLE  
 Battery condition: 7.34 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/25/97 @ 13:30:00

RCM8 w/ P and C sensors S/N: 12120 TOP  
 Battery condition: 7.36 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/25/97 @ 13:30:00

**InterOcean S4 current meter:**

#1 S4 S/N: 07801666  
Battery condition: 7.72 VDC (6 lithium D-cells)  
Sampling interval: 1minute every 15 minutes  
GMT Start: 12/24/97 @ immediately

**EdgeTech 8202 acoustic release:**

8202 S/N: 021618  
Battery condition: 9.35, 15.45, 22.48VDC (alkaline batter pack)  
Pressure case vacuum: -15 psig  
Nitrogen purge: -5 psig

**Chinstrap Mooring Hardware Statistics:**

Two 3 pack floats (+132 lbs.)	=	1 m
Top InterOcean S4 current meter S/N 07801666 (-4 lbs./-1.82 kg)	=	0.46 m
Top SBE SeaCat 16-04 CT unit S/N 1615016-2099 (-32 lbs./-14.55 kg)	=	0.84 m
Top 30" steel float (+369 lbs./-167.73 kg)	=	0.762 m
Top OSU Tracer15 w/ pendant S/N 1330-11 (-60 lbs./-27.3 kg)	=	25.0 m
-Above top of cone = 21.5 m, below top of cone 3.5 m		
Top Aanderaa RCM9 current meter w/ P and C sensors S/N 70 (-27 lbs./12.3 kg)	=	0.51 m
Middle Aanderaa RCM7 current meter S/N 11548 (-42 lbs./19.1 kg)	=	0.5 m
Bottom 30" steel float (+369 lbs./-167.73 kg)	=	0.762 m
Bottom single 3 pack Billings floats (+66 lbs.)	=	0.5 m
Bottom OSU Tracer15 w/ pendant S/N 1320-2 (-60 lbs./-27.3 kg)	=	25.0 m
-Above top of cone = 21.5 m, below top of cone 3.5 m		
Bottom Aanderaa RCM8 w/ P and C sensors S/N 12120 (-50 lbs./22.73 kg)	=	0.52 m
EdgeTech 8202 dual channel acoustic release S/N 021618 (-75 lbs/34.1 kg)	=	0.62 m
Galvanized 1/2" anchor chain	=	3.0 m
Anchor 1800 lb./818.2 kg	=	1 m

All rope is: 701- Meters 11 mm single braid Duron w/ 1/2" nylon thimbles  
Hardware: 07- 1/2" galvanized chain shackles (floats)  
09- 1/2" stainless steel anchor shackles  
08- 5/8" galvanized anchor shackles  
01- 5/8" galvanized eye and eye swivel  
04- 3/8" stainless steel chain shackles (CTD meters)  
01- 1/2" galvanized chain, 3 meters long  
02- 5/8" stainless steel sediment trap shackle  
02- 5/8" stainless steel shackle  
01- EdgeTech release link

EdgeTech 8202 Release Command Codes for *Mooring Chinstrap*:

<b>S/N 021618</b>	
<b>Command A (Release)</b>	<b>626654</b>
<b>Command B (Disable A)</b>	<b>610540</b>
<b>Command C (Enable A &amp; B)</b>	<b>610563</b>
<b>Command D (Disable B)</b>	<b>610601</b>

**New Mooring Location:** 76° 20.400'S 165° 03.220'E  
**Water Depth:** 825 meters  
**Date/Time (GMT)** 12/25/97 @ 1750

## MOORING GENTOO DEPLOYMENT STATISTICS: (December 23, 1996 @ 0146 GMT)

Information on the mooring equipment for *Mooring Gentoo*. The mooring deployment was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). Preparation of all equipment was a joint effort between Rice and IGM with assistance from Jim Barry of MBARI. There were no apparent difficulties or problems preparing the mooring or the individual instruments on this array. The McLane 78G-13 sediment traps, SeaBird SeaCat 16-04 CT units, EdgeTech 8202 dual channel acoustic release, and Aanderaa RCM8 (w/ pressure and conductivity sensors) are new instruments. Then InterOcean S4 current meters were serviced and tested prior to deployment. All floats, mooring line, and hardware were also new. A detailed outline on the deployment is listed below.

Top float package, 2-3 pack Billings floats in water @	1305L/(0005Z 12/23/96)
Top InterOcean S4 current meter in water @	1306
Lower top InterOcean S4 current meter in water @	1320
30" Billings steel buoy in water @	1325
Top McLane 78G-13 sediment trap in water @	1340
Aanderaa RCM8 current meter w/ P and T° sensors in @	1344
Top SBE 16-04 CT unit in water @	1345
Middle InterOcean S4 current meter in water @	1355
Middle float package, 5-3 pack Billings floats in at @	1400
Bottom McLane 78G-13 sediment trap in water @	1415
Bottom float, 1-3 pack Billings float	1437
Top SBE 16-04 CT unit in water @	1338
Bottom InterOcean S4 current meter in water @	1339
EdgeTech 8202 acoustic release in water @	1340
Anchor released @	1346L (0146Z 12/23/96)

### McLane 78G-13 Sediment Trap Deployment Statistics: (TOP)

Trap Cups Deployed:	13
Deployment Filename:	GENTOO96.TOP
TattleTale Interface Serial Number:	6851
Battery Condition:	9.58 VDC (1-Micro 9v alkaline) 21.24 VDC (14-Motor C-cell alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.
Trap History:	Same as Bottom trap, see below

### McLane 78G-13 Sediment Trap Deployment Statistics: (BOTTOM)

Trap Cups Deployed:	13
Deployment Filename:	GENTOO96.BOT
TattleTale Interface Serial Number:	2242
Battery Condition:	9.58 VDC (1-Micro 9v alkaline) 21.24 VDC (14-Motor C-cell alkaline)

Tests performed: Motor - OK; Interface - OK  
 Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.  
 Trap History: Same as Top and as follows

**Mooring Gentoo Top and Bottom Sediment Trap Deployment date- 23 December 1996 at 0146, and Programming. McLane 78G-13 Sediment Traps trap begin and end at an open hole under funnel.**

<b>Duration</b>	<b>GMT Time</b>	<b>GMT Date</b>	<b>Event #</b>	<b>Cup#</b>
--- Days	0146	23 December 1996	Event 0	Open
09 Days	0600	23 December 1996	Event 1	Cup 1
15 Days	0600	01 January 1998	Event 2	Cup 2
16 Days	0600	16 January 1998	Event 3	Cup 3
14 Days	0600	01 February 1998	Event 4	Cup 4
14 Days	0600	15 February 1998	Event 5	Cup 5
14 Days	0600	01 March 1998	Event 6	Cup 6
17 Days	0600	15 March 1998	Event 7	Cup 7
44 Days	0600	01 April 1998	Event 8	Cup 8
61 Days	0600	15 May 1998	Event 9	Cup 9
62 Days	0600	15 July 1998	Event 10	Cup 10
47 Days	0600	15 September 1998	Event 11	Cup 11
30 Days	0600	01 November 1998	Event 12	Cup 12
31 Days	0600	01 December 1998	Event 13	Cup 13
	0600	01 January 1998	Event 14	Open

**SeaBird SeaCat 16-04 CT units:**

TOP SBE S/N: 1615016-2260  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/22/96 @ 21:30:00

BOTTOM SBE S/N: 1615016-2261  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/22/96 @ 20:30:00

**Aanderaa RCM8 current meter:**

RCM8 S/N: 12118  
 Battery condition: 6.67 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/22/96 @ 10:30:00

**InterOcean S4 current meters:**

#1 S4 S/N: 07881689  
 Battery condition: 7.89 VDC (6 lithium D-cells)  
 Sampling interval: 1minute every 15 minutes  
 GMT Start: 12/22/96 @ 23:00:00

#2 S4 S/N: 05451197  
 Battery condition: 7.85 VDC (6 lithium D-cells)  
 Sampling interval: 1minute every 15 minutes

GMT Start: 12/22/96 @ 12:00:00

#3 S4 S/N: 05451402  
 Battery condition: 7.88 VDC (6 lithium D-cells)  
 Sampling interval: 1minute every 15 minutes  
 GMT Start: 12/22/96 @ 12:00:00

#4 S4 S/N: 07881691  
 Battery condition: 7.88 VDC (6 lithium D-cells)  
 Sampling interval: 1minute every 15 minutes  
 GMT Start: 12/22/96 @ 23:00:00

**Gentoo Mooring Hardware Statistics:**

Two 3 pack floats	=	1 m
Top InterOcean S4 current meter S/N 07881689 (-4 lbs/-1.82 kg)	=	0.46 m
Top InterOcean S4 current meter S/N 05451197 (-4 lbs/-1.82 kg)	=	0.46 m
Top 30" steel float (+369 lbs./-167.73 kg)	=	0.762 m
Top McLane 78G-13 trap w/ pendant S/N 6851 (-77 lbs./-35 kg)	=	5.1 m
-Above top of cone = 2.7 m, below top of cone 2.4 m		
Top Aanderaa RCM8 current meter S/N 12118 (-50 lbs./22.73 kg)	=	0.52 m
Top SBE SeaCat 16 CTD unit S/N 1615016-2260 (-32 lbs./-14.55 kg)	=	0.84 m
Middle InterOcean S4 current meter S/N 05451402 (-4 lbs/-1.82 kg)	=	0.46 m
Five 3 pack floats (+330 lbs./150 kg)	=	2.5 m
Bottom McLane 78G-13 trap w/ pendant S/N 2242 (-77 lbs./-35 kg)	=	5.1 m
-Above top of cone = 2.7 m, below top of cone 2.4 m		
Bottom SBE SeaCat 16 CTD unit S/N 1615016-2260 (-32 lbs./-14.55 kg)	=	0.84 m
Bottom InterOcean S4 current meter S/N 07881691 (-4 lbs/-1.82 kg)	=	0.46 m
EdgeTech 8202 dual channel acoustic release S/N020896 (75 lbs/34.1 kg)	=	1.14 m
Galvanized 1/2" anchor chain	=	3.0 m
Anchor 1800 lb./818.2 kg	=	1 m

All rope is: 546.5- Meters 11 mm single braid Duron w/ 1/2" nylon thimbles

Hardware:

- 22- 1/2" galvanized chain shackles (floats)
- 17- 1/2" stainless steel anchor shackles
- 14- 5/8" galvanized anchor shackles
- 01- 5/8" galvanized eye and eye swivel
- 04- 3/8" stainless steel chain shackles (CTD meters)
- 01- 1/2" galvanized chain, 4 meters long
- 01- EdgeTech release links
- 02- 1/2" galvanized pear master link

EdgeTech 8202 Release Command Codes for *Mooring Gentoo*:

<b>S/N 020896</b>	
<b>Command A (Release)</b>	<b>626156</b>
<b>Command B (Disable A)</b>	<b>607210</b>
<b>Command C (Enable A &amp; B)</b>	<b>607233</b>
<b>Command D (Disable B)</b>	<b>607256</b>

**New Mooring Location:** 76° 20.244'S 172° 58.758'E  
**Water Depth:** 819 meters  
**Date/Time (GMT)** 12/23/96 @ 0146

**MOORING EMPEROR DEPLOYMENT STATISTICS: (January 07, 1997 @ 1135 GMT)**

Information on the mooring equipment for *Mooring Emperor*. The mooring deployment was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). Preparation of all equipment was a joint effort between Rice and IGM. The RDI ADCP unit, EdgeTech acoustic release, McLane 78G-13 sediment trap, two SeaBird SeaCat 16-04 CT units, and three Aanderaa RCM8 current meters (w/ pressure and conductivity sensors) were all new instruments. There were no problems or difficulties preparing the mooring and individual instruments on this array. A detailed outline on the deployment is listed below.

Top 2-3 pack Billing's floats in water @	2325L/(1025Z 12/31/96)
Top Aanderaa RCM8 w/ P and C sensors in water @	0030
Top InterOcean S4 current meter in water @	2325
RDI ADCP w/ Syntactic foam float in water @	2340
Middle Aanderaa RCM8 w/ P and C sensors in water @	0030
Top SBE 16-04 CT unit in water @	2355
Lower InterOcean S4 current meter in water @	2325
Bottom flotation package, 5-3 pack Billing's floats in water @	0005
Bottom McLane 78G-13 sediment trap in water @	0025
Bottom SBE 16-04 CT unit in water @	0030
Bottom Aanderaa RCM8 w/ P and C sensors in water @	0030
EdgeTech 8202 dual channel acoustic release in water @	0035
Anchor released @	0042L (1125Z 12/31/96)

**McLane 78G-13 Sediment Trap Deployment Statistics: (BOTTOM)**

Trap Cups Deployed:	13
Deployment Filename:	FAIRY96.TOP
TattleTale Interface Serial Number:	2244
Battery Condition:	9.58 VDC (1-Micro 9v alkaline) 21.2 VDC (14-Motor C-cell alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.

**Mooring Emperor Top and Bottom Sediment Trap Deployment date- 26 December 1996 at 0736 GMT, and Programming. The McLane 78G-13 Trap begin and end at an open hole under funnel.**

**McLane 78G-13 sediment trap program:**

Duration	GMT Time	GMT Date	Event #	Cup#
--- Days	0736	26 December 1996	Event 0	Open
21 Days	1400	26 December 1996	Event 1	Cup 1
16 Days	0600	16 January 1997	Event 2	Cup 2
14 Days	0600	01 February 1997	Event 3	Cup 3
14 Days	0600	15 February 1997	Event 4	Cup 4
14 Days	0600	01 March 1997	Event 5	Cup 5
17 Days	0600	15 March 1997	Event 6	Cup 6
44 Days	0600	01 April 1997	Event 7	Cup 7

61 Days	0600	15 May	1997	Event 8	Cup 8
62 Days	0600	15 July	1997	Event 9	Cup 9
47 Days	0600	15 September	1997	Event 10	Cup 10
24 Days	0600	01 November	1997	Event 11	Cup 11
25 Days	0600	25 November	1997	Event 12	Cup 12
43 Days	0600	01 December	1997	Event 13	Cup 13
	0600	01 February	1998	Event 14	Open

**RDI Broadband ADCP:**

BBADCP 150KHz transducer S/N: 2562  
 BBACCP canister (pressure case) S/N: 1510  
 Battery pack assembly (alkaline) S/N: ABPM (includes 19 alkaline C cells)  
 Alkaline battery packs S/N: ABP-R (19 C cells/pk, 6 pks/unit)

**SeaBird SeaCat 16-04 CT units:**

TOP SBE 16-04 S/N: 1615016-2096  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Memory battery: 5.6 VDC (lithium)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 01/07/97 @ 03:30:00

BOTTOM SBE 16-04 S/N: 1615016-2259  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Memory battery: 5.6 VDC (lithium)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 01/07/97 @ 03:30:00

**Aanderaa RCM8 current meters:**

RCM8 w/ P and C sensors S/N: 12117 TOP  
 Battery condition: 6.86 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 01/07/97 @ 05:00:00

RCM8 w/ P and C sensors S/N: 12119 MIDDLE  
 Battery condition: 6.86 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 01/07.97 @ 05:00:00

RCM8 w/ P and C sensors S/N: 12121 TOP  
 Battery condition: 6.86 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 01/07/97 @ 05:00:00

**InterOcean S4 current meters:**

#1 S4 (Upper)S/N: 07801664  
 Battery condition: 7.88 VDC (6 lithium D-cells)  
 Sampling interval: 1 minute every 15 minutes  
 GMT Start: 01/07/97 @ 00:30:00

#2 S4 (Lower) S/N: 08291862  
 Battery condition: 7.88 VDC (6 lithium D-cells)

Sampling interval: 1 minute every 15 minutes  
GMT Start: 01/07/97 @ 00:30:00

**Emperor Mooring Hardware Statistics:**

Two 3 pack floats	=	1 m
Top Aanderaa RCM8 w/ P and C sensors S/N 12117 (-50 lbs./22.73 kg)	=	0.52 m
Top InterOcean S4 current meter S/N 07801664 (-4 lbs/-1.82 kg)	=	0.46 m
Top syntactic foam buoy w/ RDI ADCP S/N: 2562/1510 (+700 lbs./+318.2 kg)	=	7.65 m
-Above buoy = 4.85 m; below buoy = 1.7 m; buoy = 1.1		
Middle Aanderaa RCM8 w/ P and C sensors S/N 12119 (-50 lbs./22.73 kg)	=	0.52 m
Top SBE SeaCat 16 CTD unit S/N 1615016-2096 (-32 lbs./-14.55 kg)	=	0.84 m
Lower InterOcean S4 current meter S/N 08291862 (-4 lbs/-1.82 kg)	=	0.46 m
Five 3 pack floats (+330 lbs./150 kg)	=	2.5 m
Bottom McLane 78G-13 trap w/ pendant S/N 2244 (-77 lbs./-35 kg)	=	5.1 m
-Above top of cone = 2.7 m, below top of cone = 2.4 m		
Bottom SBE SeaCat 16-04 CT unit S/N 1615016-2259 (-32 lbs./-14.55 kg)	=	0.84 m
Bottom Aanderaa RCM8 w/ P and C sensors S/N 12121 (-50 lbs./-22.73 kg)	=	0.52 m
EdgeTech 8202 dual channel acoustic release S/N 020898 (-75 lbs/-34.1 kg)	=	0.62 m
Galvanized 1/2" anchor chain	=	3.0 m
Anchor 1800 lb./818.2 kg	=	1 m

All rope is: 603- Meters 11 mm single braid Duron w/ 1/2" nylon thimbles  
Hardware: 07- 1/2" galvanized chain shackles (floats)  
07- 1/2" stainless steel anchor shackles  
08- 5/8" galvanized anchor shackles  
01- 5/8" galvanized eye and eye swivel  
04- 3/8" stainless steel chain shackles (CTD meters)  
01- 1/2" galvanized chain, 3 meters long  
02- 5/8" stainless steel sediment trap shackle  
02- 5/8" stainless steel shackle  
01- EdgeTech release link

EdgeTech 8202 Release Command Codes for *Mooring Emperor*:

S/N 021618	
Command A (Release)	626654
Command B (Disable A)	610540
Command C (Enable A & B)	610563
Command D (Disable B)	610601

**New Mooring Location:** 76° 58.912'S 171° 58.745'E  
**Water Depth:** 675 meters  
**Date/Time (GMT)** 01/07/97 @ 0755

**MOORING FAIRY (OLD MOORING F) DEPLOYMENT STATISTICS: (December 26, 1996 @ 0627 GMT)**

Information on the mooring equipment for *Mooring Fairy*. The mooring deployment was supervised by David Mucciarone (S-216A) and performed on the RVIB N.B Palmer (Fig. 3). Preparation of all equipment was a joint effort between Rice and IGM. There were some problems and difficulties preparing the mooring and individual instruments on this array. However, having a backup RCM7 to replace the current meter damaged during the recovery and a prepared McLane 78G-13 sediment trap (new instrument) did help expedite the mooring turn around. These are discussed above. A detailed outline on the deployment is listed below.

Top float with RDI ADCP in water @	1927L/(0620Z 12/26/96)
Top McLane 78G-13 sediment trap in water @	1937
Top SBE 16-04 CT unit in water @	1938
Top Aanderaa RCM7 in water @	1338
Middle float package, 2 Resinex buoys and 2 Benthos floats in water @	1945
Bottom SBE 16-04 CT unit in water @	1949
Middle Aanderaa RCM7 in water @	2000
Bottom Tucci 24 cup sediment trap in water @	2002
5 single Benthos floats in water @	2015
Bottom Aanderaa RCM7 in water @	2032
Dual EdgeTech 8202 acoustic releases in water @	2031
Anchor released @	2037L (0731Z 12/26/96)

**McLane 78G-13 Sediment Trap Deployment Statistics: (TOP)**

Trap Cups Deployed:	13
Deployment Filename:	FAIRY96.TOP
TattleTale Interface Serial Number:	2243
Battery Condition:	9.57 VDC (1-Micro 9v alkaline) 21.4 VDC (14-Motor C-cell alkaline)
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.

**Tucci 24 Cup Sediment Trap Deployment Statistics (IGM): (BOTTOM)**

Trap Cups Deployed:	24
Deployment Filename:	N/A
TattleTale Interface Serial Number:	N/A
Battery Condition:	N/A
Tests performed:	Motor - OK; Interface - OK
Sample cup preservative:	6% Na-borate formaline solution with filtered sea water.

**Mooring Fairy Top and Bottom Sediment Trap Deployment date- 26 December 1996 at 0736 GMT, and Programming. McLane 78G-13 and Tucci Sediment Traps trap begin and end at an open hole under funnel.**

**McLane 78G-13 sediment trap program:**

<b>Duration</b>	<b>GMT Time</b>	<b>GMT Date</b>	<b>Event #</b>	<b>Cup#</b>
--- Days	0736	26 December 1996	Event 0	Open
21 Days	1400	26 December 1996	Event 1	Cup 1
16 Days	0600	16 January 1997	Event 2	Cup 2
14 Days	0600	01 February 1997	Event 3	Cup 3
14 Days	0600	15 February 1997	Event 4	Cup 4
14 Days	0600	01 March 1997	Event 5	Cup 5
17 Days	0600	15 March 1997	Event 6	Cup 6
44 Days	0600	01 April 1997	Event 7	Cup 7
61 Days	0600	15 May 1997	Event 8	Cup 8
62 Days	0600	15 July 1997	Event 9	Cup 9
47 Days	0600	15 September 1997	Event 10	Cup 10
24 Days	0600	01 November 1997	Event 11	Cup 11
25 Days	0600	25 November 1997	Event 12	Cup 12
43 Days	0600	01 December 1997	Event 13	Cup 13
	0600	01 February 1998	Event 14	Open

**Tucci 24 cup sediment trap programming:**

<b>Duration</b>	<b>GMT Time</b>	<b>GMT Date</b>	<b>Event #</b>	<b>Cup#</b>
--- Days	0736	26 December 1996	Event 0	Open
15 Days	0600	27 December 1996	Event 1	Cup 1
15 Days	0600	11 January 1997	Event 2	Cup 2
15 Days	0600	26 January 1997	Event 3	Cup 3
15 Days	0600	10 February 1997	Event 4	Cup 4
15 Days	0600	25 February 1997	Event 5	Cup 5
15 Days	0600	12 March 1997	Event 6	Cup 6
15 Days	0600	27 March 1997	Event 7	Cup 7
15 Days	0600	11 April 1997	Event 8	Cup 8
15 Days	0600	26 April 1997	Event 9	Cup 9
15 Days	0600	11 May 1997	Event 10	Cup 10
15 Days	0600	26 May 1997	Event 11	Cup 11
15 Days	0600	10 June 1997	Event 12	Cup 12
15 Days	0600	26 June 1998	Event 13	Cup 13
15 Days	0600	11 July 1997	Event 14	Cup 14
15 Days	0600	26 July 1997	Event 15	Cup 15
15 Days	0600	10 August 1997	Event 16	Cup 16
15 Days	0600	25 August 1997	Event 17	Cup 17
15 Days	0600	09 September 1997	Event 18	Cup 18
15 Days	0600	24 September 1997	Event 19	Cup 19
15 Days	0600	09 October 1997	Event 20	Cup 20
15 Days	0600	24 October 1997	Event 21	Cup 21
15 Days	0600	08 November 1997	Event 22	Cup 22
15 Days	0600	23 November 1997	Event 23	Cup 23
15 Days	0600	08 December 1997	Event 24	Cup 24
	0600	23 December 1997	Event 25	Open

**SeaBird SeaCat 16-04 CT units:**

TOP SBE S/N: 167881-1434 (IGM)  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/26/96 @ 06:30:00

BOTTOM SBE S/N: 167881-2082 (IGM)  
 Battery condition: 8.8 VDC (6 alkaline D-cells)  
 Sampling interval: 1800 seconds (30 minutes)  
 GMT Start: 12/26/96 @ 07:00:00

**Aanderaa RCM7 current meters:**

RCM7 S/N: 12032 (IGM)  
 Battery condition: 6.67 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/26/96 @ 05:30:00

RCM7 S/N: 11562 (IGM)  
 Battery condition: 6.67 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/26/96 @ 05:30:00

RCM7 S/N: 11198 (IGM)  
 Battery condition: 6.67 VDC (Type 3382 lithium)  
 Sampling interval: 30 minutes  
 GMT Start: 12/26/96 @ 05:30:00

**Fairy Mooring Hardware Statistics:**

Top float with ADCP	=	1.1 m
Top McLane 78G-13 trap and transmissometer w/ pendant S/N 2243 (-77 lbs./-35 kg)	=	5.1 m
-Above top of cone = 2.7 m, below top of cone = 2.4 m		
Top SBE SeaCat 16-04 CT unit S/N 167881-1434 (-32 lbs./-14.55 kg)	=	0.84 m
Top Aanderaa RCM7 current meter S/N 12032 (-50 lbs./22.73 kg)	=	0.52 m
Middle 2 Resinex buoys with 2 Benthos floats (+320 lbs./+145.45 kg)	=	2.36 m
Bottom SBE SeaCat 16 CTD unit S/N 167881-2082 (-32 lbs./-14.55 kg)	=	0.84 m
Middle Aanderaa RCM7 current meter S/N 11562 (-50 lbs./-22.73 kg)	=	0.52 m
Bottom Tucci 24 cup sediment trap (-80 lbs./-36.4 kg)	=	3.5 m
-Above top of cone = 1.0 m, below top of cone = 2.5 m		
Bottom 5 Benthos floats (+250 lbs./+113.6 kg)	=	2.16 m
Bottom Aanderaa RCM7 current meter S/N 11198 (-50 lbs./-22.73 kg)	=	0.52 m
Dual EdgeTech 8202 acoustic release S/N17091 & 17092 (160 lbs/72.7 kg)	=	1.14 m
Stainless steel 12 mm wire rope	=	11.0 m
Anchor (-1800 lb./-818.2 kg)	=	1 m

All rope is: 464- Meters 10 mm 2-1 Kevlar rope with 9 mm nylon thimbles and 11 mm Duron rope.  
 Hardware: 25- 1/2" stainless steel anchor shackles  
 4- 5/8" galvanized anchor shackles  
 10- 1/2" galvanized anchor shackles  
 12- 12 mm stainless steel quick links  
 01- 12 mm stainless steel wire rope, 11 meters long  
 02- EdgeTech release links  
 01- 1/2" galvanized pear master link

EdgeTech 8202 Release Command Codes for *Mooring Fairy* (IGM):

S/N 17091		S/N 170192	
<b>Command A (Release)</b>	<b>535420</b>	<b>Command A (Release)</b>	<b>535445</b>
<b>Command B (Disable A)</b>	<b>560272</b>	<b>Command B (Disable A)</b>	<b>560345</b>

**Command C (Enable A & B) 560303**  
**Command D (Disable B) 560320**

**Command C (Enable A & B) 560366**  
**Command D (Disable B) 560401**

**New Mooring Location:**

**77° 58.294'S 178° 02.274'W**

**Water Depth:**

**698 meters**

**Date/Time (GMT)**

**12/26/96 @ 0745**

