

DF-99 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

David A. Mucciarone

S-216A Cruise Participant: Robert B. Dunbar S-216A Group leader and 97-09 cruise Chief Scientist), David A. Mucciarone, Mike Lutz, Kevin Theissen, Nancy Grumet, David Munro, and Alice Cook (all from Stanford University).

Logistics and Objectives:

Most of the above group including myself departed San Francisco (SFO) at 1905 on 10/28/98. We departed LAX at 2230 and arrived in Christchurch, NZ (CHC) at 1155 on 10/30/98. EWC gear was issued on 10/31/98 at the CDC.

The following day (10/31/98) we checked in at the CDC turned in tickets and made arrangements to stay on the NBP. While in port, time was spent setting up the labs, organizing supplies, and stowing gear for the transit. We departed Lyttleton at 1000L on 11/2/98 to begin NBP98-7.

Our group had many objectives to accomplish on this cruise. Filtering rigs were set up to filter water for PON/POC $\delta^{15}\text{N}/\delta^{13}\text{C}$, phosphate, and nitrate $\delta^{15}\text{N}$. An alkalinity/pH meter, coulometer (UIC Coulometrics), and continuous flow extraction line (a final design) were set up to do, alkalinity, TDIC, and collect CO_2 for $\delta^{13}\text{C}$ on the DIC, respectively, on hydrocast, sea ice, and pore waters. A large volume centrifuge (shipped from Stanford University) was setup in the cold room to spin down brines from sea ice samples. The hanger was setup to do mooring operations. Since the coulometer was a new design a lot of time was needed to standardize the system, in addition training was necessary on all aspects of operation. The underway pCO_2 system from LDEO was left on board and ran continuously with some interruption in the Ross Sea.

Summary of Field Operations:

Chief Scientist for cruise 98-7 and Group leader for S-216A was Robert Dunbar. The NBP departed Lyttleton on 11/2/98, however, the cruise began on 11/7/98 in the northern Ross Sea. Cruise 98-7 lasted 49 days, consisted of 120 stations (see Fig 1), which included the recovery of 5 mooring (see Fig. 2) and servicing/deployment of 1 mooring (Joint US/Italian). Field science operations ended on 12/12/98 at 1740L, the cruise on the RVIB N.B. Palmer ended in Lyttleton, NZ on 12/20/98.

Ship off load began almost immediately after arrival in Lyttleton. All of S-216A cargo was prepared for offload prior to arrival. Only samples were hand carried to Stanford University accompanied by MAF permit. ECW gear was turned in on the NBP. I departed CHCH at 1720 on 12/21/98 and arrived in San Francisco (SFO) at 1835 on 12/21/98.

RVIB N.B. Palmer 98-7 Cruise:

My main objective on the RVIB N.B. Palmer 98-7 cruise was to recover 5 moorings in the southwestern Ross Sea. In addition to these responsibilities I set up the continuous flow extraction line to collect CO_2 for $\delta^{13}\text{C}$ in seawater DIC, filtering apparatus, alkalinity setup, cold room operations for sea ice, and the coulometer for TDIC. In addition, train the personnel to use the instrumentation and to provide technical support as needed. Rob Dunbar and I ran the coulometer in 12 hr shifts. Kevin Theissen and Mike Lutz performed alkalinity measurements, Nancy Grumet and David Munro operated the continuous flow

DIC extraction line. Everyone worked on filtering and processing sea ice samples. Everyone worked a 12 hr shift collecting and analyzing samples. Rob Dunbar and I with assistance from Mike Van Woert and ASA worked on mooring operations.

Mooring Operation:

Mooring Chinstrap (Recovery)

Our first mooring operation was Mooring Chinstrap (C). The recovery of this mooring was even more challenging than the previous year because it was under 100% solid pack ice cover. We began the recovery activities on December 4, 1998 @ 1600 GMT (12/5/98 @ 0600L) located at 76° 20.460'S 165° 01.778'E, water depth 827 m (857 echo) (Fig. 2). After hours of breaking up the pack ice and tirangulation on the acoustic release, the Captian opened up a large area aft of the vessel and making our best guess, we tripped the acoustic release. Unfortunately, the floats did not come up in the open area. It was then necessary to spend additional time trying to locate the mooring. Search activities included acoustic interrogation from the NBP and the sea ice and use of the PDR on the NBP. The mooring finally broke free while breaking up more pack ice around the area. Once the floats were discovered among the pack ice mooring recover commenced. The Captain did an excellent job maneuvering the NBP to allow us to recover the instrumentation on the mooring. All of the equipment was recovered minus the gear above the break-away link. After the recovery was finished we spent an additional couple of hours in an attempt to locate the upper portion of the mooring, but to no avail.

The portion above the break-away link consisted of one SBE 16-04 CT (S/N#: 1615016-2009) unit and an InterOcean S4 (S/N#: 07801666) current meter. Of the instrumentation recovered all worked perfectly with exception to the Aanderaa RCM9 current meter. The RCM9 (S/N#: 70) did not work well because of a manufacturer defect. In addition the RCM9 pressure case flooded. The RCM9 did collect data through out the entire deployment, however, during recovery the sea water inside the pressure case shorted out the electronic. There was a steep line angle on the mooring line because of the recovery problems in the heavy pack ice. After inspection of the RCM9 water intrusion was through a sensor feedthrough. A special note, the bottom OSU Tracer 15 sediment trap (S/N#: 1329-2) worked for the first time ever. The top OSU Tracer 15 sediment trap (S/N#: 1330-11) also worked as programmed. The EdgeTech 8202 acoustic release (S/N#: 021618) worked very well. There were some minor problems with the mooring line, some abrasion and broken thimbles because of the recovery ice conditions. The mooring was equipped with two OSU Tracer-15 sediment traps, one each Aanderaa RCM7 (S/N#: 11548), RCM8 (S/N#: 12120), and RCM9 (S/N#: 70) current meters with the latter two units equipped with CT sensors, one 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 (Retrograde)

This mooring was not redeployed. The Aanderaa RCM8 (S/N#: 12120) current meter and EdgeTech Acoustic release (S/N#: 021618) were packed and later used on the Palmer Deep mooring on NBP99-3. The Aanderaa RCM7 S/N#: 11548) was returned to Aanderaa because it was a rental to test the RCM9. The RCM9 (S/N#: 70) was sent to Aanderaa for repair under TCN: 8366-X376. The two OSU Tracer 15 sediment traps, one 30" steel float was shipped to Stanford University and the one 3-pack float was returned to ASA/NSF. Instruments lost one SBE 16-04 CT (S/N#: 1615016-2009) unit and one InterOcean S4 (S/N#: 07801666) current meter were reported to ASA/NSF.

Mooring Gentoo (Recovery)

The next mooring recovery was Gentoo which began on 12/7/97 at 1334 GMT (12/8/98 @ 0134L), located at 76° 20.244'S 172° 58.758'E, water depth 621 m (Fig. 2). The mooring was 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, twelve 3 pack Billings Floats.

The recovery of this mooring was easier than Chinstrap but was also recovered near the pack ice edge. Fortunately, the pack ice was more brash than pack but the mooring recovery was slower than normal. Both

McLane 78G-13 sediment traps (SN#: 6851 and 2242), both SBE 16-04 CT units (SN#: 1615016-2260 and 2261) worked as programmed, one Aanderaa RCM8 current meter (SN#: 12118) worked as programmed, all four InterOcean S4 current meters worked (SN#: 07881689, 05451197, 05451402, 07881691) worked as programmed only SN#: 05451402 recorded seem to be out of calibration (speeds recored too large). The EdgeTech 8202 (SN#: 020896) worked fine, no problems. All flotation and mooring line and connections looked normal.

Mooring Gentoo (Retrograde)

This mooring was not redeployed. Both McLane 78G-13 sediment traps (SN#: 6851 and 2242), were redeployed on Mooring Adelie (joint US/Italian mooring). Both SBE 16-04 CT units were sent to SBE for service and calibration and later shipped to Punta Arenas for potential use on the Palmer Deep mooring on NBP99-3. One of the SBE 16-04 CT units (SN#: 1615016-2260) was packed and later used on the Palmer Deep mooring on NBP99-3. The other SBE16-04 CT unit (1615016- 2261) was used as a backup on NBP99-3 and is stored in Punta Arenas warehouse under TCN#: 9072-W400 which is in TCN#: 9072-W399). The Aanderaa RCM8 current meter (SN#: 12118) was returned to ASA/NSF after NBP99-3. All four InterOcean S4 current meters (SN#: 07881689, 05451197, 05451402, 07881691) were sent to InterOcean for post cruise calibration and later returned to ASA/NSF. The EdgeTech 8202 (SN#: 020896) redeployed on Mooring Adelie (joint US/Italian mooring). Seven of the Billings 3-packs were shipped to Stanford University the remaining five 3-pack floats were returned to ASA/NSF.

Mooring Fairy, Stanford/IGM (Recovery)

We recovered *Mooring F* along the Ross Ice Shelf on 12/10/98 GMT approximately 2.39 nm north at 77° 58.294'S 178° 02.274'W, water depth 698 m (Fig. 2). *Mooring Fairy* was a joint US/Italian mooring with both programs providing instrumentation for the mooring. The mooring was equipped with one McLane 78G-13 sediment trap (SN#: 2243) 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. There was one SBE 16-04 CT unit failure (flooded pressure case). All of the other instrumentation worked as programmed.

Mooring Fairy, Stanford/IGM (Retrograde)

This mooring was not redeployed. All of the Italian instrumentation and sediment trap samples were returned to the Italian Antarctic Program in Lyttleton, NZ at the end of the cruise. The single US McLane 78G-13 sediment traps (SN#: 2243) was packed and later used on the Palmer Deep mooring on NBP99-3.

Mooring Emperor (Recovery)

Mooring Emperor located along the Ross Ice Shelf and recovered on 12/10/98 GMT at 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 (SN#: 2244) at the bottom, two InterOcean S4 current meters (SN#: 05451199, 08291862), three Aanderaa RCM8 current meters (SN#: 12117, 12119, 12121), two SeaBird Electronics (SBE) SeaCat 16-04 CT units (1615016-2096, 2259), one EdgeTech 8202 acoustic release (SN#: 020898), one RDI ADCP in a 50" syntactic foam buoy (SN#: 2562/1510), and six 3 pack Billings floats. All instrumentation on this mooring worked as programmed except the two InterOcean current meters. S4 current meter (SN#: 05451199) equipped with T and S sensors suffered low voltage power and stopped recording on 6/30/98. The other S4 unit (SN#: 08291862) failed on 1/9/98 due to flooded battery compartment.

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.

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 Adelle 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 at 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)

5.6VDC micro lithium battery

SBE SeaCat 16-04 CTD bottom unit 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

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:

<u>Duration</u>	<u>GMT Time</u>	<u>GMT Date</u>		<u>Event #</u>	<u>Cup#</u>
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: 1 minute 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)	
Release command	ABEG	Release command	BEFH
Enable command	CDE	Enable command	DEF
Rearm command	CDEH	Rearm command	DEFH

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

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

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 Aanderaa RCM8 and RCM9 current meters (w/ pressure and conductivity sensors) instruments are now one year old. The Aanderaa 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)

Tests performed: 18.91 VDC (4-Motor 9v alkaline)
 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:

Duration	GMT Time	GMT Date	Event #	Cup#
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**)
 Battery condition: **SENT TO SBE FOR REPAIR)**
 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*:

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° 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.

<u>Duration</u>	<u>GMT Time</u>	<u>GMT Date</u>	<u>Event #</u>	<u>Cup#</u>
--- 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*:

S/N 020896

Command A (Release)	626156
Command B (Disable A)	607210
Command C (Enable A & B)	607233
Command D (Disable B)	607256

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:

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

Tucci 24 cup sediment trap programming:

Duration	GMT Time	GMT Date		Event #	Cup#
--- 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	
Command A (Release)	535420	Command A (Release)	535445
Command B (Disable A)	560272	Command B (Disable A)	560345
Command C (Enable A & B)	560303	Command C (Enable A & B)	560366
Command D (Disable B)	560320	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

