Date: July 1, 1993

To:

| | |
|---|---|
| Aitken, T. | L-DEO |
| Chayes, D. | L-DEO |
| Cox, L. | L-DEO |
| Eaton, G. | L-DEO |
| Hayes, D. | L-DEO |
| Mutter, J. | L-DEO |
| MARSCICO, | L-DEO |
| Stennett, J. | L-DEO |
| Robinson, W. | L-DEO |
| Kent, D. | L-DEO |
| Science Officer | EWING |
| Captain | EWING |
| Chief Engineer | EWING |

# RESEARCH CRUISE REPORT

## R/V MAURICE EWING, LEG 93-02

"ODP Site Survey fo the Rockall Plateau and the E. flank of the Reykjanes Ridge: Drift Evolution and High Resolution Paleoceanography"

P.I. Dr. Delia Oppo, Woods Hole Oceanographic Institution
Dates: 27 May - 21 June, 1993
Ports: Woods Hole to Reykjavik, Iceland

mr/2/93

Mercy Garland
Marine Department

# WOODS HOLE OCEANOGRAPHIC INSTITUTION

## EW93-02 PRELIMINARY CRUISE REPORT

Science Party:

Delia Oppo, Co-Chief Scientist (Woods Hole Oceanographic Institution)
Scott Lehman, Co-Chief Scientist (Woods Hole Oceanographic Institution)
Patricia Manley, Co-Chief Scientist (Middlebury College)

Edward Laine, Scientist (Bowdoin College)
James Cullen, Scientist (Salem State College)
James Broda, Scientist (Woods Hole Oceanographic Institution)
Dorinda Ostermann, Scientist (Woods Hole Oceanographic Institution)
Alan Gagnon, Scientist (Woods Hole Oceanographic Institution)
Ellen Roosen, Scientist (Woods Hole Oceanographic Institution)
Ernest Joynt III, Scientist (Woods Hole Oceanographic Institution)
Brendan Roarke, Scientist (Woods Hole Oceanographic Institution)
Daniel Bissell, Scientist (Middlebury College)
John Anthony, Scientist (Woods Hole Oceanographic Institution)
Kelly Kryc, Scientist (Middlebury College)
Greg Harvey, Scientist (Bowdoin College)
Christopher Zafirou, Scientist (Woods Hole Oceanographic Institution)

PRELIMINARY CRUISE REPORT

SHIP NAME: R/V Maurice Ewing

OPERATING INSTITUTION: Lamont-Doherty Earth Observatory

DATES: 27 May - 21 June, 1993

PROJECT TITLE: ODP Site Survey of the Rockall Plateau and the E. flank of the Reykjanes Ridge: Drift Evolution and High Resolution Paleoceanography

CO-CHIEF SCIENTISTS:
D. Oppo, S. Lehman, P. Manley

CLEARANCE COUNTRIES:
Canada, Iceland

FOREIGN PARTICIPANTS: None

PORT CALLS: Woods Hole, MA, USA and Reykjavik, Iceland.

DESCRIPTION OF SCIENTIFIC PROGRAM: The purpose of the cruise was to identify potential areas for future drilling by the Ocean Drilling Project in the subpolar North Atlantic. These areas were to be identified using the geophysical data (3.5 kHz, Single Channel Seismics, and Multibeam bathymetry) and sediment samples (gravity and piston cores) collected on the cruise. Ideally, these sites identified would have high sedimentation rates (>10 cm/kyr) so that cores from these areas could be used to study the dynamics of rapid climate change using a variety of chemical, sedimentological, and geophysical techniques. Since many sites with high sedimentation rates are located within drift sediments, a secondary objective of the study was to improve our understanding of drift evolution and the controls on sediment accumulation at these sites.

The cruise track is shown in Figure 1. Three general study areas were selected to meet our scientific objectives:

AREA 1: North of the Flemish Cap
AREA 2: The Hatton Drift
AREA 3: The Bjarni Drift

Areas enclosed by squares mark the study areas. Enlargements of these areas are shown in Figures 2-4. 3.5kHz data was collected throughout the entire cruise. Station numbers denote regions where a subset of the following samples were taken: Gaint gravity core (GGC), jumbo piston core (JPC), CTD cast, full hydrocast, and sediment trap. The station locations and samples collected at each station are given in Table 1.

DATA OBSERVATIONS AND SAMPLES COLLECTED:

High-Resolution Single Channel Seismics: High-resolution SCS data was collected using a tuned air-gun array and the Lamont four channel, vertical incidence streamer. Six guns provided a total of 1350 cubic inches of air to produce a 45msec pulse. Sonobouys were deployed throughout the SCS surveys so that the sub-bottom velocity structure could be determined. Towing speed and stream tow cable length were both adjusted to make source and receiver depths roughly equal in an attempt to improve the overall resolution and signal to noise ratio of the system.

The four channels of single channel data and all sonobuoys were recorded digitally using the Digicon DSS-240 acquisition system. Recording was done on a Syquest cartridge

tape system. Normal move out correction and stacking as well as preliminary processing of all data was done onboard.

Preliminary analysis of the monitor records and processed single channel seismic data show that the Bjarni Drift has a more complicated sedimentary evolution than we had first imagined. The profiles show that bottom current, turbidity current and mass wasting processes all have played significant roles in transporting and depositing sediments on this feature. Within the drift there are seismic sequences of typical drift morphology, debris flow deposits, and possibly a deep-sea fan system. The sedimentary evolution of the drift has been modified and perhaps in some instances controlled by faulting and apparent diapirism. This complex evolution is probably a function of the proximity of the Bjarni Drift to a voluminous source of sediments on Iceland to the north and to the tectonically active Reykjanes Ridge to the west.

Hydrosweep Multibeam Bathymetry: Hydrosweep Ten days of underway Hydrosweep bathymetry were processed and plotted in support of the scientific goals of EW9302. This data is important unfolding the recent sedimentary evolution of the Bjarni Drift, particularly in delineating the pathways of turbidites issuing from Iceland and crossing the plateau-like central portions of the drift.

3.5kHz Echo Sounding: 3.5kHz echo sounding provided 1.0 msec resolution in the upper 0.05 to 0.1 seconds of the sediment column. 3.5 kHz echograms were collected during the entire cruise, both underway and during most periods of station operations.

Sediment Cores: Jumbo Pison Cores (JPCs) and Giant Gravity Cores (GGCs) were collected at sites identified on the basis of 3.5kHz and air-gun profiles (Figures 1-4; Table 1). The coring systems used are those developed by James Broda of WHOI. The JPCs and GGCs have a 4.5"/12cm diameter. A total of ten JPCs and 18 GGC (not including those with no recovery) were collected. Of these cores, a total of three were collected in Area 1, four in Area 2, and the remainder in Area 3.

CTD and Water Sampling: A Sea-Bird SBE 19 SEACAT profiler was used to measure the electrical conductivity and temperature verses pressure (depth) at 13 locations, at least one in each study area. The individual sensor accuracy as stated by the manufacturer for temperature, conductivity and pressure (depth) are 0.01 °C, 0.0001 S/m/month and 3 meters, respectively. The average winch speed during lowering was 70m/minute with a sampling rate of one second. No conductivity was measured on casts #5 and #6 due to a clogged conductivity cell. Raw data was only partially processed using Sea-Bird Seasoft software version 4.024. This data is preliminary and has not be corrected, aligned or filtered. Water samples were collected using individual one-liter Niskin bottles attached directly above GGCs or CTDs or in a hydrocast of 10 bottles at varying depths (Tables 1 and 2). The bottles and reversing thermometers were closed using wire messengers. Dissolved oxygen was titrated at sea using the techniques described in Knapp et al. (1990). Results are given in Table 2.

SCHEDULE OF DELIVERY FOR ALL DATA RESULTS AND REPORTS:

| DATA COLLECTED | DELIVERY TO HOST COUNTRIES |
|---|---|
| Geophysical data: | Final report: September, 1996 |
| CTD data | Provided with this report (APPENDIX 1) |
| Dissolved Oxygen | Provided with this report (Table 2) |
| Sediment cores | Location of cores included with this report (Table 1). Cores archived at Woods Hole Oceanographic Institution. Final report: September, 1995 |

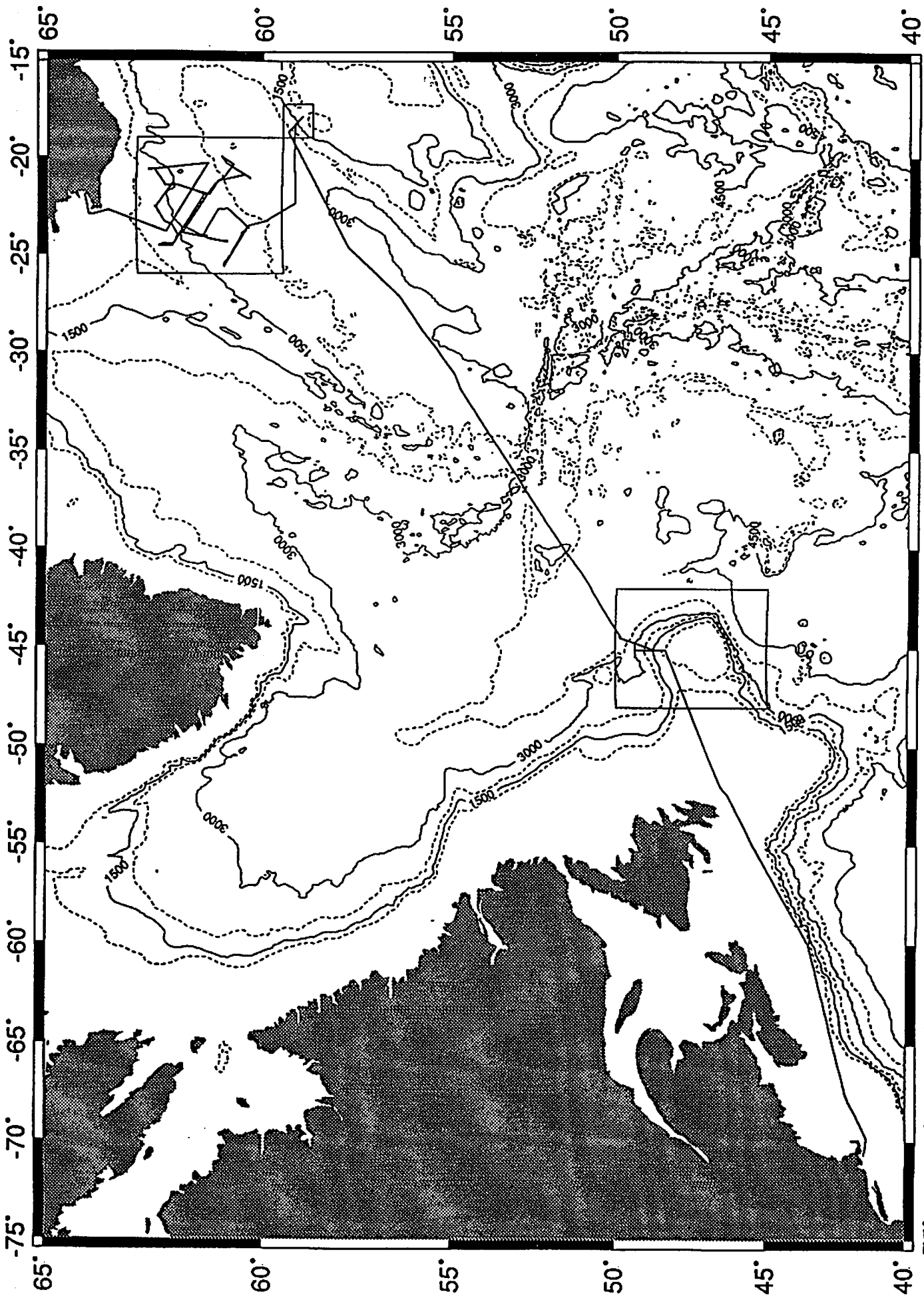



Figure 1. EW93-02 Cruise track. Study areas are enclosed by rectangles.

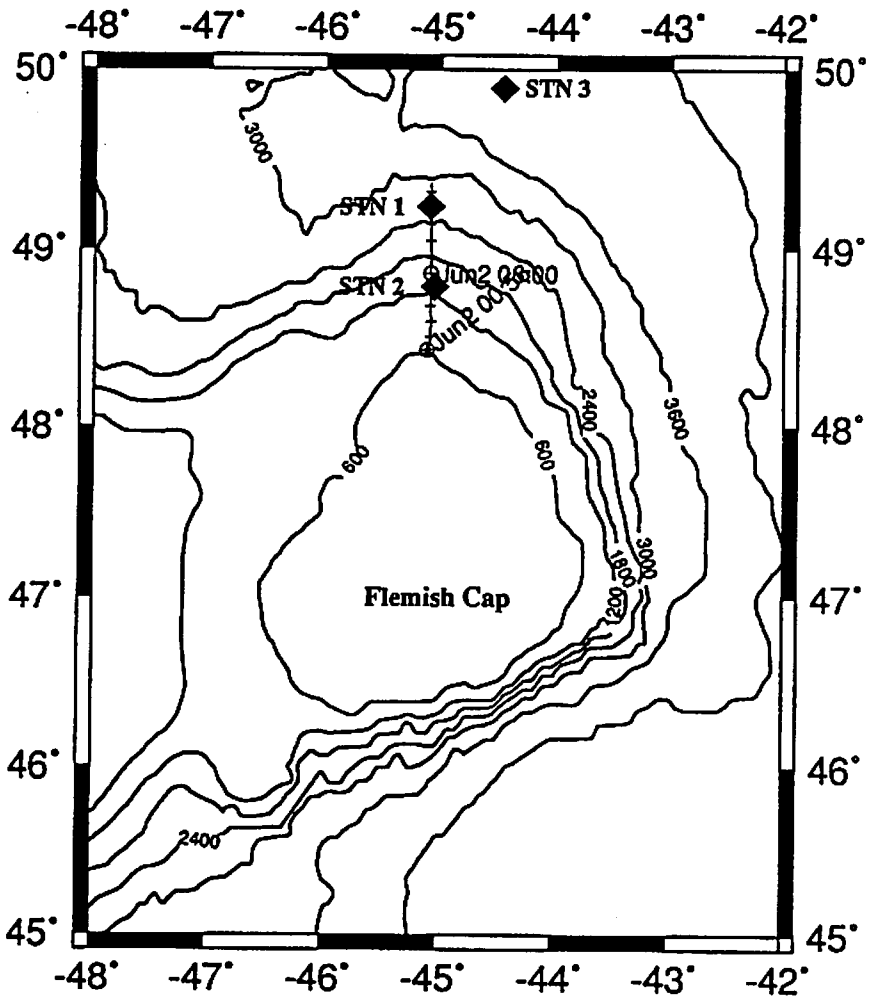
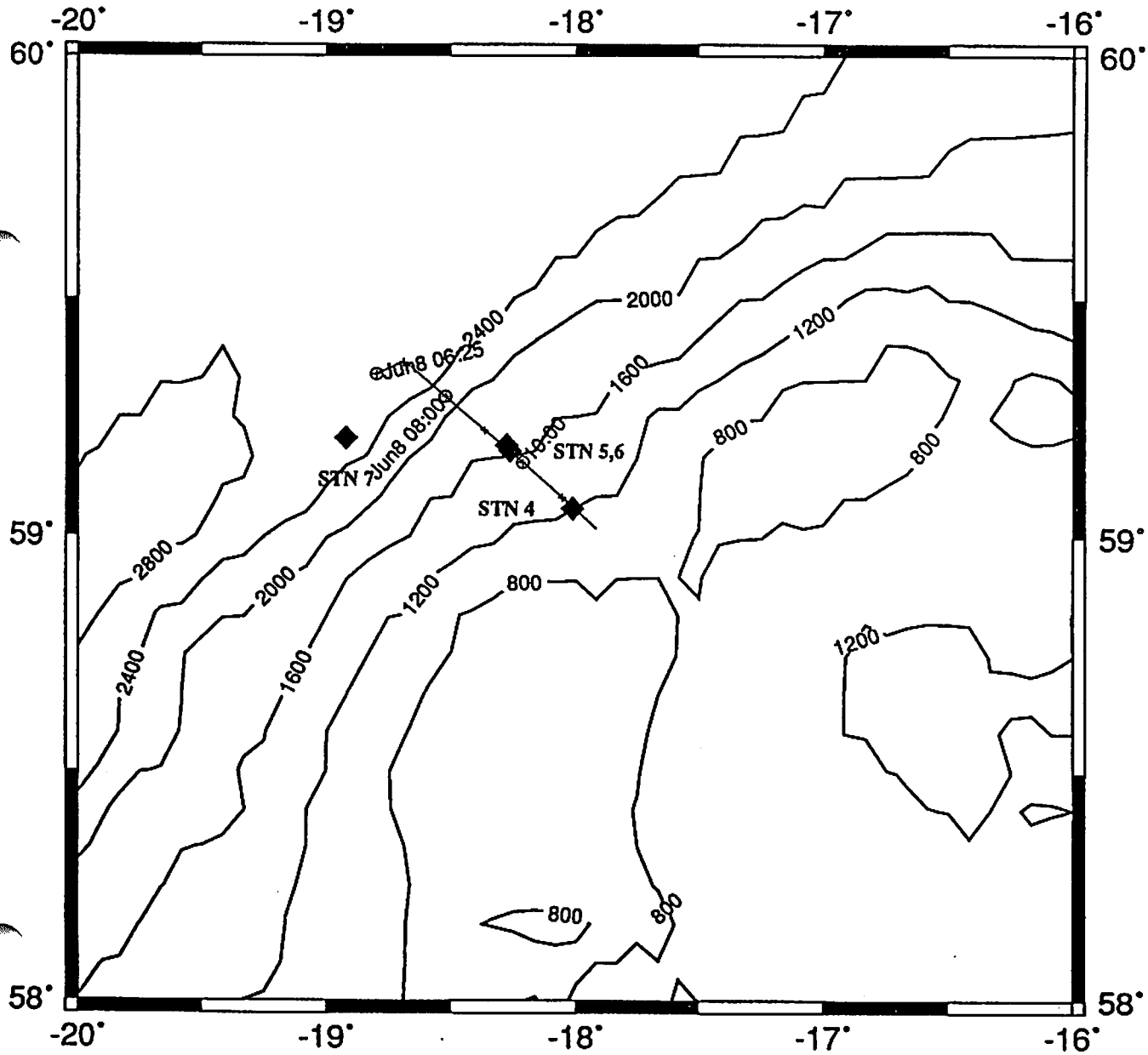



Figure 2. AREA 1: Flemish Cap geophysical survey line (SCS and Hydrosweep). Station locations are also shown.

Figure 3. AREA 2: Hatton Drift geophysical survey line (SCS and Hydrosweep). Station locations are also shown.



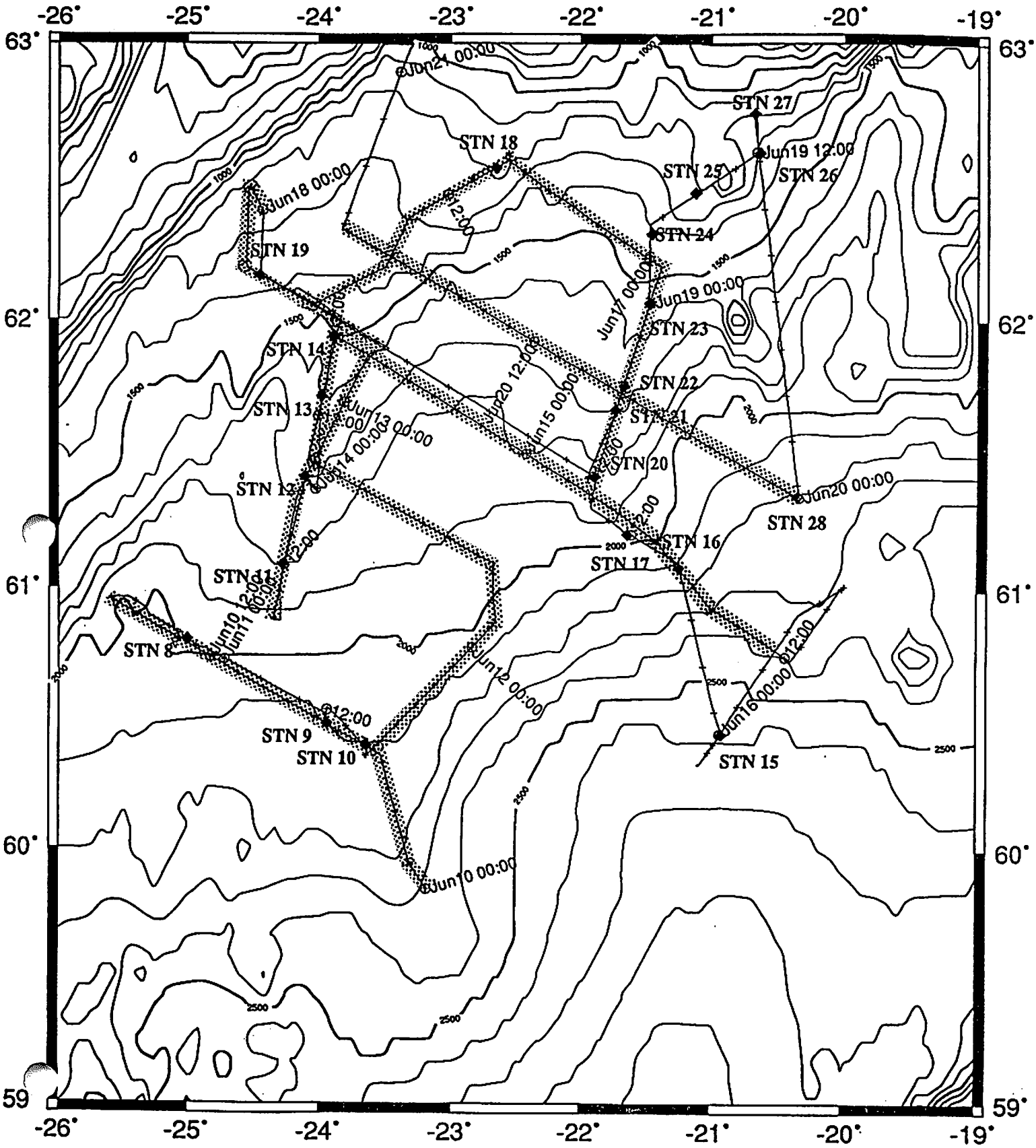



Figure 4. AREA 3: Bjarni Drift ship track. and station locations. Lines along which geophysical data (SCS and Hydrowseep) were collected are stippled.

# Table 1. EW9302 Station Information

| | Latitude (North) | Longitude (West) | Water Depth (meters) | Recovery (meters) |
|---|---|---|---|---|
| | AREA 1: NORTH OF FLEMISH CAP | | | |
| **Station 1** | **JD 153:1610 GMT-JD 153:1805 GMT** | | | |
| 1 JPC | 49 14.30 | 45 05.34 | 2527 | 11.97 |
| 1 PG | 49 14.30 | 45 05.34 | 2527 | 1.38 |
| **Station 2** | **JD 153:2253 GMT-JD 153:2340 GMT** | | | |
| 2 JPC | 48 47.70 | 45 05.09 | 1251 | 13.12 |
| 2 PG | 48 47.70 | 45 05.09 | 1251 | 1.38 |
| **Station 3** | **JD 154:1017 GMT-JD 154:1650 GMT** | | | |
| 3 GGC | 49 54.12 | 44 27.85 | 4082 | 0.86 |
| CTD-1 | 49 54.12 | 44 27.85 | 4082 | |
| CTD-2 | 49 53.18 | 44 25.04 | 4086 | |
| HYDRO-2 | 49 53.18 | 44 25.04 | 4086 | |
| | AREA 2: HATTON DRIFT | | | |
| **Station 4** | **JD 159:1328 GMT-JD 159:1406 GMT** | | | |
| 4 GGC | 59 03.82 | 18 00.95 | 1345 | 0.61 |
| **Station 5** | **JD 159:1637 GMT-JD 159:1910 GMT** | | | |
| 5 GGC | 59 10.52 | 18 15.99 | 1608 | 2.82 |
| 6 JPC | 59 10.28 | 18 15.29 | 1605 | 14.57 |
| 6 PG | 59 10.28 | 18 15.29 | 1605 | 1.32 |
| CTD-3 | 59 09.50 | 18 15.29 | 1604 | |
| **Station 6** | **JD 159:2119 GMT-JD 159:2225 GMT** | | | |
| 7 JPC | 59 11.51 | 18 16.82 | 1642 | 14.45 |
| 7 PG | 59 11.51 | 18 16.82 | 1642 | 0.41 |
| **Station 7** | **JD 160:0100 GMT-JD 160:0430 GMT** | | | |
| CTD-4 | 59 12.38 | 18 55.36 | 2617 | |
| HYDRO-4 | 59 12.38 | 18 55.36 | 2617 | |
| | AREA 3: BJARNI DRIFT | | | |
| **Station 8** | **JD 161:1852 GMT-JD 161:2133 GMT** | | | |
| 8 JPC | 60 48.33 | 25 03.23 | 1917 | 16.38 |
| 8 PG | 60 48.33 | 25 03.23 | 1917 | 1.38 |
| CTD-5 | 60 48.28 | 25 03.86 | 1932 | |
| **Station 9** | **JD 162:0304 GMT-JD 162:1000 GMT** | | | |
| 9 JPC | 60 29.30 | 23 56.47 | 2080 | 11.70 |
| 9 PG | 60 29.30 | 23 56.47 | 2080 | 1.38 |
| CTD-6 | 60 28.93 | 23 57.14 | 2085 | |

## Table 1. EW9302 Station Information continued.

| | Latitude (North) | Longitude (West) | Water Depth (meters) | Recovery (meters) |
|---|---|---|---|---|
| | AREA 3: BJARNI DRIFT continued | | | |
| **Station 10** | **JD 162:1410 GMT-JD 162:1653 GMT** | | | |
| 10 GGC | 60 24.21 | 23 38.45 | 1977 | 2.96 |
| 11 GGC | 60 25.30 | 23 23.23 | 1977 | 4.43 |
| **Station 11** | **JD 164:1004 GMT-JD 164:1325 GMT** | | | |
| 12 JPC | 61 05.60 | 24 16.07 | 1783 | 16.54 |
| 12 PG | 61 05.60 | 24 16.07 | 1783 | 1.51 |
| 13 GGC | 61 05.60 | 24 16.07 | 1783 | 2.04 |
| CTD-7 | 61 05.60 | 24 16.07 | 1783 | |
| **Station 12** | **JD 164:1640 GMT-JD 165:0021 GMT** | | | |
| 14 JPC | 61 25.17 | 24 06.33 | 1653 | 16.95 |
| 14 PG | 61 25.17 | 24 06.33 | 1653 | 1.38 |
| **Station 13** | **JD 165:0412 GMT-JD 165:0606 GMT** | | | |
| 15 JPC | 61 43.23 | 23 58.55 | 1522 | 15.47 |
| 15 PG | 61 43.23 | 23 58.55 | 1522 | 1.50 |
| **Station 14** | **JD 165:1245 GMT-JD 165:1442 GMT** | | | |
| 16 JPC | 61 56.63 | 23 52.60 | 1451 | 14.91 |
| 16 PG | 61 56.63 | 23 52.60 | 1451 | 1.55 |
| **Station 15** | **JD 166:2248 GMT-JD 167:0257 GMT** | | | |
| 17 JPC | 60 26.49 | 20 55.46 | 2572 | 0.00 |
| 18 GGC | 60 26.87 | 20 54.97 | 2573 | 1.69 |
| **Station 16** | **JD 167:0930 GMT-JD 167:1018 GMT** | | | |
| 19 GGC | 61 05.00 | 21 05.00 | 2094 | 0.00 |
| **Station 17** | **JD 167:1209 GMT-JD 167:1248 GMT** | | | |
| Sed. Trap | 61 12.43 | 21 38.53 | 1925 | |
| **Station 18** | **JD 168:0900 GMT-JD 168:0925 GMT** | | | |
| 20 GGC | 62 33.95 | 22 39.11 | 1146 | 0.00 |
| **Station 19** | **JD 169:0129 GMT-JD 169:0205 GMT** | | | |
| 21 GGC | 62 10.30 | 24 26.75 | 1353 | 1.02 |
| **Station 20** | **JD 169:1110 GMT-JD 169:1228 GMT** | | | |
| 22 GGC | 61 25.28 | 21 53.58 | 1800 | 5.22 |
| CTD-8 | 61 25.28 | 21 56.32 | 1799 | |
| HYDRO-8 | 61 25.28 | 21 56.32 | 1799 | |

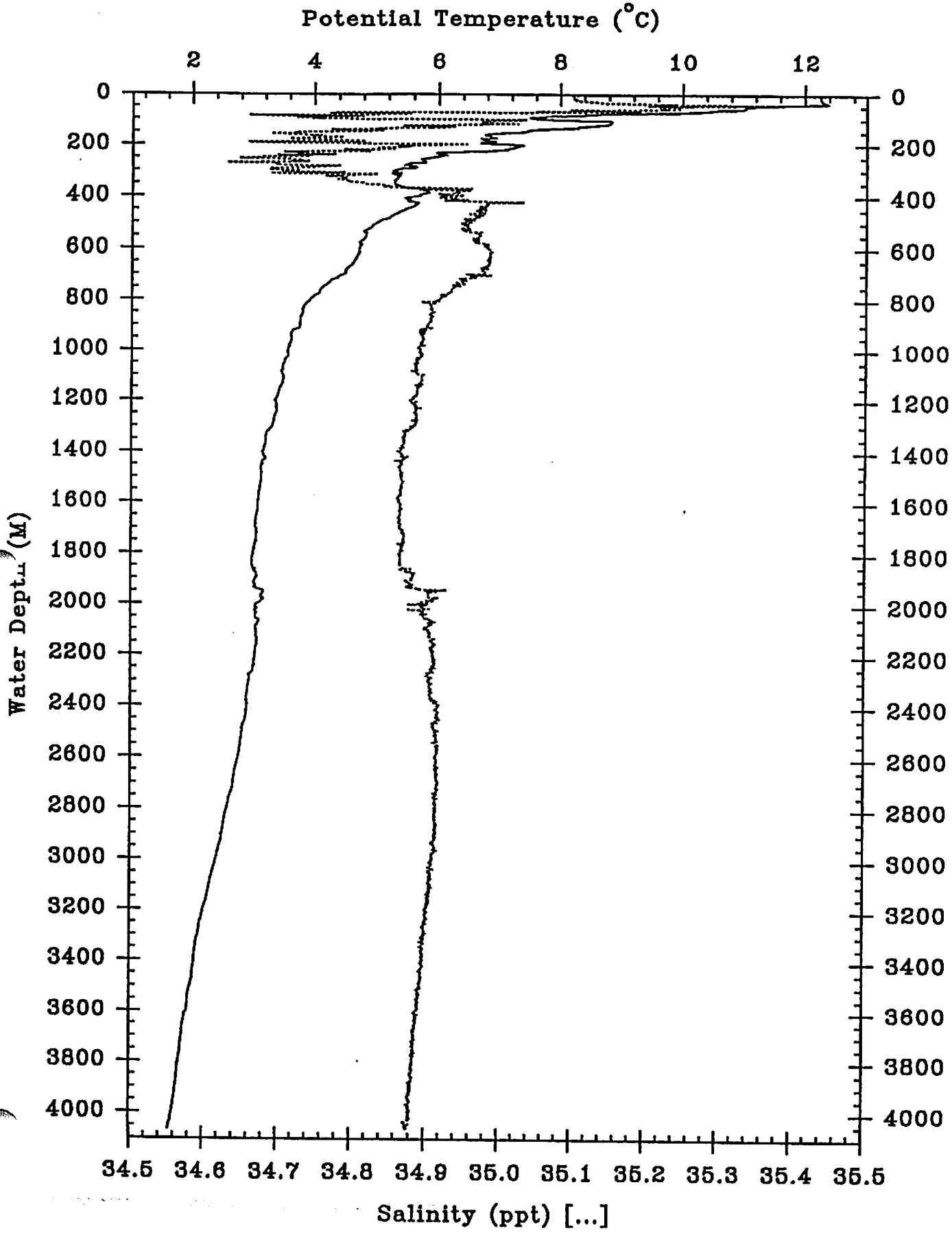
## Table 1. EW9302 Station Information continued.

| | Latitude (North) | Longitude (West) | Water Depth (meters) | Recovery (meters) |
|---|---|---|---|---|
| | AREA 3: BJARNI DRIFT continued | | | |
| **Station 21** | **JD 169:1741 GMT-JD 169:1910 GMT** | | | |
| 23 GGC | 61 40.32 | 21 43.96 | 1695 | 5.30 |
| CTD-9 | 61 40.22 | 21 44.33 | 1698 | |
| **Station 22** | **JD 169:1951 GMT-JD 169:2146 GMT** | | | |
| 24 GGC | 61 45.77 | 21 40.06 | 1629 | 5.66 |
| CTD-10 | 61 45.78 | 21 40.71 | 1630 | |
| **Station 23** | **JD 170:0000 GMT-JD 170:0151 GMT** | | | |
| 25 GGC | 62 03.78 | 21 28.33 | 1523 | 5.30 |
| CTD-11 | 62 03.50 | 21 29.13 | 1526 | |
| **Station 24** | **JD 170:0339 GMT-JD 170:0415 GMT** | | | |
| 26 GGC | 62 19.30 | 21 27.44 | 1450 | 4.31 |
| **Station 25** | **JD 170:0608 GMT-JD 170:0643 GMT** | | | |
| 27 GGC | 62 28.14 | 21 07.05 | 1406 | 0.64 |
| **Station 26** | **JD 170:0857 GMT-JD 170:1152 GMT** | | | |
| 28 GGC | 62 37.09 | 20 38.00 | 1295 | 3.25 |
| 29 GGC | 62 36.74 | 20 38.25 | 1299 | 5.22 |
| CTD-12 | 62 36.69 | 20 38.08 | 1294 | |
| | **JD 170:1310 GMT-JD 170:1400 GMT** | | | |
| 30 GGC | 62 45.03 | 20 40.65 | 1188 | 2.08 |
| **Station 28** | **JD 170:2224 GMT-JD 171:0215 GMT** | | | |
| 31 GGC | 61 20.82 | 20 20.96 | 2254 | 0.81 |
| 32 GGC | 61 20.76 | 20 20.93 | 2259 | 2.60 |
| CTD-13 | 61 20.74 | 20 20.80 | 2259 | |

# Table 2. Oxygen Titrations (*denotes estimated depths from wire out or CTD temperature)

| | Wire Out (m) | Titration Value (ml) | Titration Value (ml) | Average Value (ml) | Oxygen (ml/l) | Bottle Depth | Bottle Temp C | CTD Temp @ Z |
|---|---|---|---|---|---|---|---|---|
| **Hydrocast 2** | | | | | | | | |
| | 3 | 5.538 | 5.538 | 5.538 | 6.385 | 4.5 | 12.233 | 12.2506 |
| | 250 | 4.751 | 4.746 | 4.749 | 5.473 | 255.9 | 6.265 | 6.0087 |
| | 400 | 4.542 | 4.518 | 4.530 | 5.220 | 410.8 | 5.776 | 5.5754 |
| | 700 | 5.286 | 5.303 | 5.294 | 6.103 | 711.0 | 4.380 | 4.2905 |
| | 1000 | 5.771 | 5.771 | 5.771 | 6.654 | *1012.4 | NA | 3.6235 |
| | 1250 | 5.850 | 5.862 | 5.856 | 6.752 | 1262.9 | 3.510 | 3.4953 |
| | 1500 | 5.993 | 6.015 | 6.004 | 6.923 | 1512.6 | 3.231 | 3.1804 |
| | 2000 | 5.955 | 5.950 | 5.953 | 6.865 | 2020.0 | 3.207 | 3.1950 |
| | 2500 | 5.837 | 5.843 | 5.840 | 6.734 | 2534.8 | 3.047 | 3.0288 |
| | 3000 | 6.114 | 6.118 | 6.116 | 7.053 | *3032.4 | 2.638 | 2.6486 |
| **Hydrocast 4** | | | | | | | | |
| | 0 | 5.783 | 5.784 | 5.784 | 6.669 | 2.7 | 9.473 | 9.4586 |
| | 200 | 5.512 | 5.495 | 5.503 | 6.345 | *196.2 | NA | 8.2782 |
| | 350 | 5.406 | 5.394 | 5.400 | 6.266 | 351.5 | 7.779 | 7.6766 |
| | 650 | 5.471 | 5.470 | 5.471 | 6.308 | 653.7 | 6.764 | 6.8335 |
| | 950 | 5.006 | 4.992 | 4.999 | 5.762 | 955.1 | 5.456 | 5.3978 |
| | 1250 | 5.414 | 5.414 | 5.414 | 6.242 | 1256.7 | 4.459 | 4.4736 |
| | 1550 | 5.493 | 5.489 | 5.491 | 6.331 | 1508.4 | 4.010 | 3.9638 |
| | 1850 | | No Sample Recovered | | | 1796.4 | 3.557 | 3.5116 |
| | 2150 | 5.652 | 5.656 | 5.654 | 6.519 | 2070.3 | 3.409 | 3.3910 |
| | 2600 | 5.720 | 5.717 | 5.719 | 6.594 | 2494.2 | 2.833 | 2.9318 |
| **Hydrocast 8** | | | | | | | | |
| | 0 | 5.980 | 5.933 | 5.957 | 6.896 | 1.2 | 8.836 | 8.8617 |
| | 165 | 5.620 | 5.623 | 5.622 | 6.482 | *176.5 | NA | 7.4191 |
| | 365 | 5.521 | 5.520 | 5.521 | 6.365 | 385.4 | 7.021 | 6.9881 |
| | 565 | 5.287 | 5.309 | 5.298 | 6.108 | 584.7 | 6.547 | 6.5749 |
| | 765 | 5.002 | 5.002 | 5.002 | 5.766 | *776.5 | NA | 5.4799 |
| | 965 | 5.452 | 5.448 | 5.450 | 6.283 | 985.7 | 4.490 | 4.4173 |
| | 1165 | 5.730 | 5.746 | 5.738 | 6.616 | 1188.1 | 3.978 | 3.928 |
| | 1365 | 4.854 | 4.852 | 4.853 | 5.594 | 1400.3 | 3.593 | 3.6743 |
| | 1565 | 5.826 | 5.828 | 5.827 | 6.719 | 1591.2 | 3.209 | 3.1477 |
| | 1765 | 6.064 | 6.053 | 6.059 | 6.987 | 1778.6 | 2.759 | 2.7170 |
| **Single niskin bottles on GGC's or with CTD's** | | | | | | | | |
| CTD1-3GGC | | 5.833 | 5.908 | 5.871 | 6.770 | *3987.0 | 2.055 | 2.0556 |
| CTD3-6JPC | | 5.466 | 5.469 | 5.467 | 6.303 | 1409.8 | 4.044 | 4.0404 |
| CTD5-8JPC | | 5.648 | 5.658 | 5.653 | 6.518 | 1902.4 | 2.845 | 3.2077 |
| CTD6-9JPC | | 5.741 | 5.735 | 5.738 | 6.616 | *1546.0 | 3.573 | 3.5731 |
| CTD7-12JPC-13GGC | | 5.466 | 5.465 | 5.466 | 6.302 | 1736.0 | 4.353 | 2.9837 |
| CTD9-23GGC | | 5.675 | 5.675 | 5.675 | 6.543 | 1678.2 | 2.861 | 2.8341 |
| CTD10-24GGC | | 5.668 | 5.669 | 5.669 | 6.536 | 1590.1 | 2.840 | 2.7712 |
| CTD11-25GGC | | 5.887 | 5.870 | 5.878 | 6.778 | *1488.0 | NA | 3.1367 |
| CTD12-28GGC-29GGC | | 5.605 | 5.599 | 5.602 | 6.459 | 1189.5 | 4.004 | 3.9594 |
| CTD13-31GGC-2000m | | 5.661 | 5.670 | 5.666 | 6.533 | 2011.7 | 3.033 | 2.9685 |
| CTD13-31GGC-2200m | | 5.763 | 5.767 | 5.765 | 6.647 | 2218.9 | 2.654 | 2.6409 |

# EW9302 CTD #1


Potential Temperature (°C)
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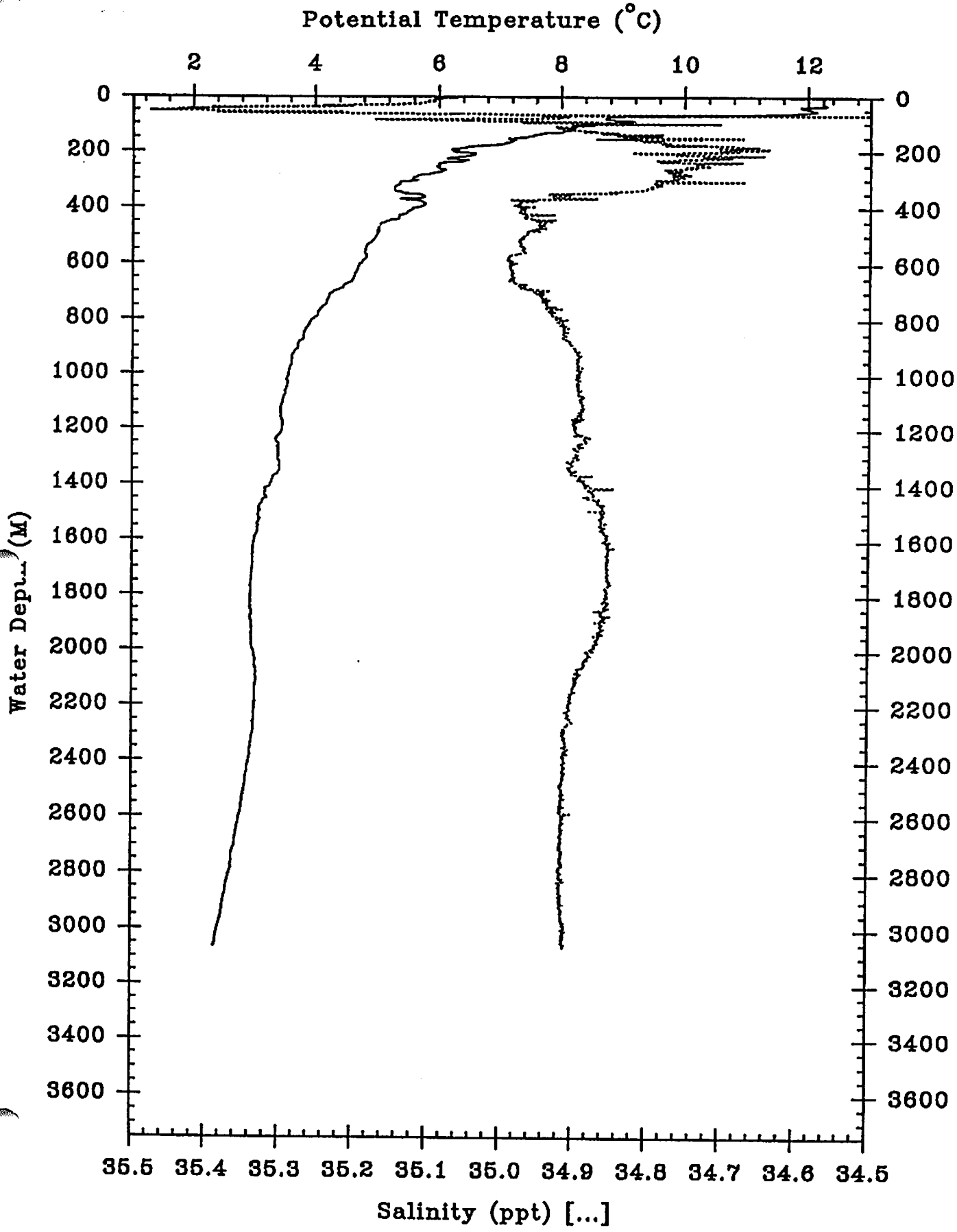
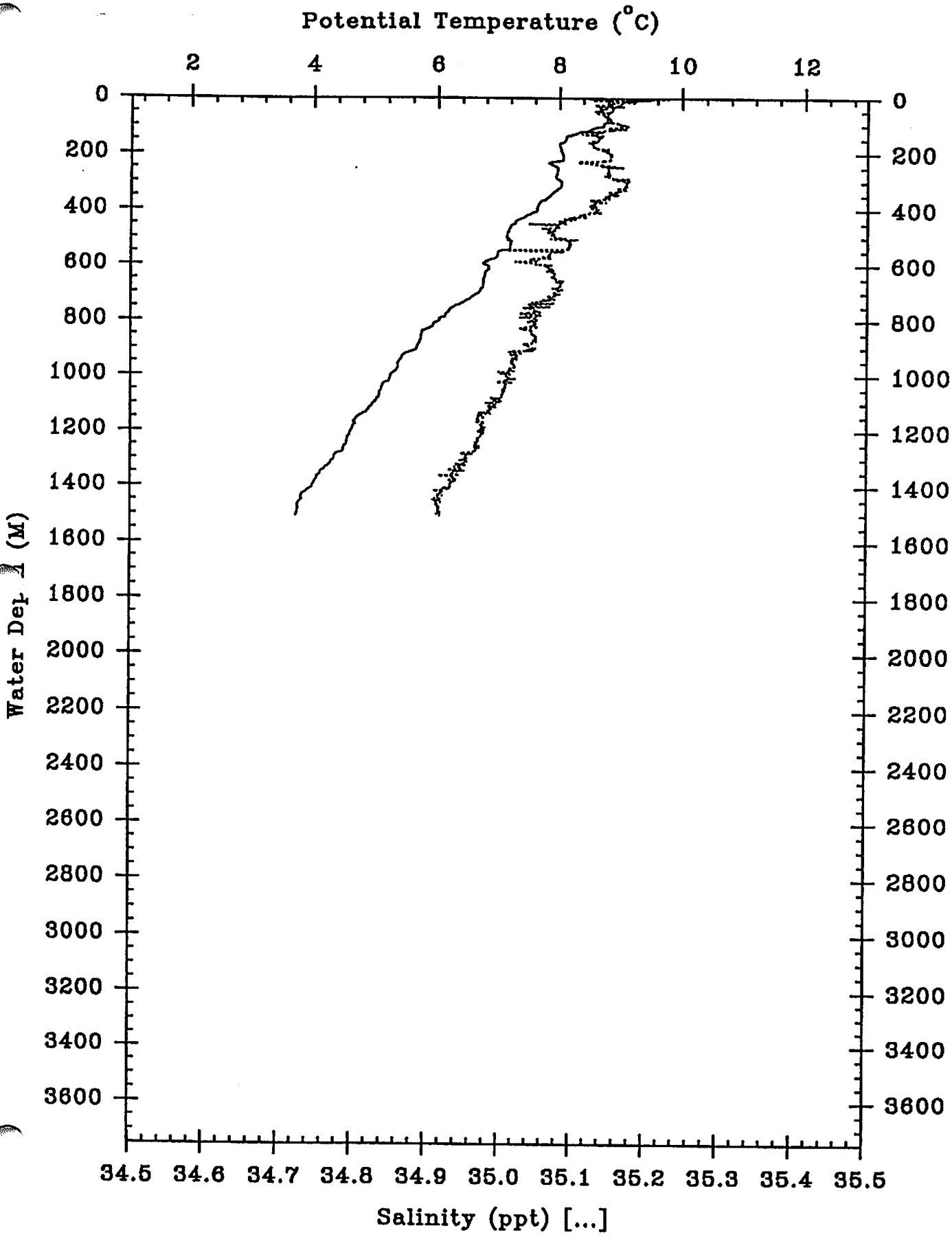
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
Water Depth (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

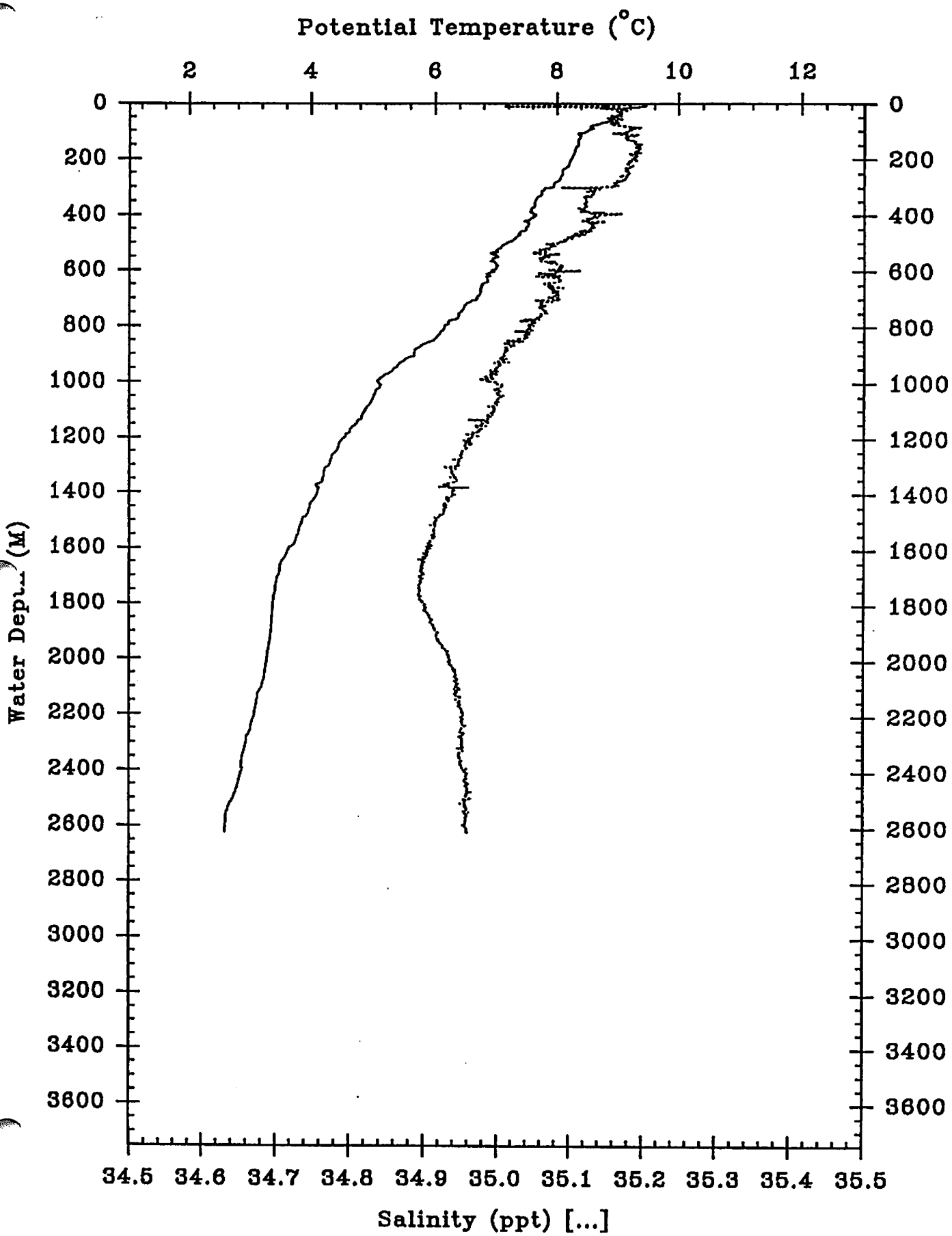
# EW9302 CTD #2


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
35.5
35.4
35.3
35.2
35.1
35.0
34.9
34.8
34.7
34.6
34.5
Salinity (ppt) [...]

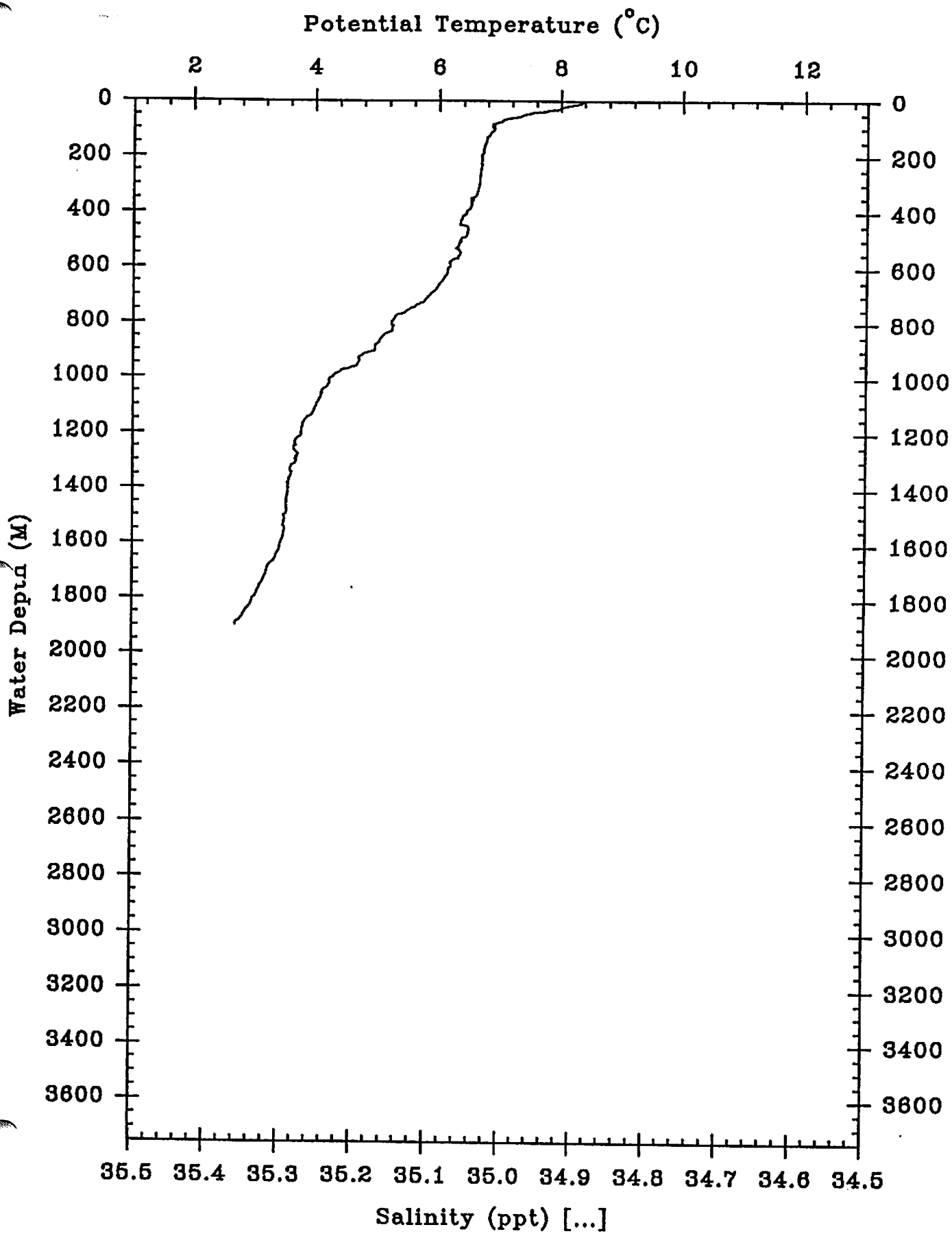
# EW9302 CTD #3


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

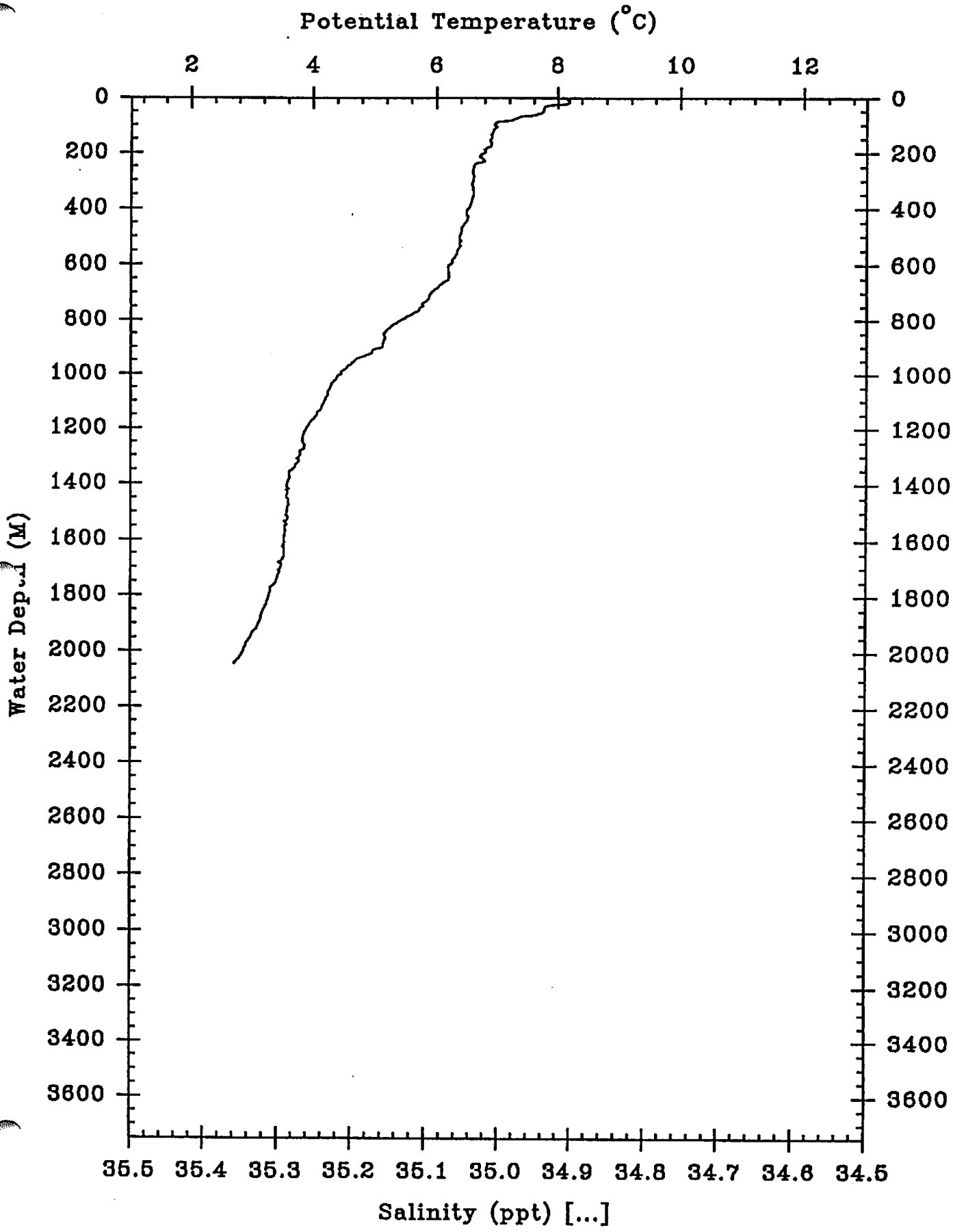
# EW9302 CTD #4


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

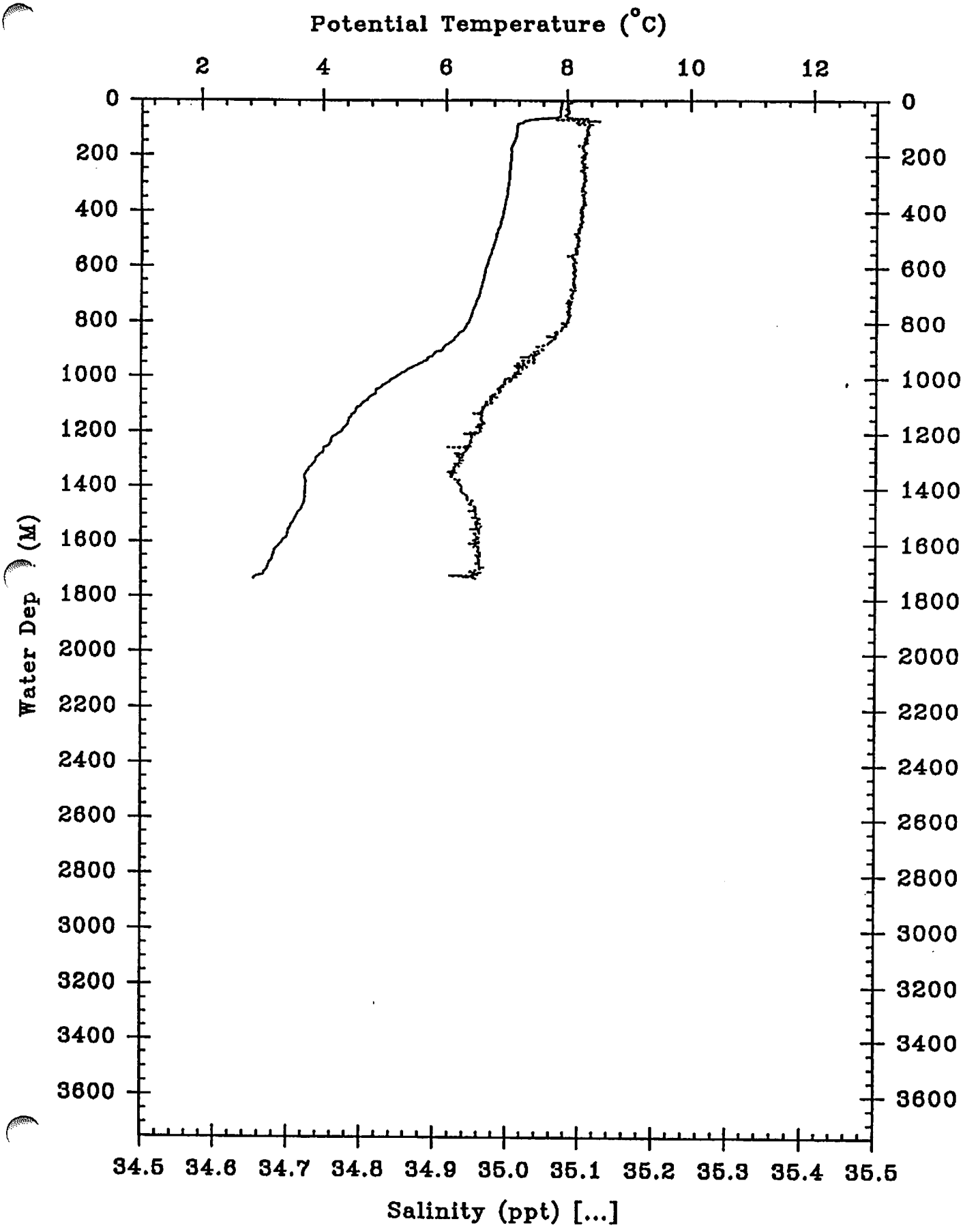
# EW9302 CTD #5


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
35.5
35.4
35.3
35.2
35.1
35.0
34.9
34.8
34.7
34.6
34.5
Salinity (ppt) [...]

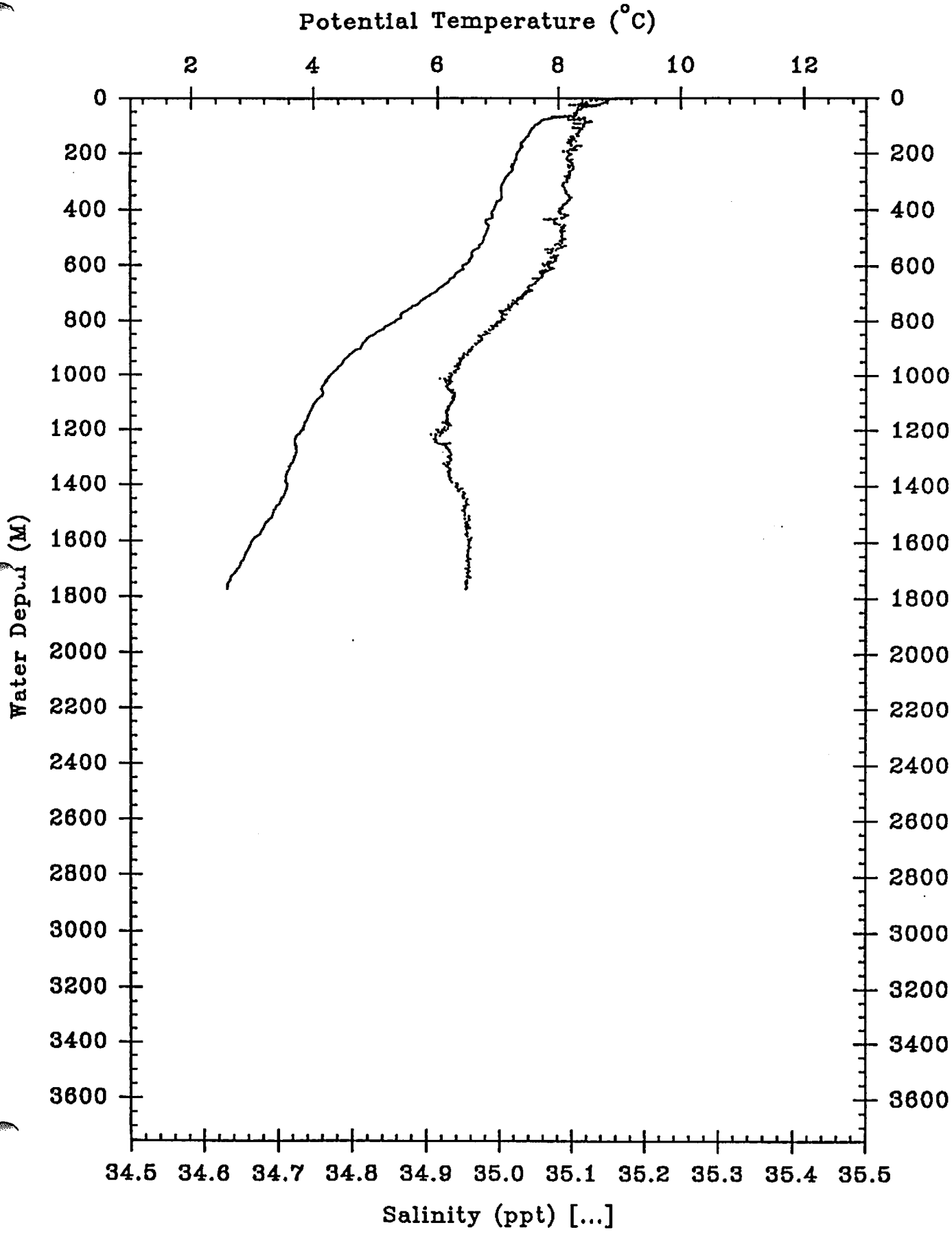
# EW9302 CTD #6


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
35.5
35.4
35.3
35.2
35.1
35.0
34.9
34.8
34.7
34.6
34.5
Salinity (ppt) [...]

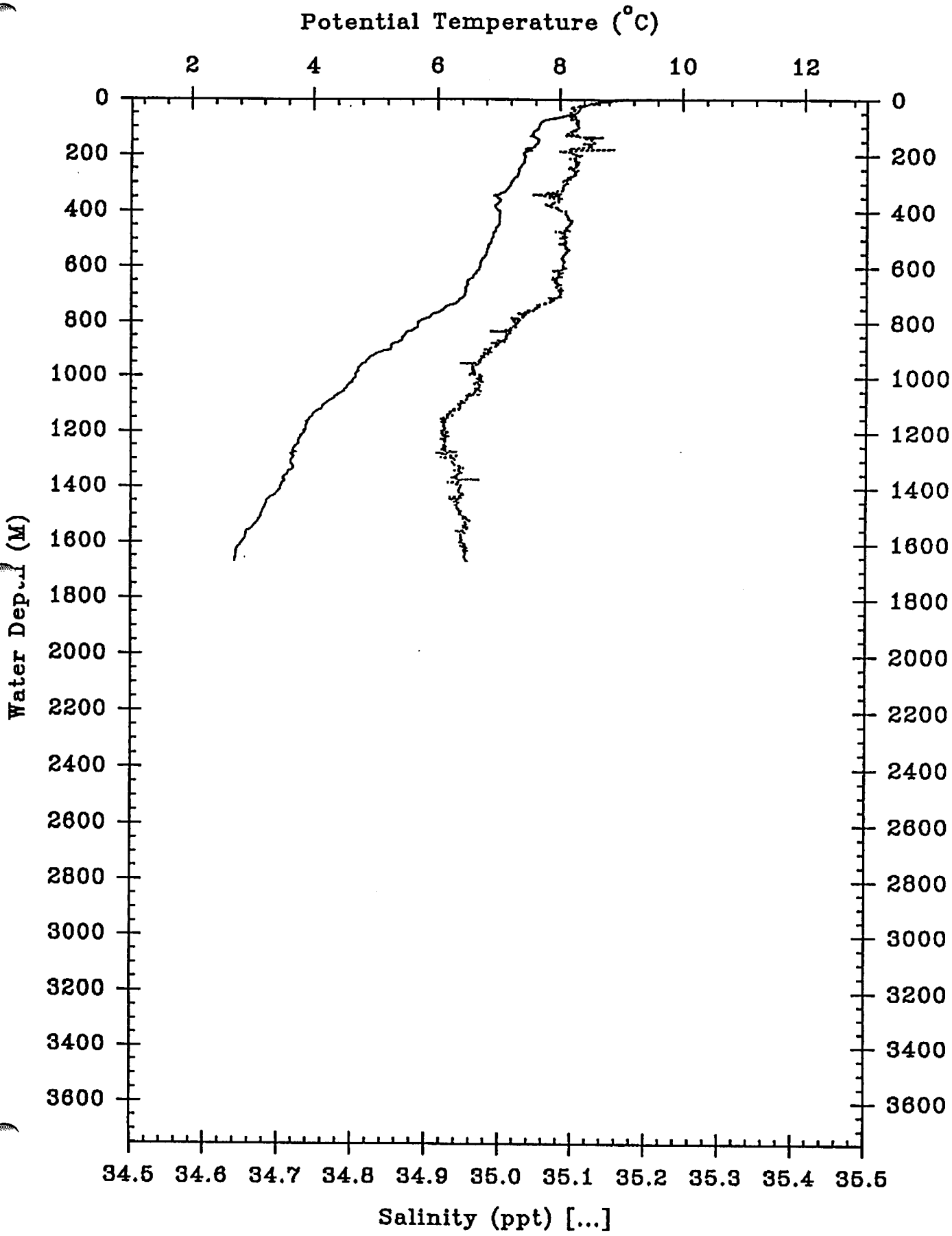
# EW9302 CTD #7


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Dep (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

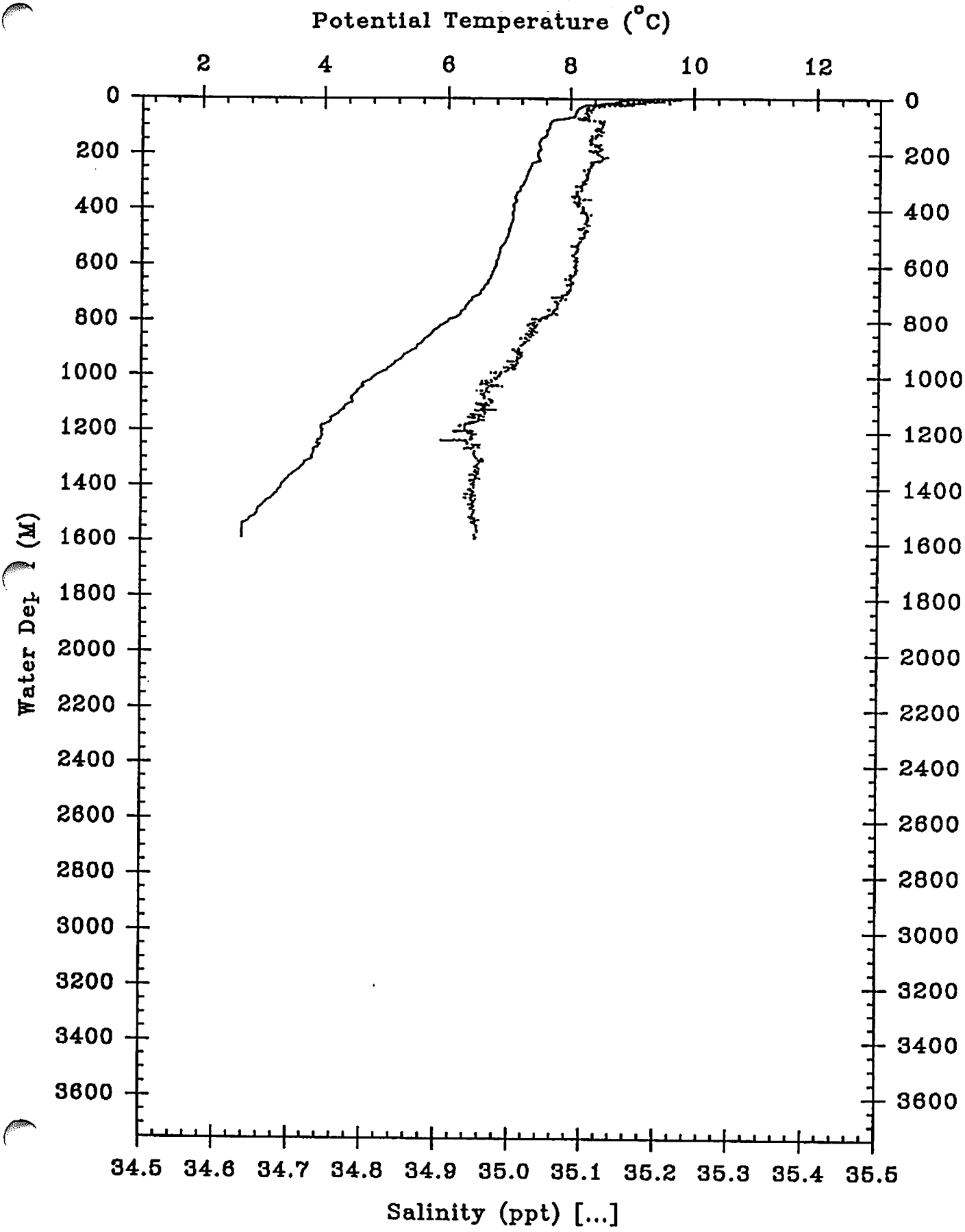
# EW9302 CTD #8


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

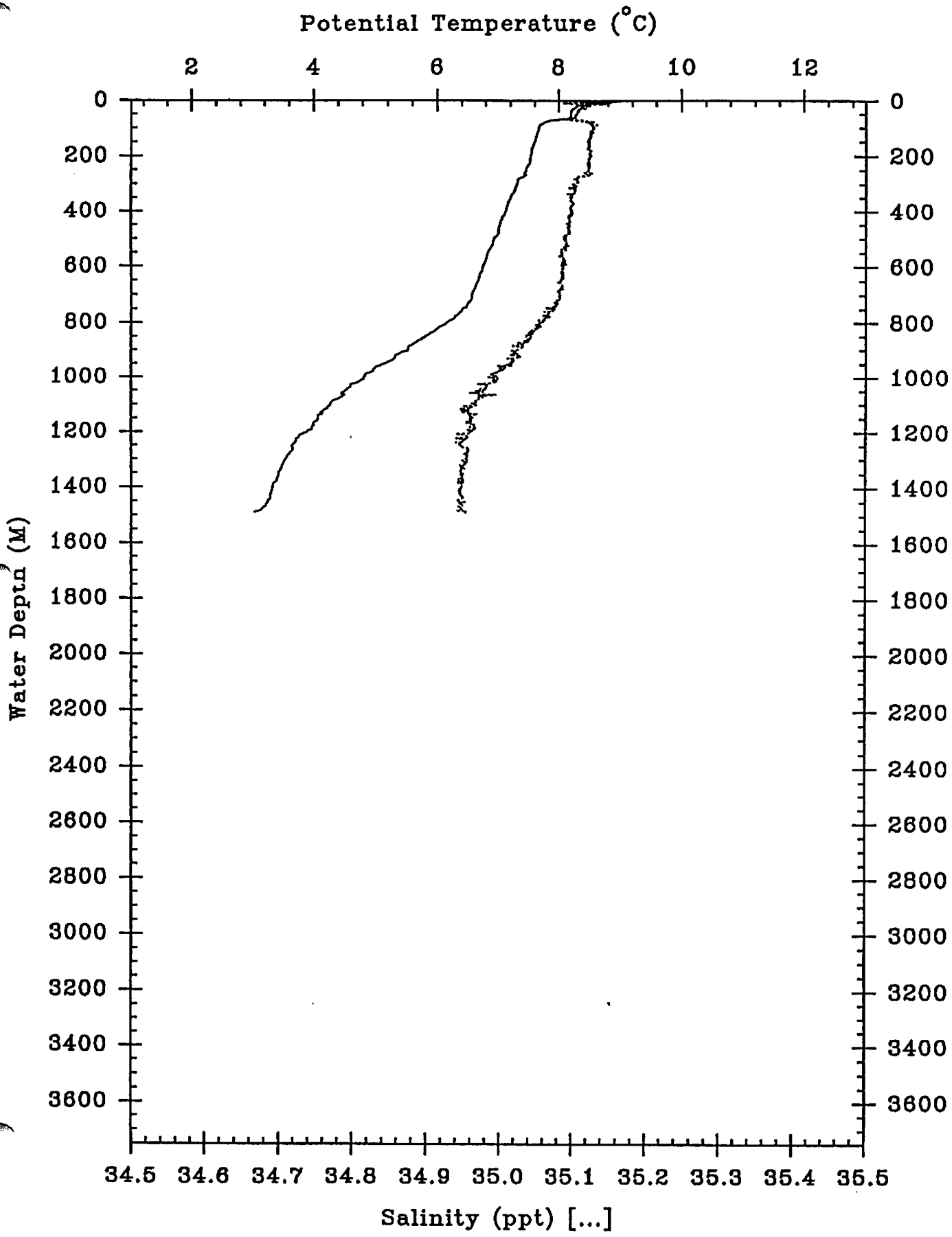
# EW9302 CTD #9


Potential Temperature (°C)
2
4
6
8
10
12
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
Water Depth (M)
34.5
34.6
34.7
34.8
34.9
35.0
35.1
35.2
35.3
35.4
35.5
Salinity (ppt) [...]

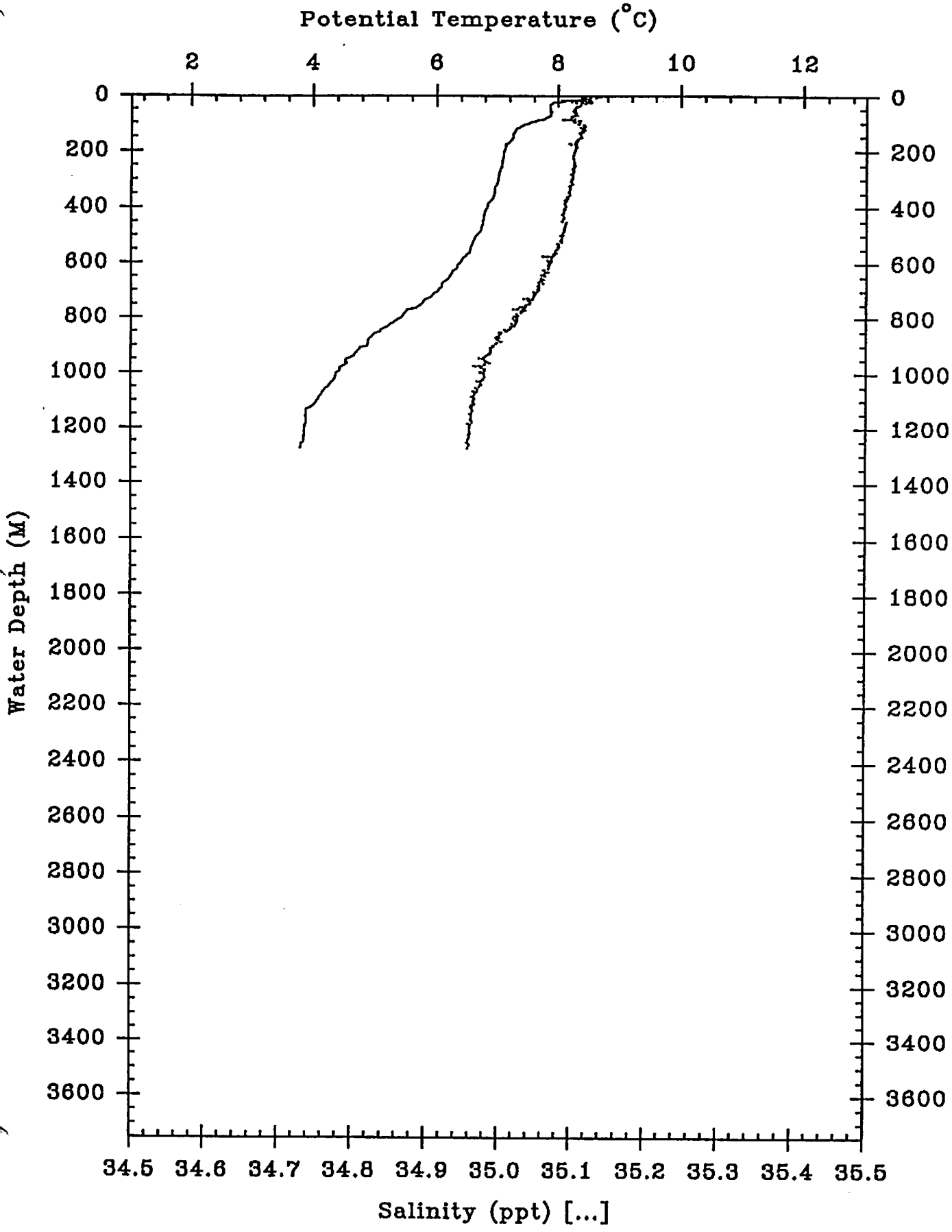
# EW9302 CTD #10



# EW9302 CTD #11



# EW9302 CTD #12



# EW9302 CTD #13