

CRN

89-03

# DAILY LOG

INSTITUTE OF OCEAN SCIENCES  
OCEAN PHYSICS

DATE

3 Oct 6

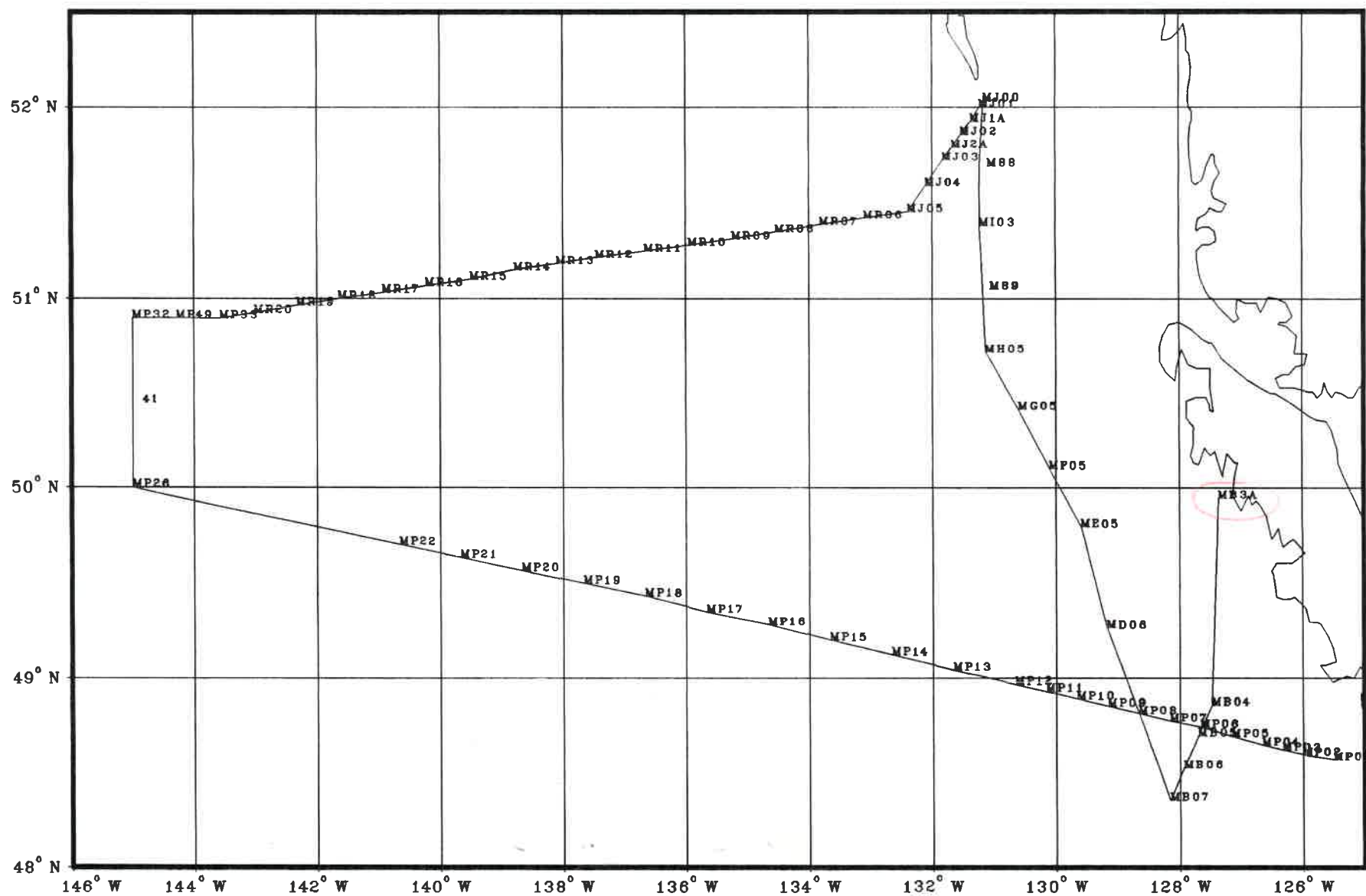
VESSEL

Parizeau

PROJECT

Papa

# Cruise 89-3



## CTD IN USE:

PROBE: model 8705 SN 41,226  
Temp 87401 43,201  
Cond 87410 41,664  
SEATECH Trans #197 (2000 m. max).  
Press. sensor: 2500 dBar.

Finger: Benthos

Winch series 410 SN 1433  
slip rings 8600/2W SN 42,991

Sytech counter B31 SN 87-003

Control unit: model 87102 SN 44,535  
IBM AT: 50615965170 . Program DTD-V9.18AS ver 1.9  
TECHNAR: QIC60H SN C8701080100-A18  
STAR: RADIX-10 PLUS  
TOPAZ 0111T21ST ISOLATION TRANSFORMER

PARIZEAU - SURAJ GULATI, Captain.

8-12: Terry Ryder  
12-4: Howie Elliott  
4-8: John Campbell.

WATCHES: 8-12: Les Spearing  
Ron Bellegay  
Andy Sybrandy (scripps)

12-4: Bernard Minkley  
Tim Soutar

4-8: Reg Bigham  
John Love

Days: Frank Whitney.

### SEAS III

Bathy A6953102 channel 44 interval 0600  
transmit 21:29

Met A681B5B2 16 0600  
transmit 23:55

hydro data consecutive numbers

5, 8, 19, 22, 29, 31, 50, 57

3 Oct 89 Local Time

1110 depart I.O.S.

1121 Aduap SEAS system

1125 started SAIL system logging.

1127 RDI started

(RDI is on 15 minute ensembles, GMT)  
(SET-UP FILE: OCT\_89, DATA FILE D:PINGDATA.001)

1520 STN JF1

1913 STN JF3

2005 PDT — SAIL on B:8903001.D2; <sup>776 sec written</sup> B:83.1% free.  
— RDI on D:PINGDATA.CXSD EMA-34.

2052 — STN JF4

2243 — Arr stn MPO1.

#2 LOOPS: S, Nut, ChlA,  $\Sigma CO_2$   
CTD #1 to 132 m.

2303 — LV MPO1.

- level wind spooling gear speed not quite set right yet.
- counter not working: counts up regardless of direction — suspect broken wire in sensor lead. Will fix in am.

0314 Sh LPO3 CTD winch spooling adjusted.

0615-0645 — obtained water for incubators.

0710 — INCUBATOR IN

0757 — Sed. trap mooring released.

| YEAR | 1989           | MONTH              | 10                   | TIME               | ZONE                | UTC      | SHIP                  | Panzen         | CRUISE                               | 89-03    | PAGE                          | 1          | OF                            |  |
|------|----------------|--------------------|----------------------|--------------------|---------------------|----------|-----------------------|----------------|--------------------------------------|----------|-------------------------------|------------|-------------------------------|--|
| DAY  | STATION NUMBER | DEPTH SOUNDING (M) | SHIP STOP/START TIME | LATITUDE/LONGITUDE | STD CONSEC. #/DEPTH | STD TIME | HYDRO CONSEC. #/DEPTH | MESSANGER TIME | SALINITY #/CALIBRATION LOOP OR DEPTH | OXYGEN # | SURFACE TEMPERATURE/ SALINITY | SALINITY # | NOTES                         |  |
|      | JF01           | 2220               |                      |                    |                     |          |                       | 1              | L.L.                                 |          |                               |            |                               |  |
| 4    | MP01           | 133                | 0543                 | 48 34.67           | 1                   | 0554     | /                     | 2              | 10.47                                |          | 10.45                         |            | FULL LOOP SAMPLES:            |  |
|      |                |                    | 0603                 | 125 30.44          | 132                 |          |                       |                | 32.852                               |          | 32.684                        |            | S, NUT, CHLA, $\Sigma CO_2$ . |  |
| 4    | MP02           | 114                | 0753                 | 48° 36.08'         | 2                   | 0756     | /                     | 3              | 12.020                               |          | 11.93                         |            | FULL LOOP SAMPLES:            |  |
|      |                |                    | 0807                 | 126° 00.26'        | 114                 |          |                       |                | 32.867                               |          | 32.545                        |            | S, NUT.                       |  |
| 4    | MP03           | 800                | 0948                 | 48 37.31           | 3                   | 0953     | /                     | 4              | 12.32                                |          | 12.24                         |            |                               |  |
|      |                |                    | 1018                 | 126 19.88          | 815                 |          |                       |                |                                      |          | 31.718                        |            | Loop samples                  |  |
| 4    | MP04           | 1343               | 1649                 | 48 39.09           | 4                   | 1651     | 5                     | 5              | 1001                                 | 15.008   | 1                             | 15.01      |                               |  |
|      |                |                    |                      | 126 40.23          | 1330                | 1200     | 1827                  |                | 1028                                 | 32.266   | 19                            | 32.075     |                               |  |
| 5    | MP05           | 2100               | 0000                 | 48 41.60           | 6                   | 0002     | /                     | 6              | 15.046                               |          | 14.97                         |            | Loop samples                  |  |
|      |                |                    | 00:25                | 127 10.00          | 2086                |          |                       |                | 32.23                                |          | 32.033                        |            | 14.99 32.04                   |  |
| 5    | MP06           | 2570               | 0325                 | 48 44.60           | 7                   | 0328     | 8                     | 7              | 1092                                 | 13.88    | 20                            | 13.97      |                               |  |
|      |                |                    | 0630                 | 127 39.89          | 2004                | 2500     | 0534                  |                | 2018                                 | 32.228   | 41                            | 32.014     |                               |  |
| 5    | MP07           | 2530               | 0853                 | 48 46.70           | 9                   | 0859     | /                     | 8              | 14.65                                |          | 14.61                         |            |                               |  |
|      |                |                    | 0959                 | 128 09.86          | 2006                |          |                       |                | 32.217                               |          | 32.005                        |            |                               |  |
| 5    | MP08           | 2540               | 12:12                | 48 49.00           | 10                  | 12:14    | /                     | 9              | 14.90                                |          | 14.86                         |            | Loop Samples                  |  |
|      |                |                    |                      | 128 40.10          | 2300                |          |                       |                | 32.227                               |          | 32.013                        |            | NU                            |  |
| 5    | MP09           | 2369               | 1526                 | 48 51.18           | 11                  | 1530     | /                     | 10             | 14.33                                |          | 14.27                         |            |                               |  |
|      |                |                    | 1615                 | 129 09.94          | 2003                |          |                       |                | 32.179                               |          | 31.963                        |            |                               |  |
| 5    | MP10           | 2680               | 1848                 | 48 53.56           | 12                  | 1851     | /                     | 11             | 15.97                                |          | 15.93                         |            |                               |  |
|      |                |                    | 1940                 | 129 40.03          | 2007                |          |                       |                | 32.222                               |          | 32.067                        |            |                               |  |
| 5    | P11            | 2780               | 2146                 | 48 56.04           | 13                  | 2148     | /                     | 12             | 15.903                               |          | 15.87                         |            | Loop samples                  |  |
|      |                |                    | 2233                 | 130 09.63          | 2034                |          |                       |                | 32.258                               |          | 32.088                        |            | KXXX                          |  |

89/10/4 PDT

0800 - RDI on D:PINGDATA.000 ens 82 ; 8.65 Mb left.  
- SAIL on B:8903001.D2 ; 3759 rec. written.

0805 - Sed-trap mooring coming up.

0807 - buoys on surface

0850 - mooring on board.

0949 - An. Stn MPO4 for CTD.

#5 loop samples: S, Nut, ChlA,  $\Sigma\text{CO}_2$ .  
CTD #4 to 1330 m.

1045 - start 1200 m hydro cast

1127 - messenger

1157 - in.

1400 - SYTECH counter fixed: 2 leads in sensor shorted (also some water in sensor)  
- doubled sheave diameter to correct scaling.

2025 - An. Stn MPO6 for CTD.

#7 loop samples: S, Nut, ChlA,  $\Sigma\text{CO}_2$   
CTD #7 to 2004 m.  
Large jellyfish, kelp

2105 - RDI on D:PINGDATA.000 ens 134 ; 8.60 Mb left.  
- SAIL on B:8903003.D1 ; 886 rec. written.

2130 - start 2500 m hydro cast: SAIL, jellyfish.

2225 - messenger

2323 - in

0159 Stn MPO7 CTD, loop sample. CTD 500 m above bottom. Wrench counter not working properly

89/10/5 PDT

0835 - RDI on D:PINGDATA.000 ens 130 ; 8.55 Mb left.  
- SAIL on B:8903003.D1 ; 3782 rec. written.

89/10/5 PDT

0826 - Arr. Stn MP 9

#10 Loop samples: S, chlA, Nut,  $\Sigma\text{CO}_2$   
CTD #11 to 2003 m.

Perseus around ship (~10).

QIC-60 backup had 116 retries

1148 - Arr. Stn MP 10

#11 Loop samples: S, chlA, Nut,  $\Sigma\text{CO}_2$   
CTD #12 to 2007 m.

XBT comparison of probes done. Spencer XBT-4-2  
and XBT-7-4 with Supersonic T-7  
QIC-60 had 32 retries

Stn MP 11 sunny, warm, light winds

CTD #13 to 2000 m.

QIC-60 had 4 retries

1730 - Arrive Stn MP 12.

#13 loop samples; S, chlA, Nut,  $\Sigma\text{CO}_2$ .

CTD #14 to app 2000 m.

Sunny & calm 0-1 knot.

2010 - RDI on D: PINGDATA.000 ens 226; 8.51 M<sub>h</sub> left  
-SAIL on B: 8903004.D1; 196 rec. written

RDI % GD is only ~65% in upper 220 m.

Next ens % GD ~40% in upper 220 m.

Went down to ASDIC compartment; bled air from xdr well.

Ens. 228: % GD has dropped to 0%.

Returned to ASDIC compartment - left valve open.

Ens. 229: % GD: 0%

230: % GD: 30% in upper 220 m.

2235 - Arr. Stn MP 13.

#14 Loop samples: S, chlA, Nut,  $\Sigma\text{CO}_2$

CTD #15 to 2004 m.

- QIC-60 did not backup file - error in  
writing to tape (27 retries + aborted).

2340 - Lvs MP 13.

- tried QIC-60 backup of 8903015.CTD. NO GO.  
"Data detected where not expected!"

Wind building all evening now up to 30 Knts  
from 191 Deg

Surface Temperature  $\approx 16^{\circ}$

Have to pull in the chains for the first  
time on the cruise.

| YEAR | MONTH          | TIME               | ZONE                 | SHIP               | CRUISE              | PAGE     | OF                    |                |                        |               |               |                               |        |                                                                |
|------|----------------|--------------------|----------------------|--------------------|---------------------|----------|-----------------------|----------------|------------------------|---------------|---------------|-------------------------------|--------|----------------------------------------------------------------|
| 89   | 10             | UTC                |                      | Paragon            | 89-03               | 2        |                       |                |                        |               |               |                               |        |                                                                |
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| 6    | MP12           | 3300               | 00:30                | 48 58 19 14        | 0038                |          |                       | 13             |                        | 15.759        | 15.81         | 32.209                        | 32.026 | Calm sea<br>loop samples taken                                 |
|      |                | 01:26              | 130 39 78 2002       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 6    | MP13           | 2940               | 0535                 | 49 02.6 15         | 0537                |          |                       | 14             |                        | 16.023        | 15.97         | 32.586                        | 32.351 | QIC-60 would not<br>backup file - required new tap             |
|      |                | 0640               | 131 40.03 2004       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 6    | MP14           | 3275               | 10:58                | 49 07 43 16        | 11:08               |          |                       | 15             |                        | 15.972        | 15.93         | 32.596                        | 32.389 | Kkxx                                                           |
|      |                |                    | 132:40:01 2007       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 7    | MP15           | 3200               | 0200                 | 49 12 04 17        | 0204                |          |                       | 16             |                        | 15.470        | 15.42         | 32.527                        | 32.367 | Loop samples taken<br>Kkxx                                     |
|      |                |                    | 133 39 89 2004       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 7    | MP16           | 3652               | 0900                 | 49 17.14 18        | 0902                | 19       | 1040                  | 17             | 2051                   | 15.335        | 15.28         | 32.550                        | 32.393 | 42<br>65<br>loop samples<br>Bottle cast to 3500 m              |
|      |                |                    | 134 39.59 2020       | 3500               |                     | 2080     |                       |                |                        |               |               |                               |        |                                                                |
| 7    | MP17           | 3535               | 1754                 | 49 21.06 20        | 1800                |          |                       | 18             |                        | 14.708        | 14.65         | 32.522                        | 32.361 | Kkxx                                                           |
|      |                | 1854               | 135 39.98 2003       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 7/8  | MP18           | 3855               | 2320                 | 49 26 02 21        | 2322                | 22       | 0120                  | 19             | 2027                   | 14.618        | Sail RT 14.56 | 32.529                        | 32.365 | 66<br>90<br>Loop Samples P <sub>CO2</sub><br>Nutrients<br>Kkxx |
|      |                | 0409               | 136 39.96 2007       | 3700               |                     | 2051     |                       |                |                        |               |               |                               |        |                                                                |
| 8    | MP19           | 3940               | 0820                 | 49 30.23 23        | 0823                |          |                       | 20             |                        | 15.004        | 14.95         | 32.551                        | 32.398 | loop samples                                                   |
|      |                | 0912               | 137 39.56 2008       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 8    | MP20           | 3985               | 13:37                | 49 34 12 24        | 1339                |          |                       | 21             |                        | 14.838        | 14.78         | 32.481                        | 32.320 | Loop samples<br>CO <sub>2</sub> nutrients salinity<br>Kkxx     |
|      |                | 14:40              | 138 39 84 2149       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 9    | MP20           | 3988               | 2340                 | 49 32.84 25        | 2346                |          |                       |                |                        | 14.599        | 14.54         | 32.478                        | 32.407 | near new AEP-1<br>mooring.                                     |
|      |                |                    | 138 38.94 2003       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 10   | MP21           | 3976               | 0525                 | 49 37.93 26        | 0531                |          |                       | 22             |                        | 14.123        | 14.05         | 32.593                        | 32.495 | Kkxx                                                           |
|      |                | 0629               | 139 39.71 2004       |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |
| 10   | MP22           | 3975               | 11:16                | 49 41 88 27        | 1122                |          |                       | 23             |                        | 13.843        | 13.81         | 32.576                        | 32.455 | Loop samples CO <sub>2</sub><br>nutrients sal.                 |
|      |                | 2001               | 140 40 30            |                    |                     |          |                       |                |                        |               |               |                               |        |                                                                |

89/10/5 PDT

2355 put another 216-bu type into unit, backed up  
Cart 15 (volume 1)

89/10/6 PDT

0800 HOVE TO, 30 kt S wind.

0835 - RDI in PAUSE mode - keyboard and  
monitor out of place (key probably pressed  
as keyboard moved).

- <CR> to resume data collection.

- RDI on D: PINGDATA.000 sum 272, 8.46 Mb left

- SAIL on B: 8903004.D1, 3418 rec. written.

1330 - still HOVE TO. 40 kt S wind  <sup>gusty to</sup> 50 kts.

1600 - enroute STN MP15 - wind 15 kt WSW  
but still large seas.

2025 - RDI on D: PINGDATA.001 sum 319, 8.41 Mb left.  
SAIL on B: 8903005.D1, 718 rec. written.

7/10/89

0200 Ste MP16, Wind down to 17 knots, large swell,  
CTD #18  
bottle cont 0-1200, 1500-3500

0600 Wind 21 kts.

0830 - RDI on PINGDATA.001 sum 368, 8.36 Mb left.  
- SAIL on B: 8903005.D1

1000 - thermometers read

1154 - An ctn MP17.

#18 Loops: S, Nut, ChlA, SCO<sub>2</sub>.

CTD #19 to 2003 m.

22 kt SW wind.

1254 - L-V MP17.

6387 - 0850 PST.

6462. 0910 PST.

3388. 0925 PST.

5970

8357 1009 PST

89/10/7 PDT

1620 Arr MP 18

#19 LOOPS

GD #20 to 2007 m

1820 0-1200 m hydro mess.

1933 1500-3700 m hydro mess

2109 Lr MP 18

2150 - RDI on D: PINGDATA.001 and 421 8.30 Mb logs

- SAIL on B: 8903006.D1, 417 records written.

- RDI %GD back up to 80 for upper 220 m.

8/10/89

0120

Str MP 19, h-frame light not working

Volume backup of CTD's done 10,820,570 bytes

in 19 files (#1 & 23). Excessive number of

retries. Changed 010-60 tape to another near end. 880

retries. Made volume backup of 1 MA files on DFC tape  
being used for file by file backup. 1,396,927 bytes in  
18 files, 0 retries.

Str MP 20. Printer ribbon came off print head - no  
printout of CTD #24.

Put new printer ribbon into Star R-10 printer

1337

Volume backup of CTD's using DFI tape (volume 10)  
11,524,954 bytes Track 2. 14 retries.

9/10/89

08:28

Release code sent, indicates release, Gassy conditions,  
wind 32 knots - marginal conditions, med swells

08:40

Nothing on surface yet - Wind 32 knots, med swells.

08:50

Alternate code sent, indicates release.

08:53

Top floatation on surface (30" buoy)

11:20

Part of mooring aboard (released)

RKB

The conditions for recovery were at best, marginal  
and tangles occurred around every current meter

9 Oct 89 POT

0830 changed 2500 m unprotected from  $\rightarrow$  3264  
changed 50 m protected 3137  $\rightarrow$  3132 (3137 reads  
high)

hydro pump feed wheel 312 mm dia  $5/32" = .15625"$   
 $C = \pi D$   $.078125"$   
 $\frac{1000}{\pi}$  D should be  $318 - 1.95 =$   
316 mm

3500 mechanical = 3470 digital = .86% error

0422 MIP22 loop samples correct.

Wind down Barometer 1017 wind  
 $\approx$  20 Knts 251° variable to 30 Knts.

89/10/9 P.d.t. (cont.)

DEPI recovery cont. The tangles appeared to be caused by the large swells combined with the lack of tension during the intervals between release and initial recovery.

Because of conditions the buoying was recovered top first, necessitating reversing all the lines on the winches (329, winding winch)

the top floatation appeared to be at about 50 meters - will drop down to 100m if data plot confirms small vertical excursions

Calibrated data shows 600m instrument steady at 598 or 599m depth. However top instrument (200m) shows minimum depth of 186.3m and a maximum excursion to 195.5m. Therefore the excursion is only 9 or 10 meters at most. It is not known why there is a 14 meter discrepancy between the two instruments. Probably either a shift in one of the calibrations or a mistake in the line lengths; calculations checked and are OK.

Assuming 200m depth is actually 186m. The top 30" ORE buoy would have been at 37.7m depth. On re-deployment the top floatation was deepened by 50m, bringing the top buoy down to 87.7m, minimum depth.

The bottom 30" ORE was moved up to within 20m of the top 30". The ID glass spheres are now 10m below the 2nd 30" ORE or 30m below the top 30" ORE.

The crew witness buoy replaced witness buoy No. 3732. Checked - OK.

The VHF Transmitter is channel 70 checked OK.

89/10/9 PDT

1646 - CTD #26 at QGP1 mooring deployment site.  
2007 - RDI on D:PINGDATA.001 end 606, 8.11 Mb left.  
-SAIL on B:8903007.D2, 809 rec. written.

2225 - Arr. Stn. MP21.

#22 Loop samples: S, Nut, chlA,  $SCO_2$

CTD #26 to 2004 m. - Very well mixed 40m  
Wind 20 kt 290°. Surface layer.

2329 - Lw MP21.

89/10/10 PDT

0830 - shut vent valve on RDI transducer  
well to prevent flooding crew's heads.

0836 - RDI on D:PINGDATA.002 end 656, 8.06 Mb written  
SAIL on B:8903008.D1, 2135 records written  
(wind 30-40 kt 260°, ship speed reduced to 3.6 kt)

1420 XBT launched, good 750m, Transmitted

2222 - RDI on D:PINGDATA.002 end 711, 8.00 Mb left  
SAIL on B:8903009.D1, 413 records written.  
(wind 20-30 kt 280°, ship speed 6 kt)

89/10/11 PDT

0833 - RDI on D:PINGDATA.002 end 752, 7.96 Mb left  
SAIL on B:8903009.D1, 3029 records written.  
(25 kt 270° wind)

2021 - RDI on D:PINGDATA.002 end 799, 7.91 Mb left  
SAIL on B:8903010.D1, 705 rec. written

89/10/12 PDT

0212 BEGAN LAUNCHING LOW COST DRIFTERS (4)  
0220 LAST DRIFTER OVER SIDE

## DAILY LOG

## OCEAN PHYSICS

## INSTITUTE OF OCEAN SCIENCES

| YEAR | 1989           | MONTH              | 10                   | TIME               | ZONE                | UTC      | SHIP                  | ARIZEAU        | CRUISE                 | 89-03         | PAGE     | OF                               |       |                                                                 |
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| 12   | W145-1         | 0912               | 46 59.96 N           | X                  | X                   | 24       |                       |                |                        |               |          |                                  |       | Loop samples (Sal, nut + chl a)<br>4 Low Cost drifters launched |
|      |                |                    | 144 59.91 W          | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 12   | W145-2         | 1150               | 47 20.0              | X                  | X                   | 25       |                       |                |                        |               |          |                                  |       | 11                                                              |
|      |                |                    | 145 00.4             | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 12   | W145-3         | 1420               | 47 40.3              | X                  | X                   | 26       |                       |                |                        |               |          |                                  |       | 11                                                              |
|      |                |                    | 144 59.6             | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 12   | W145-4         | 1705               | 48 00.28             | X                  | X                   | 27       |                       |                |                        |               |          |                                  |       | 11                                                              |
|      |                |                    | 144 59.27            | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 12   | W145-5         | 2115               | 48 30.0              | X                  | X                   | 28       |                       |                |                        |               |          |                                  |       | Loop samples<br>(sal, nut, chl a)                               |
|      |                |                    | 145 00.7             | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 13   | W145-6         | 0040               | 48 59.9 N            | X                  | X                   | 29       |                       |                |                        |               |          |                                  |       | 11                                                              |
|      |                |                    | 145 00.0 W           | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 13   | W145-7         | 0401               | 49 30.05             | X                  | X                   | 30       |                       |                |                        |               |          |                                  |       | 11                                                              |
|      |                |                    | 145 00.63            | X                  | X                   |          |                       |                |                        |               |          |                                  |       |                                                                 |
| 14   | MP26           | 4200               | 01:06 50 00.00       | 28                 | 01:17 29            | 0250     | X                     | 1092           | 12.982                 | 1295          | 91       |                                  |       |                                                                 |
|      |                |                    | 01:40 145 00.00      | 2001               | 01:17 4200          | 0250     | X                     | 2023           | 32.570                 | 32442         | 117      |                                  |       |                                                                 |
| 14   | MP26           | 4263               | 0634 50 00.12        | 30                 | 0636 31             | 10:14    | X                     | 2024           | 12.95                  | 1290          | 118      |                                  |       | LORAN JUMPY:                                                    |
|      |                |                    | 144 59.75            |                    | 0636 4200           | 10:14    | X                     | 2080           | 32.564                 | 32435         | 144      |                                  |       | ±.1'N ±.3'W                                                     |
| 14   | MP26           | 4263               | 12:09 49 59.85       | 32                 | 11:46               |          | X                     |                | 12.943                 | 1285          |          |                                  |       | LORAN ?                                                         |
|      |                |                    | 144 58.29            |                    |                     |          | X                     |                | 32.564                 | 32.487        |          |                                  |       | CTD at end of 2nd Deplcut                                       |
|      |                |                    |                      |                    |                     |          |                       |                |                        |               |          |                                  |       |                                                                 |

89/10/12 PDT

0223 LOOP SAMPLES CHLOROPHYL NUTRIENTS & SAL.  
POGN 46°59.96 N 144°59.91 W

0437 - BEGAN DEPLOYING (4) LIGHT WEIGHT DRIFTERS

0445 - LAST DRIFTER DEPLOYED

0450 - LOOP SAMPLES TAKEN NO. 25; CHLOR., NUT. & SAL.  
\* POSITION 47°20.00' N 145°00.4' W

0710 - BEGAN DEPLOYING (4) LIGHT WEIGHT DRIFTERS

0716 - LAST DRIFTER DEPLOYED

0720 - LOOP SAMPLES TAKEN NO. 26 CHLOR, NUT, S<sup>o</sup>100  
\* POSITION 47°40.3' N 144°59.6' W

\* LORAN C "JUMPY"

0905 - RDI on D: PINGDATA.002 end 850 7.86 Mb left  
- SAIL on B: 8903010.D1, 3956 records written

0952 - BEGIN DEPLOYING 2 HOLEY SOCK + 2 MINI-STAR DRIFTERS <sup>11589</sup>  
47 59.92 N 144 59.95 W

1002 - LAST DRIFTER DEPLOYED

48 00.28 N 144 59.27 W

1005 - #27 LOOPS TAKEN: S, NUT, CHL.

1409 XBT launched

1415 - Loop samples #28 at 48°30.0 N, 145 00.7 W

1740 Loop samples #29 at 48 59.9 145 00.0 W

2015 RDI on D: PINGDATA.002 end 895; 7.81 Mb left  
SAIL on B: 8903011.D1; 665 rec. written

— There is noise coming from the disc drive area of the RDI AST.

2101 - #30 Loop samples (S, NUT, CHL): 49°30.05' N / 145°00.63' W

2330 - An FOSTAR loc

2340 - begin FOSTAR deployment

89/10/13/0036 - FOSTAR released 49° 49.00' N 144° 46.83' W

89/10/13 PDT

0724: STN P26, start Productivity cast to 100 m,  
Bottle by Bottle.

0810: Cast complete.

0842: new floating incubator launched.

0905: RDI on D: AINSDATA-003 end 946, 7.76 Mb left  
SAIL on B: 8903011-D1, 3924 rec. written.

0917: Release cable transmitted to SED TRAP mooring

1200: SED TRAP mooring all on board.

1419: PRIM PROD recovery begins.

1424: PRIM PROD recovered.

THE OCCASIONAL VELLELLA FLOATED BY P26 TODAY -

1605: Andy's STD drogues with current meters top  
+ bottom launched 5000.75 m 14500.46 m

18:04 P26 CTD cast and Hydro

1958 0-1500m messenger

2132 2000-4250 m messenger. (Pinger is 6 m  
below 4200 m bottle.) (SDR: 4263 m; pinger 90 m  
off bottom with 5° wire angle.)

2144: RDI on D: AINSDATA-003 end 997; 7.71 Mb left  
SAIL on B: 8903012-D1, 1061 rec. written.  
(RDI disc drive more loaded)

2156: SDR: 4263 m; pinger 125 m off bottom with  
20° wire angle. Coming up.

2334: on STN P26 for CTD.

89/10/14 0030 CTD completed

0124 Hydro Start

14/10/89

2 Hydro Casts completed

Samples of Sal,  $O_2$ ,  $PCO_2$ , Nutrients taken  
on the first cast

CTD #30

Second hydro samples ALK,  $O_2$ , Sal, Nutrients

CTD #32 to end series on P26

Station complete at 05:40 P.D.T.  
14/10/89

Wind 14 to 20 Knts Pressure 1023 Mb  
Dir  $175^\circ$  Sea low swell 1 to 2 metre.

89/10/14 PDT

0800 - RDI on D:PINGDATA.003 ens 1038, 7.66 Mb left  
- SAIL on B:8903012-D1, 3683 rec. written  
(RDI's AST disc noise varies with ship's motion)

1050 - begin deployment SED TRAP MOORING.

1210 - wheels away.

$50^\circ 04.33' N$ ,  $144^\circ 59.32' W$ .  
4230 m on sounder.

1922 - 800 m tritium cast

~ 2100 - 3000 m "Seawater Standard" cast.

89/10/15 PDT

0827 - RDI on D:PINGDATA.003 ens 1136, 7.56 Mb left  
SAIL on B:8903013-D1, 3805 rec. written  
(RDI AST drive noisier)

89/10/15 PDT

0925 - sighted 1 STD drifting buoy.

1020 out of water (short heavy sock + ball)

1040 Sail trifter out of water

1120 3rd STD drifter on board. (long sock +  
spun)

1830 - begin OCEANO release testing on hydro  
- tested 15U to 4000 m. wire.

2110 - saw 0.8 m sun fish at surface  
near chains. Also saw a few Vellellas,  
a few squid.

2132 - 15U on board.

2140 - begin testing 16U to 4000 m.

2307 - 16U on board.

2312 - begin testing 19U to 4000 m.

89/10/16 PDT

0042 - 19U on board.

- testing complete for now.

0117: RDT on D: PINGDATA.003 end 1203, 7.49 Mb left.  
SAIL on B: 8903014.D1, 1838 rec. written.

0849: RDT on D: PINGDATA.003, end 1233, 4.47 Mb left.  
SAIL on B: 8903014.D1, 3772 rec. written.

0920: begin recovery of FDSTAR

0950: FDSTAR on board.

### DECISION TIME:

OPTION 1: VICTORIA FRI, MORNING VIA LINE P

OPTION 2: BAMFIELD SUN, VIA LINE K.

SUS chooses option 2.

16 Oct 89 PDT

1242 Sh 41. CTD #34  
loop remote temp reading high  
wind 20 knots at 266. Large swell

2019 RDI on D:PINGDATA.000 end 1279, 7.4 Mb left.  
SAIL on B:8903015.D1, 256 rec. written.

2154 Arr. stn MP49  
#33 loop samples. S, Nut, Chl A.  
CTD #36 to 1503 m.  
Wind 26-30 kt. at 235°

2232 LV MP49

17/OCT/89. PDT.

0115 ARRIVE MP33

CTD TO 1500 m LOOP SAMPLES S, Nut, Chl A  
WIND 9 knots

0201 LV MP33

0758 ARR MR19

#36 loop samples. S, Nut, Chl A.

CTD #37 to 1505 m.

Wind 15-30 kt at 300° Clouds, darkness, light  
hills of water everywhere

0852 LV MR19

- NOTICED temp sensor on CTD is dangling.  
Replaced both screws with screws stolen  
from spare CTD.

0926 - RDI is OFF. (SUSPECT power failure during  
the night).

- Hard reset RDI AST

- Copied D:PINGDATA.000 to .004 onto the  
bernoulli disc in e: (46336 bytes)

0942 - restarted ADCP program.

0945 - SAIL on B:8903015.D1; 3713 rec. written.

0958 - RDI on D:PINGDATA.004 end 1

New software indicator new data being appended to old file.

| YEAR | 89             | MONTH              | 10                   | TIME               | ZONE                | UTC      | SHIP                  | CRUISE         | 89-03                  | PAGE          | OF       |                                  |                                |
|------|----------------|--------------------|----------------------|--------------------|---------------------|----------|-----------------------|----------------|------------------------|---------------|----------|----------------------------------|--------------------------------|
| DAY  | STATION NUMBER | DEPTH SOUNDING (M) | SHIP STOP/START TIME | LATITUDE/LONGITUDE | STD CONSEC. #/DEPTH | STD TIME | HYDRO CONSEC. #/DEPTH | MESSANGER TIME | SALINITY #/CALIBRATION | LOOP OR DEPTH | OXYGEN # | SURFACE TEMPERATURE/<br>SALINITY | NOTES                          |
| 14   | MP26           |                    | 5000.0               | 33                 | 2108                | X        |                       |                | 12.937                 | 1287          |          | 1287                             | XBT testing done               |
|      |                |                    | 14500.0              | 2015               |                     |          |                       |                | 32.568                 | 32.460        |          |                                  |                                |
| 16   | MP41           | 2140               | 5027.51              | 34                 | 2142                | X        |                       | 31             | 12.461                 | 13.22         |          |                                  |                                |
|      |                | 2223               | 144 59.6             | 1564               |                     |          |                       |                | 32.544                 | 32.453        |          |                                  |                                |
| 17   | MP32           | 0110               | 5054.13              | 35                 |                     | X        |                       | 32             | 12.218                 | 12.41         |          |                                  | Wind 20 Knts 259°              |
|      |                | 0154               | 144 59.64            | 1500               | 0114                |          |                       |                | 32.573                 | 32.476        |          |                                  | Sea Heavy swell ~ 12 ft 3.5 m. |
| 17   | MP49           | 4040               | 0454                 | 5053.77            | 36                  | 0455     | X                     | 33             | 12.071                 | 12.19         |          |                                  |                                |
|      |                |                    | 0532                 | 144 16.60          | 1503                |          |                       |                | 32.551                 | 32.451        |          |                                  |                                |
| 17   | MP33           |                    | 0815                 | 5054.01            | 37                  | 0821     | X                     | 34             | 11.730                 | 11.76         |          |                                  |                                |
|      |                |                    | 0901                 | 143 34.04          | 1505                |          |                       |                | 32.566                 | 32.483        |          |                                  |                                |
| 17   | MR20           | 3500               | 11.12                | 5055.45            | 38                  | 11.15    | X                     | 35             | 12.328                 | 12.32         |          |                                  | Loop Samples                   |
|      |                |                    | 1205                 | 143 01.79          | 1500                |          |                       |                | 32.544                 | 32.446        |          |                                  | Wind 23 Knts Mod Swell         |
| 17   | MR19           | 3920               | 1458                 | 5058.11            | 39                  | 1503     | X                     | 36             | 12.476                 | 12.45         |          |                                  |                                |
|      |                |                    | 1552                 | 142 19.76          | 1505                |          |                       |                | 32.567                 | 32.457        |          |                                  | kxx                            |
| 17   | MR18           | 3854               | 1945                 | 5100.13            | 40                  |          |                       | 37             | 12.509                 | 12.49         |          |                                  | loop samples.                  |
|      |                |                    | 2026                 | 141 38.59          | 1514                | 1947     |                       |                | 32.551                 | 32.447        |          |                                  | kxx                            |
| 17   | MR17           | 3868               | 2250                 | 5102.02            | 41                  | 2307     | X                     | 38             | 12.619                 | 12.59         |          |                                  | loop samples                   |
|      |                |                    | 2350                 | 140 55.94          | 1505                |          |                       |                | 32.517                 | 32.404        |          |                                  |                                |
| 18   | MR16           | 3808               | 0232                 | 5103.96            | 42                  | 0235     | X                     | 39             | 12.271                 | 12.24         |          |                                  | Loop samples.                  |
|      |                |                    | 0318                 | 140 14.08          | 1502                |          |                       |                | 32.578                 | 32.450        |          |                                  |                                |
| 18   | MR15           |                    | 0624                 | 5106.23            | 43                  | 0635     |                       | 40             | 12.972                 | 12.90         |          |                                  | LOOP SAMPLES                   |
|      |                |                    | 0713                 | 139 30.62          | 1505                |          |                       |                | 32.492                 | 32.387        |          |                                  | KELP                           |
| 18   | MR14           |                    | 1007                 | 5109.0             | 44                  | 1010     |                       | 41             | 12.855                 | 12.78         |          |                                  | loop samples.                  |
|      |                |                    | 1047                 | 13847.35           | 1510                |          |                       |                | 32.497                 | 32.388        |          |                                  |                                |

89/10/17 PDT

1245 Sta MR18. 40-45 m angle  
1830 m wire out & get CTD @ 1500 m  
swell 6 m.

1626 Station MR17 30° L on CTD wire to  
Port. Wind 237° at 25 Knts Sea Mod swell.  
2(20ft) 6 m.

1932 An Sta MR16  
#39 Loop samples  
CTD #42 to 1502 m

2018 LV MR16

2021 RDI on D:PINGDATA.004 ems 42, 7.35 Mb left  
SAIL on B:8903016.D1, 622 rec. written.

2328 ARRIVE MR15.  
CTD TO 1500 m loop samples.

18/10/89 PDT.

0013 LV. MR15.

0640 MR13 STD

No HYDRO Due to High wind and sea conditions  
Wind 24 to 30 Knts at 239° ALSO DARK  
AND Reg is chicken

After 101 retrys, QIC-60 gave up trying to back  
up D:8903045.CTD & Tape is probably frapped.

0834 RDI on D:PINGDATA.004 ems 91, 7.30 Mb left  
SAIL on B:8903016.D1, 3761 rec. written.

1000 An Sta MR12  
#43 Loop samples: S, Nut, ChlA.  
CTD #46 to 1506 m. wind 15-33 kt 190-230°

1040 LV MR12

29/10/18 PDT

QIC-60 Found data in unexpected place,  
wouldn't back up. 46.

Changed to VOL backup tape; backed up 45, 46.

MR10

ARR 16:40 PDT Loop Samples taken

Calibration bottle on CTD wire will Trip  
at 20 m on way in (up cast)  
46 metre of mixed water. @  $\approx 13^{\circ}\text{C}$

STD

| Time  | Depth | Temp   | Ratio  | Salinity | Time<br>Messenger |
|-------|-------|--------|--------|----------|-------------------|
| 00:33 | 20    | 13.330 | .89510 | 32.287   | 00:33             |

Salinity calibration bottle #46  
NOTE — thermometer range too low ( $10^{\circ}$ ) for  
surface mixed layer ( $13.3^{\circ}$ ).

19:52

Thermometers changed on CTD bottle to  
 $15^{\circ}$  thermometer

2041 — ARR STD MR09

#47 Loop samples: S, Nut, Chl A.

CTD #49 to 1504 m: 15 kt wind 240°: jellyfish.

2053 — RDI on D: PINGDATA.004 end 140, 7.25 Mlb left  
SAIL on B: 8903017-D1, 821 rec. written.

2200 — messenger, hydro cast 0-1200 m. ( $\text{S}, \text{O}_2$ )  
RAINING LIKE HELL.

2314 — messenger, hydro cast 1800-3000 m ( $\text{S}, \text{O}_2$ )  
RAINING LIKE HELL. 35 kt 256°

0003 — L-5 MR09.

MR07

Calibration bottle on CTD wire

| Time  | Depth | Temp   | Ratio  | Sal    | Mass time |
|-------|-------|--------|--------|--------|-----------|
| 13.58 | 20    | 13.094 | .89157 | 32.338 | 14.06     |
| 14.06 | 20    | 13.092 | .89151 | 32.340 |           |
|       | 20    | 13.099 | .89157 | 32.341 |           |
|       | 20    | 13.098 | .89148 | 32.340 |           |

| LEFT |      |       | MIDDLE |      |       |
|------|------|-------|--------|------|-------|
| SN   | aux  | main  | SN     | aux  | main  |
| 5641 | 17.7 | 13.15 | 11570  | 17.7 | 12.30 |
|      | 17.7 | 13.16 |        | 17.8 | 12.29 |

MR06

CTD CAL SAMPLE

Screen values; IDLE MODE:

| TIME | DEPTH | TEMP   | RATIO   | SAL    | Mass time |
|------|-------|--------|---------|--------|-----------|
| 1017 | 27.   | 13.289 | 0.89291 | 32.233 | 1025      |
| 1022 | 25    | 13.292 | 0.89290 | 32.232 |           |
| 1024 | 26    | 13.288 | 0.89288 | 32.231 |           |
| 1025 | 26.6  | 13.291 | 0.89292 | 32.233 |           |

5641

11570

6566

21.4 13.42

21.3 13.04

20.6 13.70

21.4 13.43

21.4 13.04

20.6 13.70

| YEAR | 89             | MONTH              | 10                   | TIME               | ZONE                | UTC      | SHIP                  | PARIZEAN       | CRUISE                 | 89-03         | PAGE     | OF                      |          |             |                                                             |
|------|----------------|--------------------|----------------------|--------------------|---------------------|----------|-----------------------|----------------|------------------------|---------------|----------|-------------------------|----------|-------------|-------------------------------------------------------------|
| DAY  | STATION NUMBER | DEPTH SOUNDING (M) | SHIP STOP/START TIME | LATITUDE/LONGITUDE | STD CONSEC. #/DEPTH | STD TIME | HYDRO CONSEC. #/DEPTH | MESSANGER TIME | SALINITY #/CALIBRATION | LOOP OR DEPTH | OXYGEN # | SURFACE TEMPERATURE/CTD | SALINITY | HYDRO SAL # | NOTES                                                       |
| 18   | MR13           | 1328               | 51 11 00             | 45                 | 1330                | X        | X                     | 42             | 12.604                 | 12.54         |          |                         |          |             | Loop Samples,<br>} NOT ON F&F TAPE.                         |
|      |                | 1420               | 138 06 09            | 1512               |                     | X        |                       |                | 32.493                 | 32.450        |          |                         |          |             |                                                             |
| 18   | MR12           | 3467               | 1700                 | 51 12.56           | 46                  | 1703     | X                     | 43             | 12.292                 | 12.22         |          |                         |          |             | } Backed up on<br>VOL. TAPE.                                |
|      |                | 1740               | 137 23.94            | 1506               |                     | X        |                       |                | 32.522                 | 32.483        |          |                         |          |             |                                                             |
| 18   | MR11           | 3650               | 2024                 | 51 14.94           | 47                  | 2028     | X                     | 44             | 12.750                 | 12.68         |          |                         |          |             | Loop Samples                                                |
|      |                | 2105               | 136 40.01            | 1512               |                     | X        |                       |                | 32.533                 | 32.486        |          |                         |          |             |                                                             |
| 18   | MR10           | 3655               | 2340                 | 51 17.01           | 048                 | 2349     | X                     | 45             | 13.323                 | 13.23         |          |                         |          |             | Bottle on CTD WIRE<br>Trip at 20m see notes<br>Loop Samples |
|      |                |                    | 135 05.74            | 1503               |                     | X        |                       | 46             | 32.278                 | 32.238        |          |                         |          |             |                                                             |
| 19   | MR09           | 3510               | 0341                 | 51 18.83           | 49                  | 0345     | 50                    | 47             | 1092                   | 12.720        | 12.64    | 145                     |          |             | KKXX                                                        |
|      |                |                    | 0703                 | 135 15.11          | 1504                |          | 3000                  | 0500           | 2019                   | 32.252        | 32.196   | 167                     |          |             |                                                             |
| 19   | MR08           | 3370               | 0940                 | 51 21.33           | 51                  | 0948     | X                     | 48             | 12.974                 | 12.91         |          |                         |          |             | loop samples                                                |
|      |                |                    | 1024                 | 134 32.52          | 1515                |          | X                     |                | 32.321                 | 32.266        |          |                         |          |             |                                                             |
| 19   | MR07           | 3195               | 1315                 | 51 23.42           | 52                  | 1318     | X                     | 49             | 13.121                 | 13.04         |          |                         |          |             | CALIBRATION BOTTLE<br>20M Sal # 50<br>Loop Samples          |
|      |                |                    |                      | 133 49.23          |                     |          | X                     | 50             | 32.329                 | 32.274        |          |                         |          |             |                                                             |
| 19   | MR06           | 2982               | 1638                 | 51 25.45           | 53                  | 1641     | /                     | 51             | 13.291                 | 13.22         |          |                         |          |             | CAL BOTTLE 20M:<br>SAL # 52                                 |
|      |                |                    | 1730                 | 133 06.56          | 1505                |          | /                     | 52             | 32.222                 | 32.147        |          |                         |          |             |                                                             |
| 19   | MJ05           | 2760               | 2010                 | 51 27.55           | 54                  | 2013     | /                     | 53             | 13.140                 | 13.08         | 106.45   |                         |          |             | loop samples<br>Power failure KKXX                          |
|      |                |                    | 2043                 | 132 24.10          | 1515                |          | /                     |                | 32.225                 | 32.123        |          |                         |          |             |                                                             |
| 19   | MJ04           | 2570               | 2211                 | 51 35.58           | 55                  | 2213     | /                     | 54             | 11.784                 | 11.73         |          |                         |          |             | loop samples.<br>8/48                                       |
|      |                |                    | 2248                 | 132 06.68          | 1519                |          | /                     |                | 32.013                 | 31.929        |          |                         |          |             |                                                             |
| 20   | MJ03           | 2350               | 0005                 | 51 43.58           | 056                 | 0018     | 57                    | 2057           | 12.411                 | 12.33         | 168      |                         |          |             | XBT comparison<br>KKXX 57.45                                |
|      |                |                    |                      | 131 50.21          | 2002                |          | 2000                  | 0202           | 2071                   | 32.042        | 31.929   | 188                     |          |             |                                                             |
| 20   | MJ2A           | 2037               | 0334                 | 51 47.38           | 58                  | 0336     | /                     | 55             | 11.383                 | 11.36         | 44.02    |                         |          |             |                                                             |
|      |                |                    | 0424                 | 131 40.18          | 2002                |          | /                     |                | 32.148                 | 32.022        |          |                         |          |             |                                                             |

19 October

0240 Stn MR08. Afterdeck laptop controlled by serial panel near engine room (#13)

0852 RDI on D:PINGDATA.004 end 183, 7.20 Mb left  
SAL on B:8903017.D1, 3900 rec. written.

0938 Arr stn MR06. #51 loop samples: S, ChlA, Nut. 1015  
CTD #53 to 1505 m.

Cal. bottle 5 m above probe at 20 m.

1025 mess: 26.6 m, 13.291°C, 0.89292, 32.233‰.

1030 LV MR06.

1310 Stn MJ05 Power failure during up cast.  
John restarted RDI.  
Raining heavily.

2034 Arr Stn MJ2A.

#55 loop samples: S, Nut, ChlA.

CTD #58 to 2002 m. Saw a couple of SAURI.  
4 kt W. wind. SEAURI? SORRY? SEWRI? SORHI?

2124 LV MJ2A SORE-E?

2128: RDI on D:PINGDATA.004 end 30, 7.15 Mb left  
SAL on B:8903018.D1, 150 rec. written.

2211 Arr Stn MJ02

#56 loop samples: S, ChlA, Nut.

CTD #59 to 2007 m. 10 kt 250°.

2303 LV MJ02

2355 Station MJ1A CTD to within 5 m of bottom.

20 October

0109 Volume backup tried CTD's 24 to 60, unsuccessful  
Read or write fatal error  
No more tapes available for volume backup or  
file by file.

0512 M88 CTD to 1500 m

Back up to A Drive 890363.CTD  
Leaves 483K free on A.

0741 M103 CTD to 1503 m  
Backed up on A:  
Floppy full; replaced.

0821: RDI on D: PINGDATA.005 end 74, 7.10 Mb free  
SAIL on B: 8903018.D1, 2955 rec. written.

1014: An sta M89  
#62 loop samples: S, ChIA, Nut.  
CTD #65 to 1506 m. several Dahl porpoise,  
File backed up on A: Bull kelp.  
LW M89

1400 Transferred CTD's 25 to 48 to my computer  
14 Megs now available on D drive.

1948 An Sta MF05  
#65 loop samples: S, ChIA, Nut.  
CTD #68 to 1505 m. 1 Seagull.  
File backed up on A:

2029 LW MF05.

2033 RDI on D: PINGDATA.005 end 122, 7.05 Mb left  
SAIL on B: 8903019.D1, 546 rec. written

| YEAR | 89             | MONTH              | 10                   | TIME               | ZONE                | UTC      | SHIP                  | PARIZCAU       | CRUISE                 | 89 03         | PAGE     | OF                               |      |                                     |
|------|----------------|--------------------|----------------------|--------------------|---------------------|----------|-----------------------|----------------|------------------------|---------------|----------|----------------------------------|------|-------------------------------------|
| DAY  | STATION NUMBER | DEPTH SOUNDING (M) | SHIP STOP/START TIME | LATITUDE/LONGITUDE | STD CONSEC. #/DEPTH | STD TIME | HYDRO CONSEC. #/DEPTH | MESSINGER TIME | SALINITY #/CALIBRATION | LOOP OR DEPTH | OXYGEN # | SURFACE TEMPERATURE/<br>SALINITY | SMIL | NOTES                               |
| 20   | MJ02           | 2120               | 0511                 | 51 51.74           | 59                  | 0514     | /                     | 56             | 10947                  | 10.44         | 32.16    |                                  |      |                                     |
|      |                |                    | 0603                 | 131 32.47          | 2007                |          |                       |                | 32.222                 | 32.235        |          |                                  |      |                                     |
| 20   | MJ1A           | 1875               | 0648                 | 51 55.71           | 60                  |          | /                     | 57             | 11.115                 | 11.16         | 18.78    |                                  |      | loop samples.                       |
|      |                |                    | 0740                 | 131 22.71          | 1860                | 255      |                       |                | 32.200                 | 32.070        |          |                                  |      | kkxx                                |
| 20   | MJ01           | 655                | 0830                 | 51 59.96           | 61                  | 0834     | /                     | 58             | 11.537                 | 11.38         |          |                                  |      | loop samples                        |
|      |                |                    | 0853                 | 131 13.79          | 186                 |          |                       |                | 32.140                 | 32.032        | 5.82     |                                  |      | copied to A                         |
| 20   | MJ00           | 70                 | 0920                 | 52 02.08           | 62                  | 0923     | /                     | 59             | 10.870                 | 10.80         |          |                                  |      |                                     |
|      |                |                    | 0930                 | 131 09.88          | 85                  |          |                       |                | 32.215                 | 32.111        |          |                                  |      | copied to A                         |
| 20   | M 88           | 2030               | 1140                 | 51 41.72           | 63                  | 11:45    | X                     | 60             | 11.757                 | 11.68         |          |                                  |      | Loop samples                        |
|      |                |                    |                      | 131 13.76          |                     |          |                       |                | 32.154                 | 32.042        |          |                                  |      | COPIED TO A DRIVE<br>483K LEFT ON A |
| 20   | MI03           | 2455               | 1438                 | 51 23.23           | 64                  | 1441     | X                     | 61             | 13.221                 | 13.17         |          |                                  |      | Loop samples                        |
|      |                |                    | 1515                 | 131 13.97          | 1503                |          |                       |                | 32.175                 | 32.064        |          |                                  |      |                                     |
| 20   | M 89           | 2597               | 1714                 | 51 03.23           | 65                  | 1719     | /                     | 62             | 12.631                 | 12.57         |          |                                  |      |                                     |
|      |                |                    | 1756                 | 131 11.27          | 1506                |          |                       |                | 32.017                 | 31.908        |          |                                  |      |                                     |
| 20   | MM05           | 2637               | 1956                 | 50 42.83           | 66                  | 1957     | /                     | 63             | 12.846                 | 12.79         |          |                                  |      | loop samples                        |
|      |                |                    | 2034                 | 131 08.56          | 1521                |          |                       |                | 32.098                 | 31.985        |          |                                  |      | copied to A                         |
| 20   | MG05           | 2100               | 2309                 | 50 24.53           | 67                  | 23:12    | X                     | 64             | 13.912                 | 13.84         |          |                                  |      | Loop samples                        |
|      |                |                    | 23:55                | 130 37.45          | 1500                |          |                       |                | 32.363                 | 32.239        |          |                                  |      | Back up on A 731K left              |
| 21   | ME05           | 1842               | 0248                 | 50 06.03           | 68                  | 02:51    | /                     | 65             | 13.539                 | 13.48         |          |                                  |      | Loop samples                        |
|      |                |                    | 0329                 | 130 06.81          | 1505                |          |                       |                | 32.146                 | 32.021        |          |                                  |      | Backed up on A: 287K left           |
| 21   | ME05           | 2385               | 0551                 | 49 47.75           | 69                  | 0554     | /                     | 66             | 13.078                 | 13.03         |          |                                  |      | Backed up on A:                     |
|      |                |                    | 0630                 | 129 36.26          | 1503                |          |                       |                | 31.973                 | 31.839        |          |                                  |      | 773 K free.                         |
| 21   | MD06           | 2445               | 1015                 | 49 16.12           | 70                  | 1021     | /                     | 67             | 13.422                 | 13.39         |          |                                  |      | loop samples                        |
|      |                |                    | 1057                 | 129 09.25          | 1509                |          |                       |                | 32.030                 | 31.889        |          |                                  |      |                                     |

89/10/20 PDT

2251- An str MEOS.

# 66 Loop samples: S, ChlA, Nut.

CTD # 69 to 1503 m.

Backed up on A:

Several SAUR1;  
jellyfish.

2330 - L15 MEOS

21/10/89 PDT

0315 Str MD06 Weather is good, no wind, calm  
sea, slight swell. Northern lights putting on  
a show

0846 - RDI on D:PINGDATA.CDS end 171, 7.00 Mb Cyt  
SAIL on B:8903019.D1; 3699 rec. written.

1130 - An str MB07

#69 Loop samples: S, ChlA, Nut.

CTD # 72 to

m.

Kelp.

1320 Str MB06 Nail shower just over station.  
Winds increasing

22 October

0933 arrive pier 3, Port Alberni

$$\begin{array}{r} 26. \text{ hrs} \\ 29 \frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 268 \\ 130 \\ \hline 168 \end{array}$$

$$\begin{array}{r} 6800 \\ 1750 \cdot 24 \\ \hline 30 \text{ km} \end{array}$$

$$\begin{array}{r} 59 \text{ min} \\ \hline \end{array}$$

$$\begin{array}{r} 6.5 \\ 3.5 \\ \hline 10.0 \end{array}$$

[illegible]