

LMG02-01B ANTARCTIC PENINSULA
SEDIMENT TRAP DEPLOYMENT AND WATER CHEMISTRY CRUISE
R/V L.M. GOULD (March 6 to 18, 2002)

by

David A. Mucciarone

S-072 Cruise Participant: Robert B. Dunbar, David A. Mucciarone, Christopher Moy, and Luna Federici all from Stanford University

Travel Logistics:

Departed San Francisco (SFO) at 0839 on 3/1/02 on AA Flt#:1907 and arrived in LAX at 1012. Departed LAX on LA/AA Flt#:7709 at 1215 and arrived in Santiago (SCL) at 0610 on 3/2/02 via Lima, Peru. Departed SCL on LA/AA Flt#:6291 at 0930 on 3/2/02 and arrived in Punta Arenas (PUQ), Chile at 1255 on 3/2/02. We met with AGUNSA for clothing issue on 3/2/02 at 1500.

Prior to the LMG02-01B we performed a site survey of Lago Fagnano in Tierra del Fuego, Argentina from 3/3/02 to 3/6/02. We boarded the LMG at 1600 on 3/6/02 and we departed PUQ at 2000 headed for the Antarctic Peninsula. We immediately began setting up the lab to perform underway water sampling and for our hydrocast sampling through the Gerlache Straits. The transit from Punta Arenas to Palmer Station took approximately 4 ½ days arriving at 0800 on 3/11/02. Preliminary cargo operations were completed by the afternoon of 3/11/02 with departure from Palmer Station at 0800 on 3/12/02 to begin mooring and CTD operations. We had the additional assistance from Colm Sweeney (LDEO). We completed mooring and CTD operations at 1900 and arrived at Palmer Station at 2030 on 3/12/02 to complete cargo and fuel operations. We departed Palmer Station at 0800 on 3/14/02 for our return transit to Punta Arenas.

We arrived in Punta Arenas at 0800 on 3/18/02. We departed PUQ at 1240 on 3/19/02 on LA Flt#:280 and arrived in SCL at 1250. We stayed on night in SCL at the Hotel Monte Carlo. We departed SCL on LAB Flt#:968 at 1340 and arrived in LPB at 1945 on 3/20/02 via Santa Cruz, Bolivia. We worked on Lago Titicaca until 3/26/02. We departed LPB on LAB 811 via Cochabamba, Bolivia and arrived in SCL at 1230 on 3/26/02. Departed SCL on LA/AA Flt#:600 at 2120 and arrived in LAX via Lima, Peru at 0700 on 3/27/02. Departed LAX on AA Flt#: 1928 at 1105 and arrived at 1225 on 3/27/02.

Summary of Field Operations:

Chief Scientist and PI for cruise LMG02-01B was Robert Dunbar. The cruise began on 3/6/02 at 2000 from Punta Arenas. Cruise LMG02-01B lasted 12 days, consisted of 18 hydrocast stations, 111 underway filters, and one mooring recovery. The cruise on the L.M. Gould ended in Punta Arenas at 0800L on 3/18/02. Refer to Figure 1 for a map of the cruise track.

Cruise objectives included collecting and CTD and underway water for various analyses such as, POC, PON, DIC concentrations and DIC $\delta^{13}\text{C}$, salinity (via Autosal to confirm the SBE conductivity sensor measurements). One mooring in the Palmer Deep was recovered, serviced, and was not redeployed.

L.M. Gould 02-01B Cruise:

We recovered static mooring array in the Palmer Deep basin. This mooring was equipped with an ADCP with syntactic foam buoy, 3 current meters, 2 CT units, 2 sediment traps, and 2 acoustic releases. The mooring was serviced by R. Dunbar (instrument data down load and data quality, instrument programming, and assisted in recovery/deployment operations) and D. Mucciarone (instrument data down load, instrument programming, serviced hardware, lead recovery/deployment operations. Deck assistance for mooring operations was also provided Herb Baker (MPC) and Joshua Spillane all from RPSC, and ECO crewmembers.

A total of 111 underway filters were collected for POC and PON, and 190 bottles for DIC concentrations $\delta^{13}\text{C}$. Eighteen hydrocasts (Stations 1 - 6, 9 - 20) were taken and sampled for POC, PON, DIC and $\text{DIC}\delta^{13}\text{C}$, and salinity. R. Dunbar was the CTD operator with L. Federici, C. Moy, C. Sweeney, and D. Mucciarone all participated in collecting and filtering sea water from either the CTD or underway system. XBT's were also collected during the northern transect with numerous participants launching probes and collecting profiles.

Mooring Operation:

Mooring Palmer Deep Recovery

We recovered the *Palmer Deep* mooring at 1000 Local on 3/12/02. At 64° 51.81'S 64° 12.16'W, water depth 1045 m (Fig. 2). The mooring is equipped with two McLane 78G-13 sediment trap at the top and bottom, three Aanderaa RCM8 current meters, two SeaBird Electronics (SBE) SeaCat 16-04 CT units, two EdgeTech 8202 acoustic release, seven 3 pack Billings floats, and one RDI BBADCP in a 50" syntactic foam buoy. The mooring recovery went smoothly taking a total of 2 hour 20 minutes from locating to final recovery. Actual recovery of the mooring, once grappled, took ~1 hour. It took approximately 2 ½ days to completely service the mooring and ready it for ERR to the respective vendors (i.e., sediment traps, current meters, CT units, releases, and floats were returned to the RPSC/NSF equipment pool. All of the RDI ADCP equipment was sent to Stanford University.

PALMER DEEP MOORING RECOVERY STATISTICS: (March 12, 2002 @ 1000 Local)

Information on the mooring equipment deployed in the Palmer Deep basin. The mooring recovery was supervised by David Mucciarone (S-072) and performed on the L.M. Gould (Fig. 2 in mooring deployment section). There were no problems during the recovery operation. A detailed outline on the deployment is listed below.

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| | |
|---|----------------|
| Mooring location and release @ | 1000L(3/12/02) |
| RDI ADCP w/ syntactic foam float on deck @ | 1054 |
| Top SBE 16-04 CT unit on deck @ | 1104 |
| Top McLane 78G-13 sediment trap on deck @ | 1114 |
| Top Aanderaa RCM8 current meter w/ P and T° sensors on @ | 1120 |
| Middle Aanderaa RCM8 current meter w/ P and T° sensors on @ | 1135 |
| Middle float package, 7-3 pack Billings floats on at @ | 1145 |
| Bottom McLane 78G-13 sediment trap on deck @ | 1202 |
| Top SBE 16-04 CT unit on deck @ | 1258 |

Bottom Aanderaa RCM8 current meter w/ P and T° sensors on @ 1259
 Dual EdgeTech 8202 acoustic release on deck @ 1300L (3/12/02)

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

Trap Cups Deployed/Recovered: 13/13
 Recovery Filename: TOP2243.DEP
 TattleTale Interface Serial Number: 2243
 Battery Condition: 9.36 VDC (1-Micro 9v alkaline)
 19.8 VDC (14-Motor C-cell alkaline)
 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/Recovered: 13/13
 Deployment Filename: BOT2244.DEP
 TattleTale Interface Serial Number: 2244 with 4093 TT8
 Battery Condition: 9.36 VDC (1-Micro 9v alkaline)
 19.5 VDC (14-Motor C-cell alkaline)
 Sample cup preservative: 6% Na-borate formaline solution with filtered sea water.
 Trap History: Same as Top and as follows

Mooring Palmer Deep top and bottom sediment trap deployment program which was deployed on 5/5/00 at 1507 and recoverd on 3/12/02 over an open hole. Both traps stopped collecting material on 2/1/02. McLane 78G-13 Sediment Traps began and ended with an open hole under funnel.

| Duration | GMT Time | GMT Date | Event # | Cup# |
|----------|----------|-------------------|----------|--------|
| --- Days | 1507 | 05 May 2000 | Event 0 | Open |
| 40 Days | 0100 | 06 May 2000 | Event 1 | Cup 1 |
| 47 Days | 0100 | 15 June 2000 | Event 2 | Cup 2 |
| 45 Days | 0100 | 01 August 2000 | Event 3 | Cup 3 |
| 47 Days | 0100 | 15 September 2000 | Event 4 | Cup 4 |
| 44 Days | 0100 | 01 November 2000 | Event 5 | Cup 5 |
| 48 Days | 0100 | 15 December 2000 | Event 6 | Cup 6 |
| 42 Days | 0100 | 01 February 2001 | Event 7 | Cup 7 |
| 47 Days | 0100 | 15 March 2001 | Event 8 | Cup 8 |
| 45 Days | 0100 | 01 May 2001 | Event 9 | Cup 9 |
| 47 Days | 0100 | 15 June 2001 | Event 10 | Cup 10 |
| 45 Days | 0100 | 01 August 2001 | Event 11 | Cup 11 |
| 47 Days | 0100 | 15 September 2001 | Event 12 | Cup 12 |
| 92 Days | 0100 | 01 November 2001 | Event 13 | Cup 13 |
| | 0100 | 01 February 2002 | Event 14 | Open |

Mooring Palmer Deep Top and Bottom Sediment Trap Recovery Cup Accumulation Rate.

| Duration | GMT Time | GMT Date | Top (cm) | Bottom (cm) | Cup # |
|----------|----------|----------|----------|-------------|-------|
|----------|----------|----------|----------|-------------|-------|

| | | | | | | |
|---------|------|--------------|------|------|-------|--------|
| 40 Days | 0100 | 06 May | 2000 | 1.0 | 4.50 | Cup 1 |
| 47 Days | 0100 | 15 June | 2000 | 0.7 | 6.00 | Cup 2 |
| 45 Days | 0100 | 01 August | 2000 | 0.8 | 4.00 | Cup 3 |
| 47 Days | 0100 | 15 September | 2000 | 0.7 | 4.25 | Cup 4 |
| 44 Days | 0100 | 01 November | 2000 | 0.7 | 11.80 | Cup 5 |
| 48 Days | 0100 | 15 December | 2000 | 0.5 | 0.75 | Cup 6 |
| 42 Days | 0100 | 01 February | 2001 | 0.1 | <0.10 | Cup 7 |
| 47 Days | 0100 | 15 March | 2001 | 10.5 | <0.10 | Cup 8 |
| 45 Days | 0100 | 01 May | 2001 | 2.0 | <0.10 | Cup 9 |
| 47 Days | 0100 | 15 June | 2001 | 3.5 | <0.10 | Cup 10 |
| 45 Days | 0100 | 01 August | 2001 | 1.8 | <0.10 | Cup 11 |
| 47 Days | 0100 | 15 September | 2001 | 1.7 | <0.10 | Cup 12 |
| 92 Days | 0100 | 01 November | 2001 | 4.1 | <0.10 | Cup 13 |
| | 0100 | 01 February | 2002 | | | Open |

SeaBird SeaCat 16-04 CT units:

TOP SBE S/N: 1615016-2259
 Battery condition: 8.0 VDC (6 alkaline D-cells)
 Battery condition: 5.6 VDC (lithium)
 Sampling interval: 1800 seconds (30 minutes)

BOTTOM SBE S/N: 1615016-2260
 Battery condition: 7.9 VDC (6 alkaline D-cells)
 Battery condition: 5.6 VDC (lithium)
 Sampling interval: 1800 seconds (30 minutes)

Aanderaa RCM8 current meter:

RCM8 S/N: 12119
 Battery condition: 7.33 VDC (Type 3382 lithium)
 Sampling interval: 30 minutes

RCM8 S/N: 12120
 Battery condition: 7.33 VDC (Type 3382 lithium)
 Sampling interval: 30 minutes

RCM8 S/N: 12119
 Battery condition: 7.33 VDC (Type 3382 lithium)
 Sampling interval: 30 minutes

RDI Broadband ADCP:

BBADCP 150KHz transducer S/N: 2562
 BBACCP canister (pressure case) S/N: 1510
 Battery pack assembly (alkaline) ABPM (includes 19 alkaline C cells)
 Alkaline battery packs ABP-R (19 C cells/pk, 6 pks/unit)
 Battery condition, front 3 pack: 52.9 VDC
 Battery condition, rear 3 pack: 53.0 VDC

EDGETECH ACOUSTIC RELEASES

8202 Dual Channel release S/N: 020898
 Battery condition: 8.38 VDC
 Battery condition: 15.06 VDC
 Battery condition: 21.83 VDC

8202 Dual Channel release S/N: 021618
 Battery condition: 8.37 VDC
 Battery condition: 15.04 VDC
 Battery condition: 21.82 VDC

Palmer Deep Mooring Hardware Statistics:

| | | |
|--|---|--------|
| Top syntactic foam buoy w/ RDI ADCP S/N: 2562/1510 (+700 lbs./+318.2 kg) | = | 1.5 m |
| Top SBE SeaCat 16 CTD unit S/N 1615016-2259 (-32 lbs./-14.55 kg) | = | 0.84 m |
| Top McLane 78G-13 trap 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 Aanderaa RCM8 w/ P and C sensors S/N 12119 (-50 lbs./22.73 kg) | = | 0.52 m |
| Middle Aanderaa RCM8 w/ P and C sensors S/N 12120 (-50 lbs./22.73 kg) | = | 0.52 m |
| Seven Billings 3 pack floats (+462 lbs./150 kg) | = | 3.5 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 1615016-2260 (-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 |
| Dual EdgeTech 8202 dual channel acoustic release S/N 020898 (-75 lbs/-34.1 kg) | | |
| -and S/N 021618 (-75 lbs/-34.1 kg) | = | 0.62 m |
| Galvanized 1/2" anchor chain | = | 3.0 m |
| Anchor 2400 lb./1090.9 kg | = | 1 m |

All rope is: 822- Meters 12 mm single braid Duron w/ 1/2" nylon thimbles
 Hardware: 08- 1/2" galvanized chain shackles (floats)
 02- 1/2" galvanized anchor shackles (floats)
 08- 1/2" stainless steel anchor shackles (trap top)
 20- 1/2" galvanized anchor shackles (trap bottom)
 02- 1/2" galvanized pear links (traps)
 02- 1/2" stainless steel anchor shackles (ADCP)
 04- 3/8" stainless steel chain shackles (CT meters)
 02- 1/2" galvanized anchor shackles (releases)
 08- 5/8" galvanized anchor shackles (releases)
 01- 5/8" galvanized eye and eye swivel (releases)
 01- 1/2" galvanized master link (releases)
 02- EdgeTech release link (releases)
 01- 1/2" galvanized chain, 3 meters long (anchor)

EdgeTech 8202 Release Command Codes for *Palmer Deep Mooring*:

| S/N 021618 | | S/N 020898 | |
|--------------------------|--------|--------------------------|--------|
| Command A (Release) | 626654 | Command A (Release) | 626133 |
| Command B (Disable A) | 610540 | Command B (Disable A) | 607134 |
| Command C (Enable A & B) | 610563 | Command C (Enable A & B) | 607151 |
| Command D (Disable B) | 610601 | Command D (Disable B) | 607172 |

New Mooring Location:
Water Depth:
Date/Time (GMT)

64° 51.81'S 64° 12.16'W
1040 meters
05/05/00 @ 1507

