

CRUISE REPORT

UNOLS
Re 3

SHIP UT TION DATA

| | | | | | | | |
|--|--|---------------------------------|------------------|---|--|-------------------|--|
| SHIP NAME <u>ROBERT COWARD</u> | | OPERATING INST. <u>L-DGO</u> | | PARTICIPATING PERSONNEL | | AFFILIATION | |
| CRUISE (LEG) NO. <u>RC 28-03</u> | | DATES <u>16 Mar - 20 Apr 87</u> | | CODE | | TITLE | |
| AREA OF OPERATIONS: <u>SOUTHERN ARGENTINE BASIN</u> | | PORT CALLS: | | NAME | | SEE ATTACHED LIST | |
| | | PLACE | DATES | | | | |
| | | <u>Montevideo, UY</u> | <u>14-15 MAR</u> | | | | |
| | | " " | <u>20-21 MAR</u> | | | | |
| DAYS AT SEA <u>35</u> | | DAYS IN PORT <u>4</u> | | Use Reverse If Additional Space Required, | | | |

WAS RESEARCH CONDUCTED IN FOREIGN WATERS? YES COUNTRY: ARGENTINA

PRIMARY PROJECTS (those which govern the principal operations, area and movements of the ship)

| PROJECT TITLE AND PRINCIPAL INVESTIGATOR | SPONSORING ACTIVITY | GRANT OR CONTRACT NUMBER | PARTICIPATING PERSONNEL (AS CODED ABOVE) |
|--|---------------------|--|--|
| <u>Monitoring the Abyssal Production and Course of the Outflow from the Weddell Sea.</u> | <u>NSF</u> | <u>OCE 8414886 (Whitworth, Nowlin)</u> | <u>1, 2, 3, 4, 5, 10, 11, 12, 13, 15</u> |
| <u>Whitworth, Nowlin / Pillsbury</u> | | <u>OCE</u> | <u>1, 2, 6, 7, 8, 14</u> |
| DISCIPLINE <u>PHYSICAL OCEANOGRAPHY</u> | | | |

ANCILLARY PROJECTS (which are accomplished on a not-to-interfere basis and contribute to the overall effectiveness of the cruise)

| PROJECT TITLE AND PRINCIPAL INVESTIGATOR | SPONSORING ACTIVITY | GRANT OR CONTRACT NUMBER | PARTICIPATING PERSONNEL (AS CODED ABOVE) |
|--|---------------------|--------------------------|--|
| <u>NONE</u> | | | |

| | | | |
|--|--|---|---------------------------------------|
| SIGNATURE <u>James W. K. K. K.</u> DATE <u>4/17/87</u> | | COST ALLOCATION DATA | |
| CHIEF SCIENTIST | | DAYS CHARGED <u>42</u> | AGENCY OR ACTIVITY CHARGED <u>NSF</u> |
| TOTAL SCIENTISTS <u>4</u> | | GRANT OR CONTRACT NO. <u>OCE 86-16405</u> | |
| TOTAL GRAD STUDENTS <u>1</u> | | 5-24077 | |
| ATTACH PAGE SIZE CRUISE TRACK | | SIGNATURE <u>John R. R. R.</u> DATE <u>8 MAY 87</u> | |
| TOTAL TECHNICIANS <u>13</u> | | TOTAL STUDENTS/OBSERVERS <u>1</u> | |

R/V CONRAD Cruise RC28-03
Participating Personnel

| | | | |
|-----|--------------------------|--------------|---------------------------------|
| 1. | Dr. Thomas Whitworth III | Ch. Sci. | Texas A&M University |
| 2. | Dr. R. Dale Pillsbury | Scientist | Oregon State Univ. |
| 3. | Steven J. Worley | Scientist | TAMU |
| 4. | Alejandro H. Orsi | Scientist | Arg. Antarctic Inst. |
| 5. | Ray G. Peterson | Grad. Stud. | TAMU |
| 6. | Dennis C. Root | Technician | OSU |
| 7. | John Simpkins III | Technician | OSU |
| 8. | Kathryn Brooksforce | Technician | OSU |
| 9. | Kenneth S. Bottom | Technician | TAMU |
| 10. | David C. MacDonald | Technician | TAMU |
| 11. | Mark A. Spears | Technician | TAMU |
| 12. | Jay D. Guffy | Technician | TAMU |
| 13. | Joe C. Jennings | Technician | OSU |
| 14. | Jorge O. Castiglioni | Technician | AAI |
| 15. | Oscar A. Gonzalez | Technician | AAI |
| 16. | James A. Smith | Sci. Officer | L-DGO |
| 17. | Robert J. Blaes, Jr. | Technician | L-DGO |
| 18. | Ropate Maiwiriwiri | Technician | L-DGO |
| 19. | Claudio W. Ronda | Observer | Arg. Naval Hydrographic Service |

D. Kaye
Lyonography

May 28, 1987

TO:

Barbee, W.D. - UNOLS
Dudley, J. - LDGO
Gerard, S. - LDGO
✓ Hayes, D. - LDGO
Cox, L. - LDGO
Lotti, R. - LDGO
Raleigh, B. - LDGO
Ruddiman, W. - LDGO
Ryan, W.F.B. - LDGO
Sykes, L.R. - LDGO
Takahashi, T. - LDGO
Science Officer - CONRAD
Captain - CONRAD

RESEARCH CRUISE REPORT

R/V ROBERT D. CONRAD 28-03

Attached is a copy of a cruise report for the above CONRAD cruise.

Ann Burns

Ann Burns
Marine Office

Enc.

TEXAS A&M UNIVERSITY

COLLEGE OF GEOSCIENCES

COLLEGE STATION, TEXAS 77843-3146

ly to
Department of
OCEANOGRAPHY

May 8, 1987

Preliminary report of RC28-03

Ship: Robert D. Conrad
Operated by: Lamont-Doherty Geological Observatory
Dates: 16 March - 19 April, 1987
Project title: Monitoring the Abyssal Production and Course of the Outflow from the Weddell Sea
Chief Scientist: Dr. Thomas Whitworth III, Texas A&M Univ.
Clearance from: Argentina (U.S. Embassy Buenos Aires telegram No. 2271, 9 March, 1987)
Foreign Participants: Lt. Claudio W. Ronda (Argentine Naval Hydrographic Service), Alejandro Orsi, Jorge Castiglioni and Oscar Gonzalez (Instituto Antartico Argentino)
Port Calls: Montevideo to Montevideo, Uruguay

Scientific Program Summary

The objective of this program is to study the source waters and variability of the deep boundary current that supplies cold antarctic waters to the South Atlantic Ocean. An array of 61 current meters on 14 moorings was deployed in February, 1986 to monitor the flow of this current and to determine by which of several possible paths the cold water enters the Argentine Basin. During the CONRAD cruise, the current meter array was recovered, and supporting hydrographic and CTD measurements were made. Underway observations included an XBT survey across the Falkland and Brazil currents. This program is a cooperative effort among Texas A&M University, Oregon State University and the Instituto Antartico Argentino.

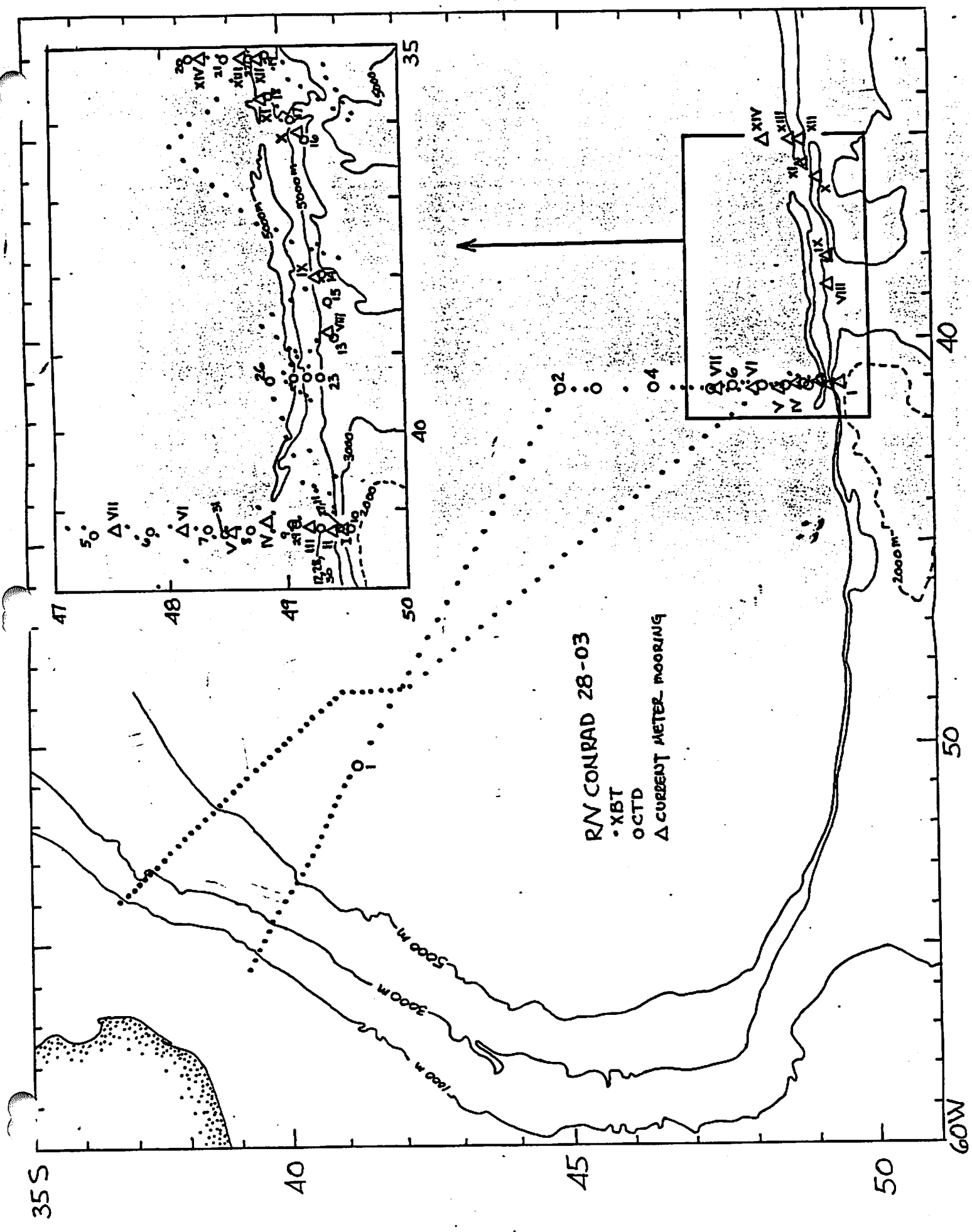
| Data Collected | | | |
|------------------|-----------|-------------------|--|
| TYPE | CUSTODIAN | DELIVERY TO | DATE |
| XBT | TAMU | Nav. Hydro. Serv. | April 87 (transmittal letter attached) |
| CTD | TAMU | Ant. Institute! | |
| HYDRO | TAMU | Ant. Institute > | see note below |
| CURRENT METER | OSU | Ant. Institute! | |

note: Scientists from the Instituto Antartico Argentino are full participants in this experiment and will be involved in the reduction and analysis of all data. Since the Institute will be involved in the preparation of final data, the delivery schedule will be by mutual agreement, and will not be reported further. Obligations of foreign research clearance have been fulfilled through delivery of final XBT data to the Naval Hydrographic Service.

Information addresses:

TAMU
Dr. Thomas Whitworth III
Department of Oceanography
Texas A&M University
College Station, TX 77843

OSU
Dr. Dale Pillsbury
College of Oceanography
Oregon State University
Corvallis, OR 97331



TEXAS A&M UNIVERSITY

COLLEGE OF GEOSCIENCES

COLLEGE STATION, TEXAS 77843-3146

ply to
Department of
OCEANOGRAPHY

R/V Conrad
17 April, 1987

Head, Department of Oceanography
Naval Hydrographic Service
Av. Montes de Oca
1271-Buenos Aires, Argentina


Dear Sir:

I am forwarding with your representative, XBT data collected aboard R/V Robert D. Conrad on cruise RC28-03. The data consist of five-meter average temperatures versus depth on magnetic tape. The data were edited and corrected during the cruise, and should be considered the final data set. The data are from two XBT sections that extend from about 56 degrees West to 41 degrees West, and include all stations made within 200 miles of Argentina. The enclosed base map shows the locations of the sections.

Sincerely yours,



Thomas Whitworth III
Chief Scientist



Receipt Acknowledged:

Lt. Claudio W. Ronda

xc: W. Thomas Cocke, Dept. of State
Ann Burns, L-DGO

Preliminary Cruise Report
Robert Conrad 28-03
8 May 1987

Background The scientific objective of this cruise was to continue an investigation of the bottom flow of cold antarctic water from the Weddell Sea into the southern Argentine Basin. This current is thought to enter the Argentine Basin near the Falkland Channels which separate that basin from the Georgia Basin to the south. The influx of cold water may be influenced by the overlying eastward flow of the Antarctic Circumpolar Current. The first phase of the experiment was completed in February, 1986, with the deployment of 14 current meter moorings and a supporting hydrographic/CTD survey. The primary purpose of the CONRAD cruise was to recover the moorings and to resample the hydrographic conditions.

Accomplishments CONRAD departed Montevideo Uruguay on 16 March, 1987. A list of the scientific party is given in Table 1. At the 300-m isobath off the Argentine Continental Shelf, an XBT survey was begun across the Falkland Current and continued offshore across the Brazil Current. XBTs were continued at regular intervals throughout the cruise (see Figure 1). A north-south line of CTD/hydrographic stations was made between 45°S and the Falkland Escarpment, and four of the seven moorings along this line were recovered. The remaining three moorings would not respond to acoustic release commands. Mooring recovery and CTD stations were continued to the east along the Falkland Escarpment. During transits between moorings, bathymetric and XBT surveys were made to better define the structure of the ridge system and to locate the positions of the major fronts of the Antarctic Circumpolar Current. Following the recovery of mooring 14, CONRAD returned to 41°W to attempt the recovery of the final three moorings.

The acoustic releases on moorings 2, 3 and 5 were repeatedly interrogated but failed to respond to release commands. These moorings were recovered by cutting the mooring lines with the CONRAD's trawl wire dragged behind the ship. When mooring line tension was relieved by cutting, the releases operated, resulting in complete recovery of the instrumentation. Table 2 gives a preliminary assessment of the recovered data.

During the transit back to Montevideo, the XBT survey was continued across the central Argentine Basin and the Brazil Current. CONRAD arrived in port on the evening of 19 April.

Table 1

R/V CONRAD Cruise RC28-03
Participating Personnel

| | | | |
|-----|--------------------------|--------------|---------------------------|
| 1. | Dr. Thomas Whitworth III | Ch. Sci. | Texas A&M University |
| 2. | Dr. E. Dale Pillsbury | Scientist | Oregon State Univ. |
| 3. | Steven J. Worley | Scientist | TAMU |
| 4. | Alejandro H. Orsi | Scientist | Arg. Antarctic Inst. |
| 5. | Ray G. Peterson | Grad. Stud. | TAMU |
| 6. | Dennis C. Root | Technician | OSU |
| 7. | John Simpkins III | Technician | OSU |
| 8. | Kathryn Brooksforce | Technician | OSU |
| 9. | Kenneth S. Bottom | Technician | TAMU |
| 10. | David C. MacDonald | Technician | TAMU |
| 11. | Mark A. Spears | Technician | TAMU |
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| 13. | Joe C. Jennings | Technician | OSU |
| 14. | Jorge O. Castiglioni | Technician | AAI |
| 15. | Oscar A. Gonzalez | Technician | AAI |
| 16. | James A. Smith | Sci. Officer | L-DGO |
| 17. | Robert J. Blaes, Jr. | Technician | L-DGO |
| 18. | Ropate Maiwiriwiri | Technician | L-DGO |
| 19. | Claudio W. Ronda | Observer | Arg. Naval Hydro. Service |

TABLE 2

Mooring Recovery Notes

April 18, 1987

| | Depth (m) | RCM No. | Comments |
|------------|-----------|---------|----------------------------------|
| Mooring 1 | 1000 | 3125 | Low Battery |
| Recovered | 1750 | 4576(A) | OK |
| March 28 | 2388 | 7353 | OK |
| Mooring 2 | 1750 | 6736 | Dead battery after 12-13 mo |
| | 2500 | 4575(A) | Flooded after 8-9 mo |
| Dragged up | 3500 | 497 | Mesecar clock, dead at end |
| April 12 | 4500 | 3190 | OK |
| | 5680 | 5109 | Low battery |
| Mooring 3 | 1000 | 7217 | Low battery |
| | 1750 | 4579(A) | Low battery |
| Dragged up | 2500 | 4577(A) | Low battery |
| April 10 | 3500 | 501 | M clock, dead after 12 months |
| | 4500 | 1536 | M clock, dead after 5 mo |
| | 5130 | 1538 | M clock, dead after 10 mo |
| Mooring 4 | 1000 | 3123 | Low Battery |
| Recovered | 1750 | 4582(A) | Flooded after 2-3 months |
| March 27 | 2500 | 7162 | OK |
| | 3500 | 503 | Mesecar clk, Dead after 11-12 mo |
| | 4500 | 1534 | Mesecar clk, dead after 12-13 mo |
| | 5380 | 4418 | OK |
| Mooring 5 | 1750 | 7164 | Low battery |
| | 2500 | 4580(A) | Flooded after 1-2 mo |
| Dragged up | 3500 | 1244 | Low battery |
| April 15 | 4500 | 1245 | M clock, dead after 12 mo |
| | 5330 | 4416 | OK |
| Mooring 6 | 1000 | 7165 | OK |
| Recovered | 1750 | 4578(A) | OK |
| March 25 | 2500 | 4581(A) | Flooded after 2-3 mo. |
| | 3500 | 1539 | OK |
| | 4500 | 5330 | Very low Battery |
| | 5930 | 7407 | OK |
| Mooring 7 | 2500 | 7209 | OK |
| Recovered | 3500 | 1540 | Low Battery |
| March 24 | 4500 | 1542 | Mesecar clk, dead after 11-12 mo |
| | 5880 | 7408 | OK |

| | | | |
|------------|------|---------|----------------------------------|
| Mooring 8 | 1000 | 7210 | OK |
| Recovered | 1750 | 4584(A) | OK |
| March 30 | 2500 | 7163 | Low Battery |
| | 3500 | 1964 | Mesecar clk, dead after 11-12 mo |
| | 4500 | 6087 | Low Battery |
| Mooring 9 | 1750 | 7211 | OK |
| Recovered | 2500 | 4583(A) | Low Battery |
| March 31 | 3500 | 2268 | OK |
| | 4500 | 6088 | Low Battery |
| Mooring 10 | 2500 | 7212 | OK |
| Recovered | 3500 | 2278 | OK |
| April 1 | 4830 | 6591 | OK |
| Mooring 11 | 2500 | 7213 | OK |
| Recovered | 3500 | 2280 | Mesecar clock, very low battery |
| April 1 | 5180 | 6730 | OK |
| Mooring 12 | 1000 | 7214 | OK |
| Recovered | 1750 | 4586(A) | OK |
| April 4 | 2500 | 7351 | Low Battery |
| | 3500 | 6733 | Low Battery |
| Mooring 13 | 1750 | 7215 | OK |
| Recovered | 2500 | 4585(A) | Flooded after about 1 mo. |
| April 4 | 3500 | 2281 | Mesecar clk, dead after 11-12 mo |
| | 5180 | 6735 | Flooded after about 1 mo |
| Mooring 14 | 2500 | 7216 | OK |
| Recovered | 3500 | 500 | OK |
| April 5 | 5220 | 7769 | OK |

(A) = ARGENTINA

Table 3
R.D. Conrad 28-03 CTD Stations

| Station | Date | Time | Latitude | Longitude | Depth |
|---------|------|------|----------|-----------|-------|
| 1 | 3/18 | 1529 | 41 13.1S | 50 34.3W | 5548 |
| 2 | 3/20 | 1511 | 45 00.0 | 41 14.2 | 4965 |
| 3 | 3/21 | 0218 | 45 45.3 | 41 15.0 | 5410 |
| 4 | 3/22 | 0116 | 46 29.6 | 41 14.6 | 5703 |
| 5 | 3/24 | 2222 | 47 20.4 | 41 18.7 | 5965 |
| 6 | 3/25 | 2227 | 47 49.5 | 41 14.8 | 5858 |
| 7 | 3/26 | 0735 | 48 18.2 | 41 10.2 | 5922 |
| 8 | 3/26 | 2150 | 48 40.6 | 41 08.8 | 5561 |
| 9 | 3/27 | 0129 | 49 00.1 | 41 10.3 | 5275 |
| 10 | 3/28 | 2256 | 49 29.4 | 41 15.2 | 2561 |
| 11 | 3/29 | 0510 | 49 22.7 | 41 15.5 | 5598 |
| 12 | 3/29 | 1229 | 49 16.9 | 41 15.4 | 5411 |
| 13 | 3/30 | 0429 | 49 24.5 | 38 43.5 | 4592 |
| 14 | 3/30 | 2258 | 49 20.4 | 37 57.3 | 4785 |
| 15 | 3/31 | 0559 | 49 24.2 | 38 20.2 | 4834 |
| 16 | 3/31 | 2220 | 49 11.2 | 36 07.5 | 4892 |
| 17 | 4/1 | 0441 | 49 03.2 | 35 58.0 | 5393 |
| 18 | 4/1 | 0029 | 48 51.8 | 35 41.3 | 5152 |
| 19 | 4/2 | 0740 | 48 51.1 | 35 05.7 | 3660 |
| 20 | 4/5 | 2332 | 48 15.9 | 35 08.0 | 5312 |
| 21 | 4/6 | 0721 | 48 36.3 | 35 09.3 | 5271 |
| 22 | 4/6 | 1415 | 48 47.7 | 35 09.0 | 5054 |
| 23 | 4/7 | 2249 | 49 17.9 | 39 17.8 | 5382 |
| 24 | 4/8 | 0530 | 49 11.3 | 39 16.1 | 5421 |
| 25 | 4/8 | 1120 | 49 04.7 | 39 18.3 | 5393 |
| 26 | 4/8 | 1603 | 48 52.7 | 39 18.8 | 5385 |
| 27 | 4/9 | 0440 | 49 26.2 | 41 16.9 | 4535 |
| 28 | 4/9 | 2151 | 49 16.4 | 41 13.4 | 5372 |
| 29 | 4/10 | 0430 | 49 06.1 | 41 01.3 | 5031 |
| 30 | 4/11 | 0505 | 49 15.7 | 41 15.7 | 5100 |
| 31 | 4/13 | 0315 | 48 31.4 | 41 17.3 | 6025 |

D. Hayes
Coord.