

CRN

91-15

DAILY LOG

INSTITUTE OF OCEAN SCIENCES
OCEAN PHYSICS

DATE 17 Oct. to 1 Nov, 1991

VESSEL CNAV Endeavour

PROJECT WOCE/PAPA

Captain: McMUNAGLEFirst Officer: WOODMANSecond Officer: BRADLEY (12-4)Third Officer: CHAMPAGNE (8-12)BOATSWAIN: TOM JIVCOFFCruise Participants/Agencies: OCEAN PHYSICS, OCEAN CHEM, UBCScientific Personnel: Party Chief: RON BELLEGAY

Name	Watch	Cabin	Name	Watch	Cabin
RON BELLEGAY (O.Chem)	8-12	01-01	LES SPEARING	8-12	2-17
BERNARD MINKLEY (OP)	12-4	01-09	TIM SOUTAR		2-15
MIKE DEMPSEY (OCEANIC MEAS.)	4-8	2-16	ROBERT MUGO (UBC)		2-20
RON PERKIN (FSRG)	4-8	2-18			
HUGH McLEAN (UBC)	12-4	2-20			
JINPING WU (O.Chem)		2-21			

Second leg of cruise: Party Chief:

Third leg of cruise: Party Chief:

Data logging system: Unit number: 1Program version: 1.16CTD deck unit make: GUILDLINEmodel: 87107serial no.: 58610Computer make: HEWLETT PACKARDmodel: D1430Aserial no.: 2945A07169Monitor make: NEC

model:

serial no.:

Printer make: ROLAND

model:

serial no.:

1st CTD make: GUILDLINEmodel: 8706serial no.: 43 571

Temperature sensor

model: 87401serial no.: 46 707

coefficients: slope:

offset:

Conductivity sensor

model: 87410serial no.: 43 591

coefficients: slope:

offset:

Pressure sensor range:

psi

serial no.:

coefficients: FSP: 1500

dB

offset:

Transmissometer

model:

serial no.:

coefficients: slope:

offset:

Comments:

FSRG PROBE(FSRG LOGGING SYSTEM EDR #9250)

2nd CTD make: GUILDLINE model: 8715 serial no.: 58483/1
 Temperature sensor model: 87401 serial no.: 57915
 coefficients: slope: _____ offset: _____
 Conductivity sensor model: 87410 serial no.: 58814
 coefficients: slope: _____ offset: _____
 Pressure sensor range: 4500 psi serial no.: none visible — DGS 9/1/0/7
 coefficients: FSP: 3000 dB offset: _____
 Transmissometer model: _____ serial no.: _____
 coefficients: slope: _____ serial no.: _____

WINCHES:

CTD	make: <u>SWANN</u>	model: <u>329</u>	serial no.: <u>1482</u>
counter	make: <u>SYTECH</u>	model: <u>B31</u>	serial no.: <u>87002</u>
HYDRO	make: <u>SWANN</u>	model: <u>310</u>	serial no.: <u>1083</u>
counter	make: <u>REVLIS</u>	model: <u>NOT VISIBLE</u>	serial no.: <u>EDR 8763</u>
Spooling	make: <u>SWANN</u>	model: <u>455</u>	serial no.: <u>1451</u>
Drag	make: _____	model: _____	serial no.: _____
Other	make: <u>HARRISON 1</u> <u>ROBBINS</u>	model: <u>535</u>	serial no.: <u>589</u>

Salinometer make: _____ model: _____ serial no.: _____

SAIL System:

Program version: _____ Time zone: _____
 Sampling interval: _____ sec.
 CTF module no.: _____ serial no.: _____
 Remote temperature model: _____ serial no.: _____
 Flow sensor model: _____ serial no.: _____
 Other sensors: (special for this cruise)
 Name: _____ module I.D.: _____ serial no.: _____
 Name: _____ module I.D.: _____ serial no.: _____

Comments: - GPS = TRIMBLE "TRANSPAK GPS"

ADCP Setup:

Program version: _____ number of depth bins: _____
 Time zone: _____ bin length (2"): _____
 Sampling interval: _____ sec. pulse length: _____
 Blank beyond transmit: _____ pings per ensemble: _____
 Pulse cycle time: _____
 Percent pings good threshold: _____

Comments:

- Hydro winch readout takeoff is on wrong side of shaft; should be changed.
- CTD winch is slow: 1.2 m/s max.

PDT

91/10/17

1351

Depart Esquimaux. Sunny, no wind.
En route / STN P26 directly.

0000

91/10/20

SHIP'S TIME CHANGED FROM PDT TO PST
BY TURNING BACK ALL CLOCKS 1 HR.

0800

PST

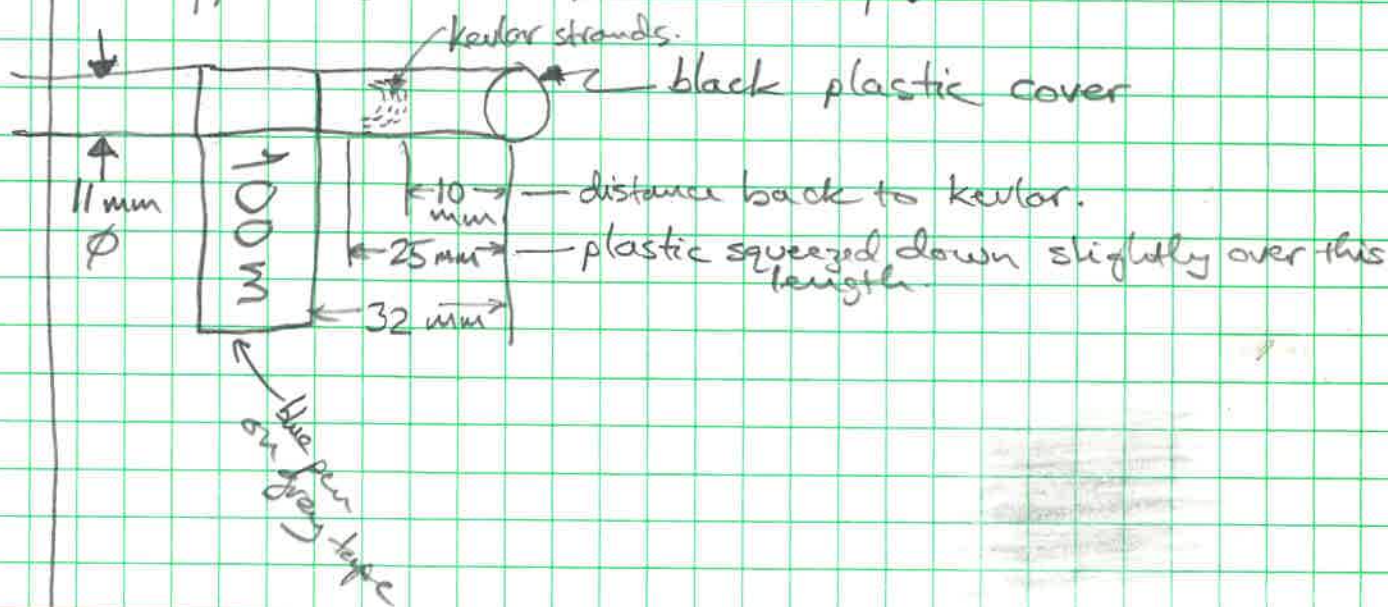
- O. Chun released stn P sed. trap mooring.

0900

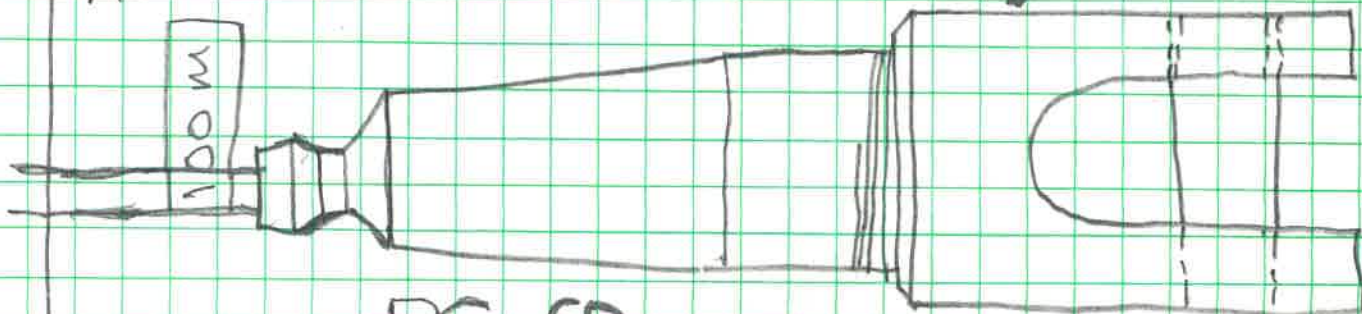
- glass floats alongside. wind 22 knots @ 327

0940

- mooring line parked at kevlar end termination
just above first sediment trap when trap
nearly at surface. Line and fittings were
supplied with German trap.



FITTING AT OTHER END:



MARKING:

PS 60
TF

ENGLAND

PS1

91/10/20 contd.

GPS positions:

0938 - $49^{\circ}57.73'N$ $144^{\circ}56.14'W$
 0941 - $49^{\circ}57.687'N$ $144^{\circ}56.095'W$

Conditions - est. 20 kt wind, 1 m waves on small swell.

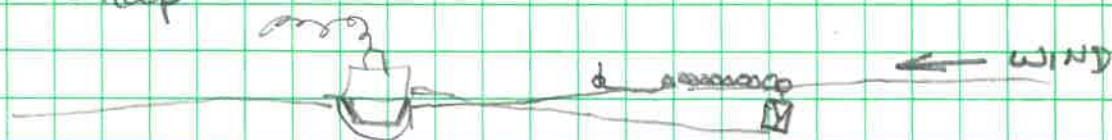
Diameter of hydro fueller wheel = 31.1 cm = circumference = 97.7
 CTD " = 30.9 cm wire = 8.4 mm

O.Chem. - Stn P sed. trap beacon CH.73.

1452 - Ch. 73 beacon launched.

1454 - 10 glass balls hand launched. Ship broadside

1455 - trap launched. Begin 400 m line. (16 kt ^{60°} wind)
 Ship drifted broadside with some bow thruster aid
 Glass balls are steaming toward us from trap



1509 = $49^{\circ}59.795'N$ } GPS = wheels
 $145^{\circ}15.851'W$ } away; little tension on system.

Steaming to Stn P for CTD-bottle cast - CTD set.

1550 - change of plans - now proceeding to
 Stn AG sediment trap mooring directly.

21/10/91

0843	at position	52 50.0	144 59.7
1204		53 22.8	144 59.4
2038		$54^{\circ}49.4'N$	$145^{\circ}00.0'W$

PST

21 Oct

2145

Station M209

2212

CTD to 1500 db

2300

hydro 0 to 1000

hydro 1200 to 4000

Winch spooler popped
out of gear, not noticed by winch operator.

22 Oct.

Boomer killed out to clean cable jam.

0410

CTD to 1500

duplicate oxygen and salinity taken from 4000
bottle.

YEAR	91	MONTH	10	TIME ZONE	UTC	SHIP	Endeavour	CRUISE	9115	PAGE	1	OF		
DAY	STATION IDENTIFICATION	DEPTH SOUNDING (m)	SHIP STOP/START TIME	LATITUDE/ LONGITUDE	STD CONSEC #	STD TIME	HYDRO CONSEC #	MESSENGER TIME	HYDRO SALINITY #	OXYGEN #	SURFACE TEMPERATURE/ SALINITY	bucket	1000 SALINITY #	NOTES
					1/2									test casts in lab.
22	MZ09	?		54 59.75 144 59.74	0667 0647	stop						Arctic probe		STOP POSITION 144 59.264 W 54 59.519 N
22	MZ09			54 57.88 144 57.31			1	0757	1 26	1003 1038				
22	MZ09			54 57.77 144 57.46		1504/210						Arctic probe		
23	MZ08			54 26.72 145 00.34	5	0220		O.P. PROBE			1			STOP TIME: 0249 STOP POS: 54 26.64 144 59.90
23	MZ07		0550 0654	54 00.15 145 00.15	7	0555 0620 (STOP)					2			no CTD # 6. ?
23	MZ06		0912 1015	53 32.69 144 59.99	8	0921					3			bucket samples taken.
23	MZ05		1240	53 05.86 145 00.28	9	1247					4			stop 0947 53 32.45 / 144 59.66 Bucket: 1255 Z 53 05.86 N 145 00.28 W Stop: 13112
23	MZ04		1600 1704	52 38.76 144 59.07	10	1606					5			bucket samples.
23	MZ03		1915 2013	52 12.02 144 58.47	11	1918					6			stop 1636 bucket samples.
23	MZ02		2210 2311	51 47.88 144 59.93	12	2217					7			2216 lag samples stop 2243 51 47.58 / 144 59.88
24	MZ01			51 21.08 144 59.97	13	0125					8			

9/10/21 PST

2145 - ARR STN AG.

9/10/22 PST

0816 - Sed. trap mooring released. 20 kt W wind.
BEACON CH. 71

0905 - mooring at surface

0950 - mooring on board.

1012 - 0 m POC bottle (10 l)
2, 5, 10, 20, 30, 50, 70, 100, 200, 300, 400, 600
800, 1000, 1200, 1500.
5°K

1206 - wind WNW 25 kt ↑

1254 - messenger away on 1500 m single 10/60 FLO

1321 Completed oxygen standardization.

1345 plankton tow complete

1355 move back to Abmooring site

1448 GPS 54°59.760'N 145°04.678'W

1449 54 59.761 145 04.675

72

1450 Sed. trap mooring Beacon buoy CH 72 launched.
Wind 15-25 kt WNW.

Ship broadside, drifting away from buoy.

1456 Trap launched.

1509 wheels away at GPS:

54°59.362'N 145°04.336'W

1513 LV STN AG, headed South.

CTD Stn M208

2050 Arr STN M207. Wind 18 kt WNW. RAINING.

CTD # 7 to 1503 m. #2 Loops: S, Chl, Nt.

2254 Lvmz SAURI, LG JELLYFISH, RAIN

Very small wire angle.

9/10/23 PST

- 0112 arriving Sta M206. CTD #8:
I had to brush out conductivity cell to get proper salinity
values. bucket sample taken. Wind 10 knots @ 290
Salinity data 0 to 75db looks suspicious compared to
nearest data which showed mixed layer.
- 0800 Arr. M204. #5 bucket samples: S, Chl A, 2 nwt. (plastic only)
CTD #10 to 1504 m. 10 kt NNW. wind.
Note pause at 1100 m for minor winch repair.
- 0904 LV M204.
- 1115 Arr M203 #6 bucket samples: S, Chl A, 2 plastic nwt.
CTD #11 to 1505 m. wind 6 kt N.
- 1144 5211.85, 144 58.15
- 1213 depart station
- 1250 moved GPS antenna from bridge deck to flight deck.
- 1410 Sta M202. CTD #12 to 1504 db.
- 1510 complete CTD. CTD pressure reads 2.0 db on deck.
- 1726 Sta M201 CTD #113.

24 Oct.

- 0126 arriving Sta MP26
- 0133 CTD to 1715 to correct poor wire lay on winch.
- 0235 complete CTD, waiting for "Orin" to change hoses.
- 0255 10 Lube GO-Fls to 50 m
Nurken bottle to 50 m
- 0306 HYDROCAST START
- 0329 LAST BOTTLE ON WIRE
- 0336 MESSENGER DOWN $< 12^\circ$
- 0343 cast started up.

DAILY LOG

OCEAN PHYSICS

INSTITUTE OF OCEAN SCIENCES

YEAR	MONTH	TIME ZONE	SHIP	CRUISE	PAGE	OF							
91	10	UTC	Endeavour	91-15	2	OF							
DAY	STATION IDENTIFICATION	DEPTH SOUNDING (m)	SHIP STOP/START TIME	LATITUDE/ LONGITUDE	STD CONSEC #	STD TIME	HYDRO CONSEC #	MESSENGER TIME	HYDRO SALINITY #	OXYGEN #	SURFACE TEMPERATURE/ SALINITY	BUCKET TEMP SALINITY #	NOTES
24	MP26	0925	50 00.17	145 00.03	14	0933		27			9		loop samples
	MP26		50 00.17	145 00.03			2	1136					
	MP26		49 58.90	145 00.94	15	1721							
	MP26		49 58.6	145 01.0	16	1850							Arctic probe
25	MP35	0930	50 00.00	144 17.92	17	0938					10		loop samples
25	MP25		50 00.1	143 36.2	18	1304					18		OP PROBE
25	MP25		50 00.2	143 36.1	1519	1425					19		ARCTIC PROBE
25	MP24	1847	49 50.29	142 40.74	1520	1856					20		ARCTIC PROBE + SYSTEM
25	MP23	2326	49 46.09	141 39.82	21	2331				12.323			" "
	MP23		49 46.01	141 39.88	22					32.278			600-1500 data questionable
26	MP23		49 45.7	141 39.7	1523	0027 0053 (STOP)							SWITCHED TO ARCTIC SYSTEM
26	MP22	0450	49 42.12	140 40.04	1524	0501					26		ARCTIC PROBE + SYSTEM

9/10/24 PST

0433 49 59.38 144 59.44

0503 deep cast (1200 - 4200 m) messenger away
49 59.12 144 59.23
min 215°

0530 start bring up deep cast. Wind 20 knots @ 280
49 58.91 144 59.14

0600 2000 m bottle messenger did not slide down wire.

0618 messenger sent (Cast 3 2500 - 4200 m)
49 58.52 144 58.96

0648 start bring up deep cast
49 58.46 144 59.11

0830 removed thermistors from Arctic probe. They had both failed.

0800 - 0830 POC, nut, primary productivity water cast to 100 m (10-L. GO FLOWS).

0855 - 0859 P.PROD. INCUBATOR LAUNCHED AT $49^{\circ} 59.15' N$
(CH.70 BEACON) $145^{\circ} 00.76' W$

#15
0921 CTD to 2018 Jb
stop position 49 58.75 145 00.75
1034 complete CTD.

1050 - 1150 : CTD with ARCTIC PROBE + ROSETTE.

1200 - 1500 Complete POC CAST TO 1500 m.

1500 - 1545 Search + Retrieved incubator for primary productivity.

1600 - 2230 : UBC TRACE METALS CASTS.
Wind 35-40 kt. NW. since about 1800.
Forecast to continue GALE force.
Headed for P35.

0138 CTD at stn MP35
0146 49 59.95 144 17.89 Bucket samples for S, Nut & chl.

Wind 30 knots @ 330°
wave angle very good.

0233 complete CTD.

0504 CTD #18 at MP25 (O.P. probe).
Salinity offset noticed at 1500 m.
Returned to surface and changed to
Arctic probe.

0625 Arctic probe CTD #1519 to 1500 m. using Arctic
#0730 LV MP25. program.
WIND NW @ 30 KTS.

1047 Stn MP24. #20 ^{BUCKET:} Loops: S, chl A, 2 plastic Nutrients,
CTD #1520 to 1500 m. using Arctic probe + program.
Wind: 25 kt NNW. throughout stn.
1154 LV. MP24.

1530 STN MP23 TRIED logging a CTD but the computer
locked up at 750 m. Tried logging 750 - 1500 m
but had more problems with the config. pressure
slope. Switched to Arctic deck unit and logged
file CTD-1523.BIN. STOP AT BOTTOM @ 0053Z, Oct. 26

to 2050 - Meeting with Captain 1st mate to discuss QEP meetings.

2050 STN MP22. #26 BUCKET SAMPLE: S, chl A, 2 plastic Nutrients,
CTD #1524 to 1500 m using Arctic probe + program.
Wind 15-20 kt N.

2157 LV MP22.

0117 CTD 1525 at stn MP21
0127 bucket samples 4938.21 13939.99
Wind 16 knots @ 350.

YEAR	91	MONTH	10	TIME ZONE	UTC	SHIP	Endeavour	CRUISE	91-15	PAGE	3 OF		
DAY	STATION IDENTIFICATION	DEPTH SOUNDING (m)	SHIP STOP/START TIME	LATITUDE/ LONGITUDE	STD CONSEC #	STD TIME	HYDRO CONSEC #	MESSENGER TIME	HYDRO SALINITY #	OXYGEN #	SURFACE TEMPERATURE/ SALINITY	BUCKET TEMP SALINITY #	NOTES
26	MP21	0917 1018	49 38.16 139 39.76	1525	0924						25		
27	MP20	0225 138 48.3	49 34.0 1526	0250							26		
27	MP20		49 33.59 138 39.50		3	0525	56 73	1003 1029					0 to 500, @ 0421 0 to 1000 m
27	MP20		49 33.32 138 38.79			0657	74 85	1030 1043					1200 to 3800
27	MP20		49 33.24 138 38.85	1527	0824								
27	MP20			28									
28	MP20	0219		1529	0222								header has old position
28	MP19		49 29.70 137 39.93	1530	0925						30		
				</									

9/10/26 PST

0725 - initial ranges on mooring QEP1-E. (5 cm/s)

0809 - released 960.

0811 - top buoy in sight

0907 - hooked onto first buoy (start recovery), top first
- last kevlar line wound directly onto
spooling winch. (not enough room on recovery winch)

1213 - recovery complete; releases on board.

1215 depart for QEP3-A (bottom only).

1447 - ranging on QEP3-A.

1458 - released 190. (based on very faint range returns)

1538 - believe buoys on surface.

1604 - proceed to GPS position. Buoys sighted.

1614 - recovery complete; releases on board.

1835 - arr P20.

1850 - CTD 1526 to 1500 m with Rosette

2021 hydro to 500 m for TCO_2 and nutrients
hydro 0 - 1000 for Sal & O_2

2155 hydro mishap developed oil leak.
300 m Baskin bottom cap does not seal.
hydro 1200 to 3800 m.
CTD # 1527 (Arctic probe)

0133 CTD # 28 (Physics probe) - Bad. salinity. Removed
conductivity cell plug, filled bulkhead connector with grease.
plug fits into connector too easily. Upcast salinity lower
than down cast data. CTD probe # 58483 has a
problem.

0225 complete CTD, depart for mooring site.

9/10/27 PST

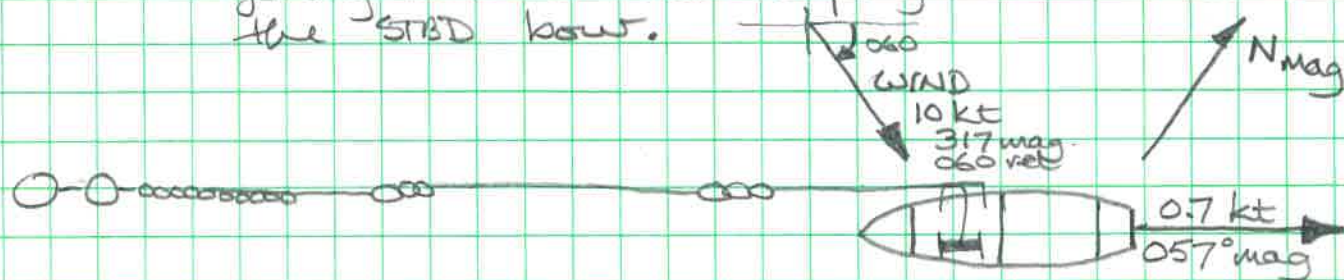
- 0644 - began ranging on QEP2-A.
- 0819 - released 15U @ 500m horizontal range
- 0822 - 3 buoys on surface.
- 1150 - recovery complete, all of mooring on deck.
- 1155 - proceed to QEP1-F site.

- 1552 - begin deployment of QEP1-F. *
- 1759 - wheels away at $49^{\circ} 31.992' N$ } LAB
 $138^{\circ} 35.226' W$ } GPS.

1822 CTD #1529 & 1500, & station MP20 (app)
no GPS position available - got one later.

* NOTES ON DEPLOYMENT OF QEP1-F:

- kevlar lines stacked on spooling winch down in order top to bottom, linked with $\frac{3}{16} \times 2$ shackles.
- mooring launched through A-frame.
- ship tensioned mooring during deployment by going astern and keeping the wind 60° off the STBD bow.



Tension relieved to insert instrument assemblies at kevlar junctions by ship taking off way.
Tension restored by going astern.

- wheels released as soon as system all together, rather than towing system to original position.
- used ship's DREF designed release hook - works very well at all angles.
- the old large-throat OSCO block worked very well - recommend it again.
- we need to bring a SOUNDER (EPC + ATR) next time.

DAILY LOG

OCEAN PHYSICS

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YEAR 91

MONTH 10

TIME ZONE UTC

SHIP ENDEAVOUR

CRUISE 91-15

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YEAR 91		MONTH 10		TIME ZONE UTC		SHIP ENDEAVOUR		CRUISE 91-15		PAGE 4 OF			
DAY	STATION IDENTIFICATION	DEPTH SOUNDING (m)	SHIP STOP/START TIME	LATITUDE/ LONGITUDE	STD CONSEC. #	STD TIME	HYDRO CONSEC. #	MESSENGER TIME	HYDRO SALINITY #	OXYGEN #	SURFACE TEMPERATURE/ SALINITY	BUCKET TEMP. SALINITY #	NOTES
29	MP18		49 25.97	1531 0355									Rosette Bottle @ 555, 1000, 1502 db.
29	MP18	3850	0525 49 25.46			4	0531	86			31		0-1000
29	MP18		0800 49 25.05			4	0648	116					1200-3800
29	MP17	3200	1117 49 20.89	1532 1122							32		3500 bottle did not close
29	MP16		1612 49 17.24	1534 1620							33		DISK FULL ERROR AT 1000 m. Log set 1000-1500 m. H 1533
29	MP16		49 16.93			5	1754	117 1003					0-1000 m
29	MP16		2010 49 16.92			5	1905	140 1039					1200-3500 m.
29	MP16		2015										POC; ¹³ C; δ CO ₂
30	MP15		0040 49 12.07	1535 0040							35		TO 500 m.
	MP15		0125 49 12.11										Bucket sample taken - thermistor termination repaired with g rans - high S values.
30	MP14		0513 49 07.31	1536 0534							35		

91/10/27 PST

1900 TRACE METAL GO-FLO CAST TO 1500 m. (USE)
- SAURY (220) and SOUND IN GALLOW'S light.
2154 CAST COMPLETE

2204 - 2245 : sounding over mooring position.
→ estimate: 3983 m.

0010 Read thermometers from hydro cast #3.

91/10/28
PST

0118 arrive Shn MP19, Wind 13 knots @ 330.
CTD #1530 & 15000b.

0149 CTD #1500 49 30.02 137 39.92

0757 - began ranging on QEP4-A

0758 - released 94U @ 1000 m horizontal range

0803 - buoys on surface (30")

1048 - recovery complete, all of mooring on deck

~~810~~

2105 start hydro cast # MP18.

2125

at depth

#31 Loop sample (49°25.58'N, 136°39.41'W)

2131

49 25.46 136 39.34

2139

2248

meninger time deep cast 49 25.05 136 39.08

2311

start long cast up 49 24.96 136 39.02 (unstable pos.)
no water sample from 3500, Niskin did not close as
longer angled through loop.

2400

complete station

29 Oct 91 PST

1256 Thermometers from Sta MP18 have been read.

0322 CTD cast 1532. Disk full even at 1000m.
Logged remaining data to 1500m on Cast 1533.
Converted 1532 + 1533 to ascii.
At this point, all Arctic CTD casts have been converted to ascii files of P, T, R. using the pre-cruise calibration constants.

0812 An MP16 #33 bucket: Sal, chl A, 2 plastic nut.
CTD # 1534 to 1510 m.

0954 0-1000 m hydro cast messenger
→ Sal, O₂, 3 plastic nut, temp.

1105 1200 - 3500 m hydro cast messenger
→ Sal, O₂, temp.

1215 - Start POC, C₁₂, ZCO₂ cast to 500m
1330 - cast complete.

2113 - an. MP14.

- Arctic CTD gave high Cond. ratio (1.99) and garbage FIO output.
- Pulled, cleaned, greased COND. cell connector.
→ reasonable values.

CTD # 1536 to 1503 m.

Bucket # 35: Sal, chl. a, 2 plastic nutrients.

2226 LV MP14.

DAILY LOG

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DAILY LOG			OCEAN PHYSICS					CRUISE 91-15		PAGE 5 OF			
YEAR 91	MONTH 10/11	TIME ZONE UTC	SHIP										
DAY	STATION IDENTIFICATION	DEPTH SOUNDING (m)	SHIP STOP/START TIME	LATITUDE/ LONGITUDE	STD CONSEC. #	STD TIME	HYDRO CONSEC. #	MESSENGER TIME	HYDRO SALINITY #	OXYGEN #	SURFACE TEMPERATURE/ SALINITY	BUCKET SURFACE SALINITY #	NOTES
30	MP13	0945	49 02.75										Raining
		1046	131 40.12	1537							37		
30	MP12		48 58.53										light rain
			130 39.79	1538	1412						1538		Rosette & samples taken
30	MP11	1648	48 56.67										
		1748	130 08.88	1539	1653						39		
30	MP10	1920	48 53.60										
		2314	129 39.99	1540	1923						40		
30	MP09	2159	48 51.3										foggy, Wind 15
		2251	129 09.90	1541	2159						41		
31	MP08	0040	48 48.88										Fog, Wind 15
		0137	128 40.04	1542	0040						42		
31	MP07		48 46.54										
		0420	128 09.88	1543	0327						43		Chin. Wind 17
31	MP06	0602	48 44.55										Velilla velilla and
			127 39.85	1544	0609						44		large jellies and siphonophores
31	MP06		48 44.15						141	1003			in water at time of cast
			127 38.59			6	0752		161	1040			
31	MP05	1142	48 41.25										
			127 09.95	1545	1154						45		
31	MP04		48 39.01										Added touchdown weights
			126 39.69	1546	1506						46		to CM - worked well.
31	MP04		48 39.10						162	1044			ship's sonar read
		1812	126 39.45			7	1636		181	1065			1220m touchy clown
													weight tripped at 1316

30 Oct. 91 PST

0145 arrive Sta MP13, Raining, wind 15 @ 220.
CTD #1537 to 1500m.
bucket samples for Sal, nutrients, & Chl. A.
GPS position not good, as it updates only every 15 to 20 minutes.

0612 CTD 1538 at Sta MP12 - Rosette sample at 500, 1000, +1500 m.
Bucket samples.

0848 Au MP11. wind: 22 kt SW
CTD #1539 to 1499 m
Bucket #39: Sal, Chl. A, 2 plastic nutrients,
2 ^{big} sparrow-like birds on well deck off and on.
0948 LV MP11 suspect stranding.

1120 Au MP10 wind 20 kt WSW
CTD #1540 to 1503 m.
Bucket #40: Sal, Chl. A, 2 plastic nutrients

1214 LV MP40

1359 MP09 CTD #1541 to 1500m
48 51.30 N, 129 09.90 W
Bucket sample.

1640 MP08 CTD #1542 to 1500m
48 48.98 N, 128 40.04 W
Bucket sample.

0727 MP07 CTD #1543 to 1500m - long SALP (1m).
48 46.54 N, 128 09.88 W - several very large
Bernoulli Disk is full opaque jellyfish
on surface.
Bucket sample.

0420 LV MP07.
- SAURI. (small).
- VERRILL.

- Installed 2nd Bernoulli disk.

91/OCT/30 PST

2202 An MPOG.

15 kt WNW.

#44 BUCKET: SAL, CHL.A, 2 plastic nut-tubes.
CTD #1544 to 1500 m.

Many SAURI, 1 large (2m) squid, many small
jellyfish, many VERRA, a few SALP.
Rosette cal. samples at 500, 1000, 1500 m.

2352. mess, 2000m hydro cast. T, S, O₂.

Duplicate oxygen samples taken from 500 & 2000
m bottles.

30 litre Go-Flu at 50 m for trace metals.
Ship steaming at 6 knots & next station.

91/10/31 PST

0345 arrive Sta MPO5.

CTD #1545 to 1501 m. Some bad data in
file. Program crashed when logging stopped.

0450 depart Sta.

Replaced 300 m thermometer 12083 with 8886

0706 MPO4 Rigged up a "touch-down" weight
CTD to 1210m? with Rosette at 535m, 800, 1000m

0807 17 kt WNW
CTD #1546
BUCKET #46.

0836 Hydro cast mess to 1300m.

0915 2000m zooplankton net vertical haul

0925 - PC 10L Go-Flu Cast to 500m.

1012 - ls. MPO4. Raining during Cast.

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[illegible]

9/10/31 PST



1120 Au. MPO3. 10 kt E. wind.
Bucket #47: S, ChlA, 2 plastic and.
CTD # 1547 to 807 m.
KEEP ON SURFACE.

1218 Bernoulli disk has allocation error and will
not allow any files to be written to it.

1320 MPO2 CTD # 1548, Bucket, 2 trace metal bottles.