PRELIMINARY CRUISE REPORT, W0004B
R/V WECOMA, 11-17 April 2000
GLOBEC/ENSO Long-Term Observations off Oregon

Submitted by Jane Fleischbein
College of Oceanic & Atmospheric Sciences
Oregon State University
Corvallis, Oregon 97331-5503
flei@oce.orst.edu, 541.737.5698

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PRINCIPAL INVESTIGATOR(S): GLOBEC: Adriana Huyer, Robert L. Smith, P. Michael Kosro, P. A. Wheeler, W. T. Peterson and Jack A. Barth

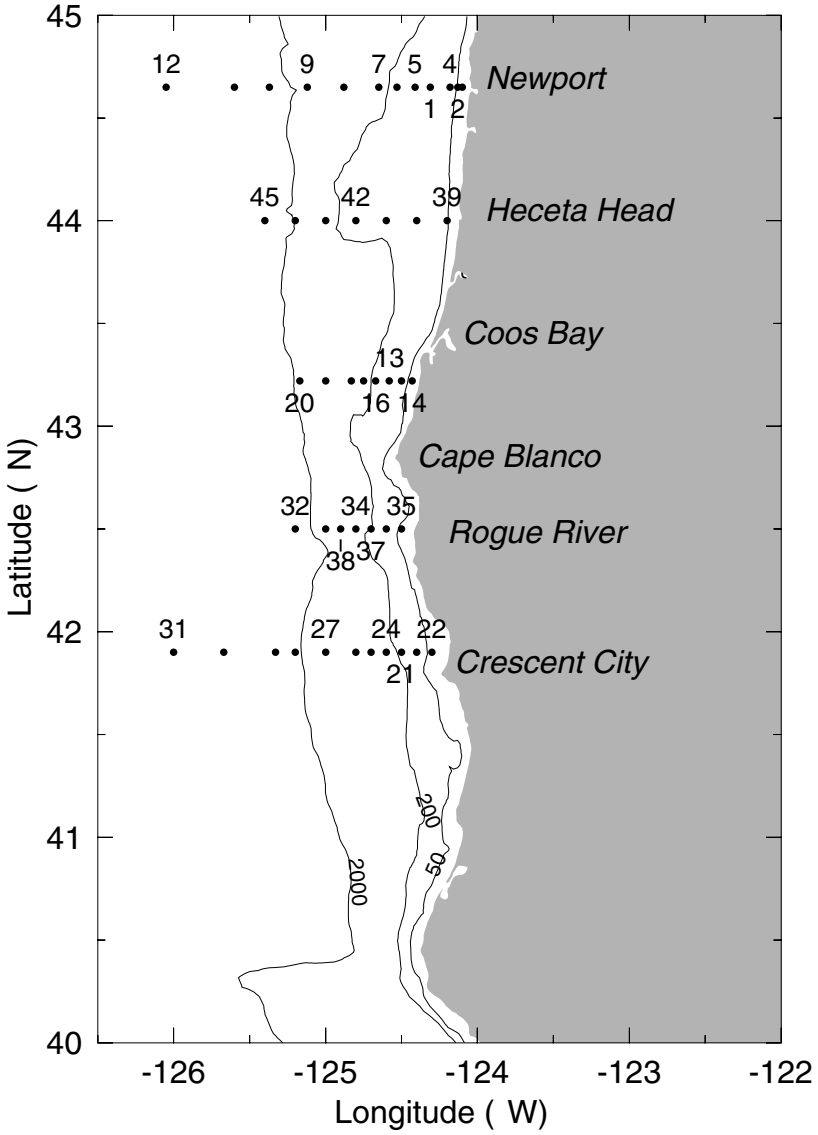
PURPOSE: To determine physical, plankton and nutrient/chemical conditions over the continental margin for climate change studies in NE Pacific. In particular, to make CTD and CTD/rosette and net tow stations along 5 lines (off Newport, Heceta Head, Coos Bay, the Rogue River and Crescent City, OR, to deploy drifters at selected locations on the Newport line, and to make continuous observations of currents using ADCP and of surface-layer temperature, salinity and fluorescence by means of ship's thru-flo system. Figure 1 shows the location of the CTD stations. Table 1 shows the CTD station positions, and Table 2 shows the biochemical sampling depths.
SAMPLING PLAN:
1. Use ship's intake continuously for Temperature, Salinity, and Fluorescence
2. Continuous ADCP Profiling (150 kHz transducer) for water velocity and backscattering for bio-acoustics.
3. Standard CTD Stations using SBE 9/11 plus CTD system for Temperature, Salinity, Fluorescence, Light Transmission, Oxygen.
4. Rosette sampling: 5 liter bottles for nutrients, and chlorophyll.
5. Deploy surface drifters after selected NH-line stations.
6. Vertical net tows: 1/2 meter nets 100 m to surface; Horizontal net tows with 1 m^2 MOCNESS.

CRUISE NARRATIVE

A brief overview of the cruise is presented here. An event log is provided in Table 3, and the participating personnel are listed in Table 4. Wecoma departed Newport at 1000 PDT on 11 April 2000. A surface mooring and an ADCP mooring were deployed near NH-10, followed by a CTD, vetical net tow and drifter release at NH-10. Finished with the mooring work, Mike Kosro and Walt Waldorf departed on the R/V Sacajawea by late afternoon. After releasing 4 more drifters and completing CTD's and net tows along the Newport Line at 2155 PDT, 12 April, we transited to the FM line. Sampling was started at FM-4, and then proceeded to FM-1, 3, 5, etc. to allow adequate time during the transits for the nutrient and chemical sample processing, and to set up the Mocness nets. Initial processing of the CTD data during the FM line showed an increasing number of spikes in the CTD data. Upon closer inspection, the CTD cable was found to have a kink about 2 meters above the rosette, so the CTD was reterminated on the transit to the Crescent City line. Calm seas prevailed as we completed the Crescent City, Rogue River and Heceta Head lines in record time. The order of

sampling of the inshore stations of the Crescent City Line was again modified to allow the most efficient use of time, beginning with CR-3 at 0623 PDT, 14 April. Finishing the net tows at CR-11 at 0825 PDT, 15 April, we ran to the offshore end of the Rogue River line, arriving at 1147 PDT. After completing RR-6, only a CTD and vertical net tow were done at RR-4 to allow the ship to run inshore to RR-1 and survey possible crab pot lines during daylight. Sampling resumed at RR-1 at 1912 PDT, followed by RR-2, RR-3, a Mocness tow only at RR-4, and completing the line with a CTD at RR-5 at 0236 PDT, 16 April. The Heceta Head line was sampled from the inshore end, starting at 1145 PDT, to offshore, finishing at 0235 PDT on 17 April and heading for Newport. We arrived alongside the pier at Newport at about 0833 PDT on 17 April 2000.

Figure 1. W0004B CTD stations along the Newport, Heceta Head, Five Mile, Rogue River and Crescent City Hydrographic Lines.



PRELIMINARY RESULTS

Vertical sections of the parameters measured by the SBE CTD system (temperature, salinity, density, fluorescence voltage and transmissometer voltage and dissolved oxygen concentration) are presented at the end of this report. Also included are vertical sections of the alongshore currents measured by the shipborne Acoustic Doppler Profiler, and a map showing the trajectory of the five drifters deployed during this cruise. In all sections, we observed a clear response to the upwelling-favorable winds that had persisted for more than 10 days before the beginning of our cruise: on all sections, isotherms, isohalines and isopycnals slope generally upward from depths of 100 – 150 m offshore (beyond 125 W) to depths of 0-50 inshore over the inner shelf. The ADCP sections show an equatorward jet coincident with these regions of sloping isopycnals. Winds during our cruise were relatively weak, and generally from the west or southwest. A large region of low surface salinity (<32 psu) indicated the Columbia River Plume extended well past the NH-Line at 44.6 and covered most of the HH-Line at 44.0 N; only a narrow band of S < 32.5 psu was observed on the FM and CR lines off Coos Bay and Crescent City.

The most remarkable feature in the temperature and salinity sections is the pool of cold (<7 C), saline (S >34.0 psu), dense (sigma-t > 26.6 kg/m3), and low-oxygen (<2 ml/l) water located just inshore of Heceta Bank on the HH-line. These extreme water properties occur at depths as shallow as 120 m in this location, and at depths of about 220 m offshore. These properties are observed at shallower depths on the HH-line than on any of the other sections. The FM-line ranks next: the minimum depth of the 7 C, 34.0 psu and 26.6 kg/m3 contours here is about 150 m. Thus our data suggest that the cold, dense water on Heceta Bank arrived there from the south rather than from the north.

Our fluorescence data has two remarkable features. The first of these are the full-scale values (≥5 V) through most of the water column over the inner shelf off Newport and Crescent City and the full-scale values of the inshore surface waters off the Rogue River. The second feature is the bimodal structure of the fluorescence voltage near the shelf-break on the RR-Line. The deeper subsurface fluorescence maximum was observed at three separate but adjacent CTD stations, with the core depth increasing with distance from shore. No similar feature was observed on the other sections.

The attached zooplankton report was provided by Dr. Wm. Peterson.

Table 4. Names, affiliations, and responsibilities of scientific personnel participating on W0004B.

Adriana Huyer	Chief Scientist	OSU	CTD
P. Michael Kosro	Co-Chief Scientist	OSU	ADCP, Moorings
Jane Fleischbein	Technician	OSU	CTD
Joe Jennings	Technician	OSU	CTD, oxygen
Sheila O'Keefe	Graduate Student	OSU	CTD
Margaret Sparrow	Technician	OSU	CTD
Walt Waldorf	Technician	OSU	Moorings
Lee Karp-Boss	Post-doc	OSU	nuts, chl
Nobuyuki Kawasaki	Technician	OSU	nuts, chl
Dale Hubbard	Technician	OSU	nuts, chl
Woody Moses	Graduate Student	OSU	nuts, chl
William T. Peterson	Co-Chief Scientist	NOAA	
Julie Keister	Technician	HMSC	zooplankton
Leah Feinberg	Technician	HMSC	zooplankton
Michael Green	Technician	ODFW	zooplankton
Linda Fayler	Technician	OSU	martec
Daryl Swensen	Technician	OSU	martec

Table 1. CTD station positions during W0004B, and sampling at each station (C: Bio/Chem bottle sampling, N:half-meter vertical net tows, M:Mocness, D:drifter, P:Pigment, O:Oxygen samples)

Station		Distance	Lat.	Long.	Cast	Bottom	Sampling
Name	No.	from shore	°N	°W	Depth	Depth	Type
NH-1	2	3.0 km	44.65	-124.10	23 m	28 m	N
NH-3	3	5.4	44.65	-124.13	42	48	P
NH-5	4	9.1	44.65	-124.18	55	60	C,N,M
NH-10	1	19.6	44.65	-124.31	75	81	P,N,D
NH-15	5	27.6	44.65	-124.41	90	97	C,N,M,D
NH-20	6	36.9	44.65	-124.53	136	143	P,N
NH-25	7	46.5	44.65	-124.65	291	296	C,N,M,D
NH-35	8	65.0	44.65	-124.88	444	449	C,N,M
NH-45	9	83.3	44.65	-125.12	692	700	C,N,M,D
NH-55	10	103.2	44.65	-125.37	1005	2865	P
NH-65	11	121.5	44.65	-125.60	1005	2860	C,N,D,O
NH-85	12	157.2	44.65	-126.05	1006	2885	C
FM-1	14	3.3	43.22	-124.43	31	36	N
FM-3	15	8.7	43.22	-124.50	55	61	C,N,M
FM-4	13	15.6	43.22	-124.58	81	85	C,N,M
FM-5	16	22.2	43.22	-124.67	153	157	C,N,M
FM-6	17	28.9	43.22	-124.75	306	311	
FM-7	18	35.6	43.22	-124.83	335	342	C,N,M
FM-8	19	49.1	43.22	-125.00	1005	1080	C,N
FM-9	20	62.6	43.22	-125.17	1005	1642	C,N,O
CR-1	22	7.8	41.90	-124.30	37	42	C,N
CR-2	23	16.1	41.90	-124.40	65	69	N,M
CR-3	21	24.4	41.90	-124.50	131	137	C,N,M
CR-4	24	32.6	41.90	-124.60	495	501	C,N,M
CR-5	25	40.9	41.90	-124.70	650	657	C,N,M
CR-6	26	49.3	41.90	-124.80	671	699	
CR-7	27	65.6	41.90	-125.00	828	833	C,N,M
CR-8	28	82.2	41.90	-125.20	1004	2728	O
CR-9	29	93.3	41.90	-125.33	1006	3054	C,N
CR-10	30	120.9	41.90	-125.67	1005	2885	
CR-11	31	148.5	41.90	-126.00	1006	3279	C,N
RR-1	35	7.0	42.50	-124.50	34	35	C,N
RR-2	36	15.6	42.50	-124.60	83	87	C,N,M
RR-3	37	23.7	42.50	-124.70	122	132	C,N,M
RR-4	34	31.9	42.50	-124.80	560	589	C,N,M
RR-5	38	40.2	42.50	-124.90	1005	1164	O
RR-6	33	48.3	42.50	-125.00	1006	1747	C,N
RR-7	32	64.6	42.50	-125.20	1006	2935	C,N
HH-1	39	5.0	44.00	-124.20	50	55	C,N
HH-2	40	20.9	44.00	-124.40	116	121	C,N,M
HH-3	41	36.9	44.00	-124.60	149	154	C,N
HH-4	42	52.8	44.00	-124.80	105	110	C,N,M
HH-5	43	68.9	44.00	-125.00	936	933	C,N,M
HH-7	44	84.8	44.00	-125.20	1006	1701	C
HH-9	45	100.9	44.00	-125.40	1005	3019	C

Table 2. Sample depths and types of subsamples for biochemical sampling during W0004B.

Station, Depth, Dist. From shore	**Sample Collection Depths (m)**	**Type of Sample Collected**
NH-03, 48m, 5km	42, 20, 5	Pigments for HPLC analysis only at 5m and 20m
NH-05, 60m, 9km	55, 50, 43, 41, 30, 26, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
NH-10, 81m, 20km	75, 30, 15, 1	Pigments for HPLC analysis only at 15m and 1m
NH-15, 97m, 28km	86, 70, 61, 50, 41, 35, 30, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
NH-20, 143m, 37km	120, 61, 26, 2	Pigments for HPLC analysis only at 26m and 2m
NH-25, 291m, 46km	289, 201, 151, 101, 70, 50, 40, 30, 21, 10, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 289m, 201m and 151m)
NH-35, 449m, 65km	445, 400, 150, 100, 70, 50, 40, 31, 20, 15, 10, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 445m, 400m and 150m)
NH-45, 700m, 83km	580, 500, 151, 101, 70, 50, 40, 31, 20, 16, 10, 2	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 580m, 500m and 151m)
NH-55, 2865m, 103km	1006, 20, 1	Pigments for HPLC analysis only at 2m and 39m
NH-65, 2860m, 121km	830, 300, 150, 100, 70, 50, 40, 29, 25, 20, 10, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 830m, 300m and 150m)
NH-85, 2885m, 157km	1005, 849, 150, 100, 70, 50, 40, 30, 20, 13, 10, 1	TOC (all depths), Nutrients, TN (all depths, except 1000m), Chl, Chl<10μm, POC/PON (except 1000m)

Station, Depth, Dist. From shore	**Sample Collection Depths (m)**	**Type of Sample Collected**
HH-1, 55m, 7km	49, 40, 30, 25, 20, 15, 10, 5, 1.5	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
HH-2, 121m, 16km	115, 100, 70, 60, 50, 40, 30, 20, 15, 10, 5, 2	TOC (surface), Nutrients, TN (surface), Chl, POC/PON
HH-3, 154m, 24km	150, 145, 100, 71, 60, 50, 40, 30, 20, 15, 10, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
HH-4, 105m, 32km	100, 95, 70, 60, 50, 40, 30, 20, 16, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
HH-5, 933m, 40km	500, 195, 150, 100, 70, 50, 40, 30, 20, 15, 10, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 500m, 195m and 150m)
HH-7, 1701m, 48km	1005, 900,150, 100, 70, 50,40, 30, 28, 20, 10, 1	TOC (surface only), Nutrients, TN (surface only), POC/PON (except 1005m, 900m and 150m)
HH-9, 3019m, 65km	1005, 150, 100, 70, 50, 40, 35, 30, 20, 10, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 1005m and 150m)

Table 2. cont.

Station, Depth, Dist. From shore	Sample Collection Depths (m)	Type of Sample Collected
FM-3, 61m, 9km	55, 49, 45, 40, 30, 25, 20, 15, 10, 7	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
FM-4, 85m, 16km	80, 70, 60, 51, 40, 30, 20, 16, 11, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
FM-5, 157m, 22km	153, 124, 100, 70, 60, 49, 41, 30, 24, 21, 10, 2	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 153m)
FM-7, 342m, 36km	335, 300, 150, 100, 70, 50, 40, 30, 20, 15, 10, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 335m, 300m and 150m)
FM-8, 1080m, 49km	1005, 800, 150, 101, 70, 51, 41, 30, 25, 21, 10, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 1005m, 800m, and 150m)
FM-9, 1642m, 63km	1005, 900, 150, 100, 70, 50, 40, 30, 20, 10, 1	TOC (all depths), Nutrients, TN (all depths), POC/PON (except 1005m, 900m and 150m)

Station, Depth, Dist. From shore	Sample Collection Depths (m)	Type of Sample Collected
RR-1, 35m, 7km	30, 25, 20, 19, 15, 9, 6, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
RR-2, 87m, 16km	81, 70, 61, 52, 39, 34, 31, 22, 11, 11, 5, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
RR-3, 132m, 24km	122, 116, 70, 61, 50, 40, 30, 20, 15, 11, 5, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON
RR-4, 589m, 32km	1005, 150, 100, 70, 50, 40, 30, 25, 20, 10, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 1005m and 150m)
RR-6, 1747m, 48km	1007, 960, 150, 100, 70, 50, 40, 30, 20, 17, 10, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 1007m, 960m and 150m)
RR-7, 2935m 65km	1005, 440, 150, 100, 70, 50, 40, 32, 30, 20, 10, 1	TOC (surface only), Nutrients, TN (surface only), POC/PON (except 1005m, 440m and 150m)

Table 2. cont**.**

Station, Depth, Dist. From shore	**Sample Collection Depths (m)**	**Type of Sample Collected**
CR-1, 42m, 8km	36, 33, 30, 25, 20, 15, 10, 5, 3, 1	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
CR-3, 137m, 24km	130, 100, 69.9, 61, 50, 41, 30, 25, 20, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
CR-4, 501m, 33km	495, 450, 150, 100, 70, 50, 40, 30, 25, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON (except 495m, 450m and 150m)
CR-5, 657m, 41km	650, 500, 150, 100, 70, 50, 41, 30, 25, 20, 10, 20	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 650m, 500m and 150m)
CR-7, 833m, 66km	500, 360, 150, 100, 70, 50, 40, 30, 20, 15, 10, 1	TOC (surface only), Nutrients, TN (surface only), Chl, POC/PON (except 500m and 150m)
CR-9, 3054m, 93km	1005, 150, 100, 70, 50, 40, 30, 25, 20, 10, 1	TOC (all depths), Nutrients, TN (all depths), POC/PON (except 1005m and 150m)
CR-11, 3279m, 148km	1005, 766, 151, 101, 70, 50, 41, 25, 20, 10, 1	TOC (surface only), Nutrients, TN (surface only), POC/PON (except 1005m, 766m and 151m)

Subsample	**Replicates**
TOC	3
Nutrients	1
TN	3
Chl	2
POC/PON	1
Pigments	3
Slides	2

Table 3. Event Log for W0004B

Date	Start	End	Sta.	Sta.	Latitude		Longitude		Bottom	Atmos	Wind	Wind	Event	Event ID
(UT)	Time	Time	No.	Name	(deg)	(min)	(deg)	(min)	Depth	Press	Dir.	Speed		
	(UT)	(UT)							(m)	(mbar)	(deg T)	(kts)		
11-Apr	1700												Depart Newport	
													Start DAS	
													Start flo-thru	
													Start ADCP	
	2032			NH-10	44	38.74	-124	18.35	80.6	1017.2	020	10	Surface mooring deployed	WE10200.01
	2135				44	38.80	-124	18.37	80.6	1017.0	345	10	ADCP mooring deployed	WE10200.02
	2208		1	NH-10	44	38.7	-124	18.6	81	1016.8	340	12	CTD with pigments at 1m, 15 m	WE10200.03
	2228			NH-10	44	38.5	-124	18.80					vertical net tow, 75 m	WE10200.04
	2240			NH-10	44	38.46	-124	18.81					drifter 15899	WE10200.05
	2305	2308											Sacajawea alongside	
	2346		2	NH-1	44	39.1	-124	06.0	28	1015.9	005	12	CTD	WE10200.06
	2358												secchi disk	WE10200.07
12-Apr	0000	0002			44	39.1	-124	06.0					vertical net tow, 20 m	WE10300.08
	0020		3	NH-3	44	39.1	-124	07.8	48	1015.9	005	10	CTD with pigments at 5m, 20m	WE10300.09
	0103		4	NH-5	44	39.1	-124	10.6	60	1016.4	200	12	CTD with biochem	WE10300.10
	0123	0126			44	39.1	-124	10.6					vertical net tow, 50 m	WE10300.11
	0239				44	39.0	-124	10.7					Mocness deployed	WE10300.12
		0309			44	38.2	-124	11.1					Mocness aboard	WE10300.13
	0330												cleaned flo-thru filters	
	0449			NH-15	44	39.1	-124	25.0		1018.0	200	17	Mocness deployed	WE10300.14
		0524			44	38.1	-124	25.9					Mocness aboard	WE10300.15
	0600				44		-124						vertical net tow, 80 m	WE10300.16
	0640			NH-20	44	39.1	-124	31.7		1018.8	195	11	vertical net tow, 100 m	WE10300.17
	0720			NH-25	44	39.1	-124	39.9		1018.8	215	12	vertical net tow, 100 m	WE10300.18
	0744	0850			44	39.9	-124	39.8					Mocness tow	WE10300.19
	1045		5	NH-15	44	39.1	-124	24.7	97	1017.9	185	10	CTD with biochem	WE10300.20
					44	39.08	-124	24.69					drifter 15900	WE10300.21
	1211		6	NH-20	44	39.1	-124	31.7	143	1017.5	var	3	CTD with pigments at 2m, 26 m	WE10300.22
	1346		7	NH-25	44	39.1	-124	39.0	296	1018.0	var	5	CTD with biochem, cleaned flo-thru filt.	WE10300.23
					44	39.05	-124	39.02					drifter 15864	WE10300.24
	1518			NH-35	44	39.1	-124	53.1		1018.7	200	9	vertical net tow, 100 m	WE10300.25
	1555		8	NH-35	44	39.1	-124	53.0	449	1018.7	200	9	CTD with biochem	WE10300.26
	1639				44	39.0	-124	53.2					Mocness deployed	WE10300.27
		1808			44	37.3	-124	56.2					Mocness aboard	WE10300.28
	1856		9	NH-45	44	39.1	-125	07.0	700	1018.0	120	10	CTD with biochem	WE10300.29
	1954	2135			44	39.1	-125	06.0					Mocness tow	WE10300.30
	2210	2218			44	39.1	-125	07.0					vertical net tow, 100 m	WE10300.31

Table 3. cont.

Date	Start	End	Sta.	Sta.	Latitude		Longitude		Bottom	Atmos	Wind	Wind	Event	Event ID
(UT)	Time	Time	No.	Name	(deg)	(min)	(deg)	(min)	Depth	Press	Dir.	Speed		
	(UT)	(UT)							(m)	(mbar)	(deg T)	(kts)		
12-Apr	2220				44	39.1	-125	07.1					drifter 15898	WE10300.32
	2326		10	NH-55	44	39.2	-125	22.0	2865	1015.5	050	6	CTD with pigments at 1m, 21m	WE10300.33
13-Apr	0111		11	NH-65	44	39.1	-125	36.0	2860	1014.5	065	10	CTD with biochem, oxygen	WE10400.01
	0203	0206			44	39.1	-125	36.0					vertical net tow, 100 m	WE10400.02
	0210				44	39.12	-125	35.95					drifter 15901	WE10400.03
	0402		12	NH-85	44	39.1	-126	03.0	2885	1013.9	120	13	CTD with biochem	WE10400.04
	0455												begin transit to FM-Line	
	1403		13	FM-4	43	13.0	-124	35.1	85	1013.5	180	20	CTD with biochem	WE10400.05
	1428				43	13.0	-124	35.0					vertical net tow	WE10400.06
	1443				43	12.9	-124	35.0					Mocness deployed	WE10400.07
		1511			43	12.0	-124	35.0					Mocness aboard	WE10400.08
	1605		14	FM-1	43	13.0	-124	26.0	36	1013.8	185	11	CTD	WE10400.09
	1621				43	13.1	-124	26.0					vertical net tow	WE10400.10
	1650		15	FM-3	43	13.0	-124	30.0	61	1013.9	190	12	CTD with biochem	WE10400.11
	1708				43	13.2	-124	30.0					vertical net tow, 55 m	WE10400.12
	1723				43	13.1	-124	30.1					Mocness deployed	WE10400.13
		1745			43	12.4	-124	30.1					Mocness aboard	WE10400.14
	1844		16	FM-5	43	13.0	-124	40.0	157	1014.0	180	16	CTD with biochem	WE10400.15
	1926				43	12.8	-124	40.0					Mocness deployed	WE10400.16
		2010			43	11.5	-124	39.4					Mocness aboard	WE10400.17
	2024				43	11.4	-124	39.6					vertical net tow, 100 m	WE10400.18
	2138		17	FM-6	43	13	-124	45.0	311	1013.2	190	28	CTD	WE10400.19
	2235		18	FM-7	43	13.0	-124	49.9	342	1013.3	190	28	CTD with biochem	WE10400.20
	2306	2311			43	13.0	-124	49.9					vertical net tow	WE10400.21
	2318				43	12.8	-124	50.0					Mocness deployed	WE10400.22
14-Apr		0037			43	09.9	-124	51.1					Mocness aboard	WE10500.01
	0158		19	FM-8	43	13.0	-125	00.0	1080	1013.2	205	16	CTD with biochem	WE10500.02
	0257				43	12.9	-125	00.0					vertical net tow, 100 m	WE10500.03
	0400		20	FM-9	43	13.0	-125	09.9	1642	1013.4	200	10	CTD with biochem, oxygen	WE10500.04
	0450				43	12.9	-125	09.9					vertical net tow, 100 m	WE10500.05
	0502												begin transit to CR-Line	
	1323		21	CR-3	41	54.0	-124	30.0	137	1012.5	115	5	CTD with biochem	WE10500.06
	1348	1354			41	54.0	-124	30.0					vertical net tow	WE10500.07
	1403				41	54.0	-124	30.0					Mocness deployed	WE10500.08
		1449			41	52.3	-124	30.1					Mocness aboard	WE10500.09
	1451												cleaned flo-thru filters	
	1554		22	CR-1	41	54.0	-124	18.0	42	1013.5	var	4	CTD with biochem	WE10500.10
	1610				41	54.0	-124	17.9					vertical net tow, 35 m	WE10500.11
	1647			CR-2	41	54.0	-124	23.9		1013.9	190	4	vertical net tow, 65 m	WE10500.12

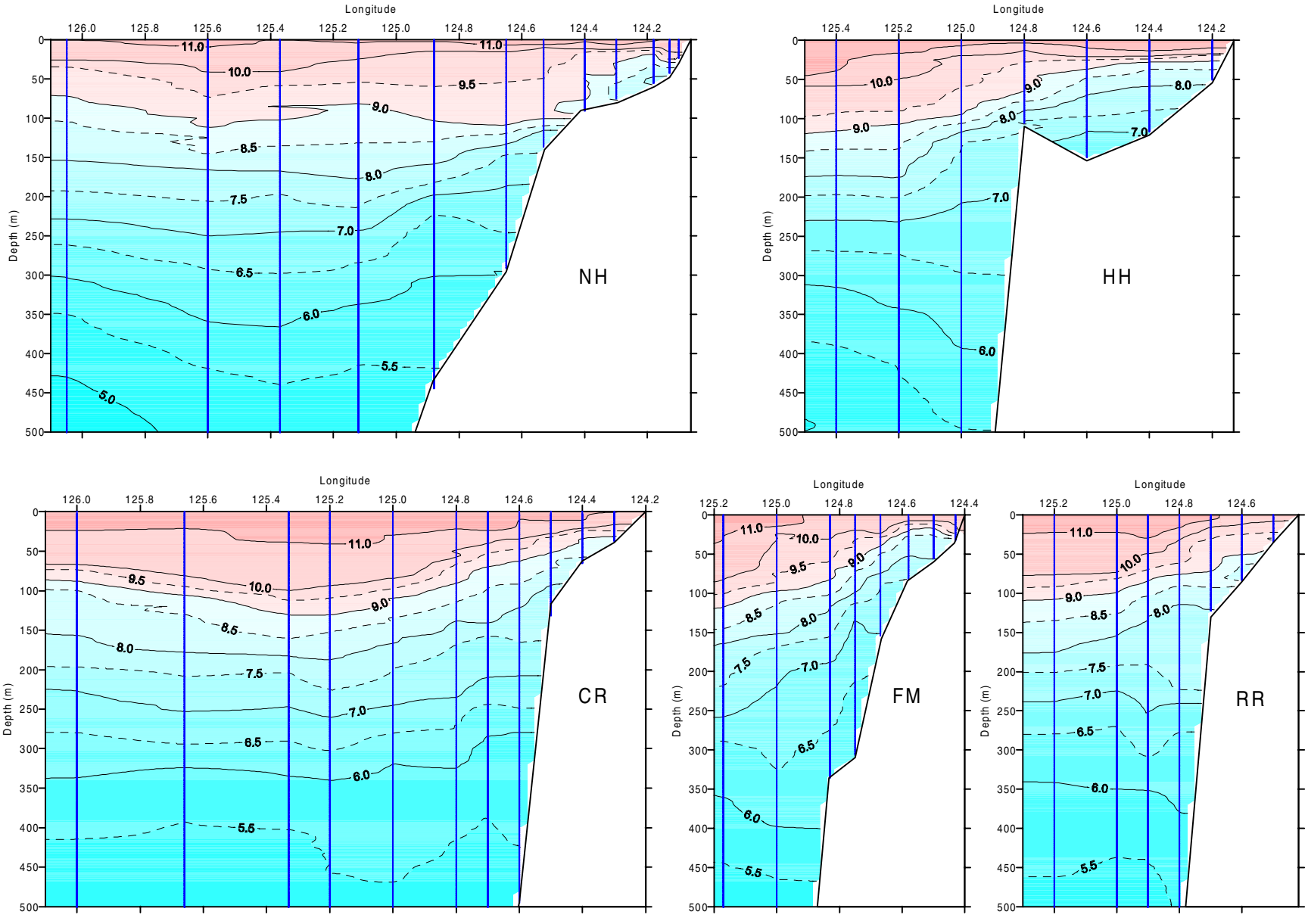
Table 3. cont.

Date	Start	End	Sta.	Sta.	Latitude		Longitude		Bottom	Atmos	Wind	Wind	Event	Event ID
(UT)	Time	Time	No.	Name	(deg)	(min)	(deg)	(min)	Depth	Press	Dir.	Speed		
	(UT)	(UT)							(m)	(mbar)	(deg T)	(kts)		
14-Apr	1659				41	53.8	-124	24.0					Mocness deployed	WE10500.13
		1721			41	53.2	-124	24.5					Mocness aboard	WE10500.14
	1749		23		41	54.0	-124	24.0	69				CTD	WE10500.15
	1903		24	CR-4	41	53.9	-124	35.9	501	1014.5	295	12	CTD with biochem	WE10500.16
	1950	2134			41	53.6	-124	35.8					Mocness tow	WE10500.17
	2211				41	54.0	-124	35.9					vertical net tow	WE10500.18
	2253		25	CR-5	41	54.0	-124	42.0	657	1014.0	280	16	CTD with biochem	WE10500.19
	2330												vertical net tow	WE10500.20
	2349				41	54.1	-124	42.3					Mocness deployed	WE10500.21
15-Apr		0126			41	55.6	-124	45.6					Mocness aboard	WE10600.01
	0147		26	CR-6	41	54.0	-124	48.1	699	1014.0	200	7	CTD	WE10600.02
	0325		27	CR-7	41	54.0	-124	59.9	842	1013.8	240	8	CTD with biochem	WE10600.03
	0410				41	54.0	-124	59.8					vertical net tow, 100 m	WE10600.04
	0428				41	53.9	-125	00.1					Mocness deployed	WE10600.05
		0506			41	52.8	-125	04.1					Mocness aboard	WE10600.06
	0654		28	CR-8	41	54.0	-125	12.0	2728	1014.1	270	9	CTD with oxygen samples	WE10600.07
	0842		29	CR-9	41	54.0	-125	20.0	3054	1014.0	290	10	CTD with biochem	WE10600.08
	0945	0950			41	54.0	-125	20.0					vertical net tow	WE10600.09
	1114		30	CR-10	41	54.0	-125	40.1	2885	1013.0	270	7	CTD	WE10600.10
	1324		31	CR-11	41	54.0	-126	00.0	3279	1012.5	290	7	CTD with biochem	WE10600.11
	1417												vertical net tow	WE10600.12
	1425												begin transit to RR-7	
	1428												cleaned flo-thru filters	
	1847		32	RR-7	42	30.0	-125	12.0	2958	1009.5	065	12	CTD with biochem	WE10600.13
	1943	1948			42	30.0	-125	12.0					vertical net tow, 100 m	WE10600.14
	2045			RR-6	42	29.9	-125	00.0		1013.0	130	5	vertical net tow, 100 m	WE10600.15
	2059		33	RR-6	42	30.0	-125	00.0	1747				CTD with biochem	WE10600.16
	2258		34	RR-4	42	30.0	-124	48.0	589	1012.5	160	9	CTD with biochem	WE10600.17
	2334	2340											vertical net tow	WE10600.18
16-Apr	0212		35	RR-1	42	30.0	-124	29.8	35	1010.9	var	1-2	CTD with biochem	WE10700.01
	0225	0228											vertical net tow	WE10700.02
	0303			RR-2	42	30.0	-124	36.0		1010.9	var	1	vertical net tow, 80 m	WE10700.03
	0323		36	RR-2	42	30.0	-124	36.0	87				CTD with biochem	WE10700.04
	0350				42	29.9	-124	36.0					Mocness deployed	WE10700.05
		0414			42	29.1	-124	36.3					Mocness aboard	WE10700.06
	0428												clearned flo-thru filters	
	0459			RR-3	42	30.0	-124	41.9		1010.8	080	5	Mocness deployed	WE10700.07
		0431			42	29.9	-124	43.2					Mocness aboard	WE10700.08
	0558				42	30.0	-124	42.0					vertical net tow, 100 m	WE10700.09

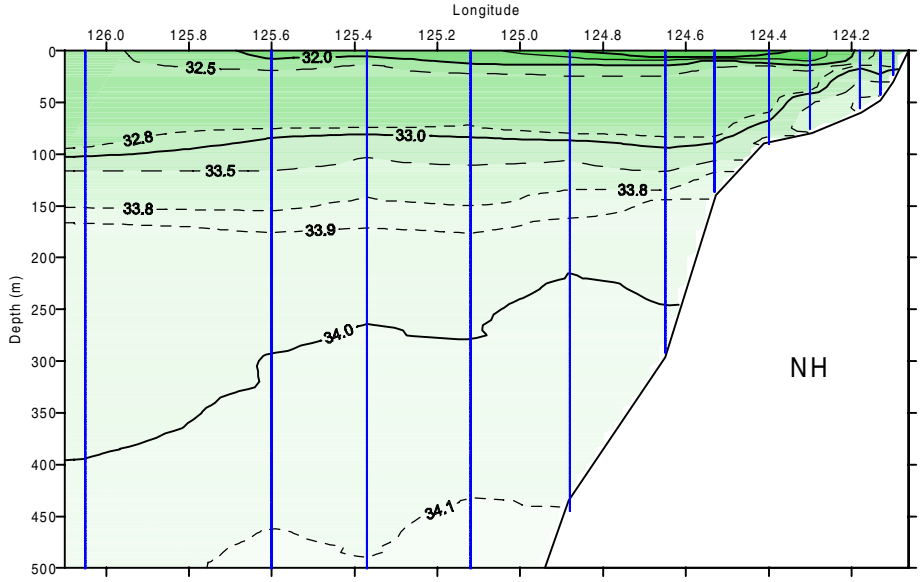
Table 3. cont.

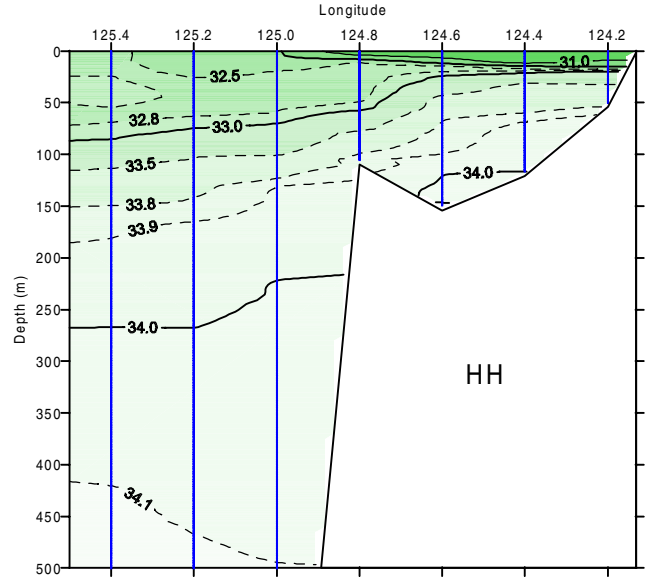
Date	Start	End	Sta.	Sta.	Latitude		Longitude		Bottom	Atmos	Wind	Wind	Event	Event ID
(UT)	Time	Time	No.	Name	(deg)	(min)	(deg)	(min)	Depth	Press	Dir.	Speed		
	(UT)	(UT)							(m)	(mbar)	(deg T)	(kts)		
16-Apr	0611		37	RR-3	42	30.0	-124	42.0					CTD with biochem	WE10700.10
	0705			RR-4	42	30.1	-124	48.3		1010.5			Mocness deployed	WE10700.11
		0840			42	32.0	-124	50.7					Mocness tow complete	WE10700.12
	0936		38	RR-5	42	30.0	-124	54.1	1164	1009.5	065	12	CTD with oxygen samples	WE10700.13
													begin transit to HH-1	
	1547												clearned flo-thru filters	
	1845		39	HH-1	44	00.0	-124	12.0	55	1010.8	085	11	CTD with biochem	WE10700.14
	1907				44	00.0	-124	12.0					vertical net tow, 48 m	WE10700.15
	2012		40	HH-2	44	00.0	-124	24.0	121	1012.1	080	11	CTD with biochem	WE10700.16
	2039	2045			44	00.0	-124	24.0					vertical net tow	WE10700.17
	2055	2130			44	00.0	-124	24.3					Mocness tow	WE10700.18
	2221		41	HH-3	44	00.0	-124	36.0	154	1011.0	010	10	CTD with biochem	WE10700.19
	2250	2255			44	00.0	-124	36.0					vertical net tow	WE10700.20
	2344	2349		HH-4	44	00.0	-124	48.0					vertical net tow	WE10700.21
	2355			HH-4	44	00.1	-124	47.9					Mocness deployed	WE10700.22
17-Apr		0035			44	01.3	-124	47.5					Mocness aboard	WE10800.01
	0054		42	HH-4	44	00.0	-124	47.9	110	1011.2	20	8	CTD with biochem	WE10800.02
	0210			HH-5	44	00.1	-125	00.0					Mocness deployed	WE10800.03
		0312			44	02.2	-125	00.1					Mocness aboard	WE10800.04
	0347			HH-5	44	00.0	-125	00.0					vertical net tow	WE10800.05
	0400		43	HH-5	44	00.0	-125	00.0	933	1011.5	350	13	CTD with biochem	WE10800.06
	0553		44	HH-7	44	00.0	-125	12.0	1701	1012.3	035	17	CTD with biochem	WE10800.07
	0754		45	HH-9	44	00.0	-125	24.0	3019	1011	030	28	CTD with biochem	WE10800.08
	1458												Shut down ADCP, DAS, flo-thru	
	1533												Arrive Newport	

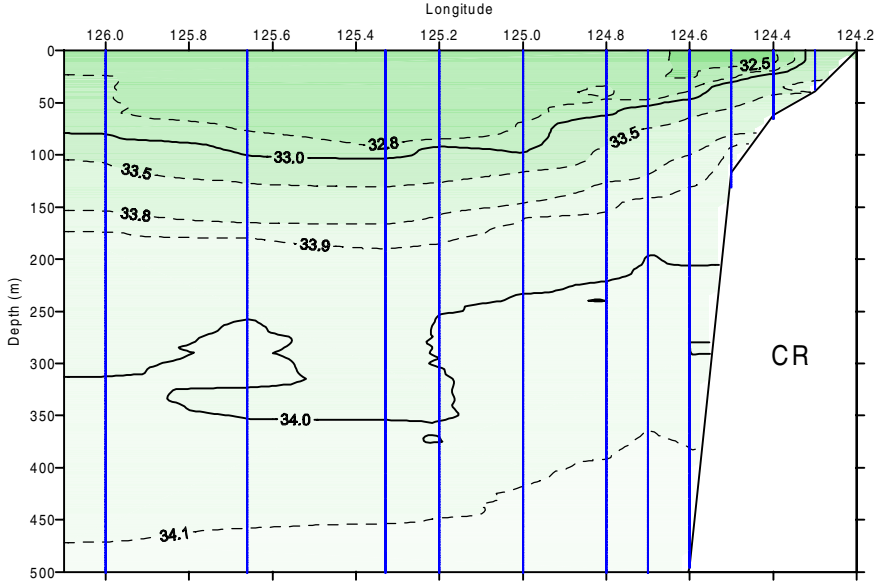
Temperature, April 2000

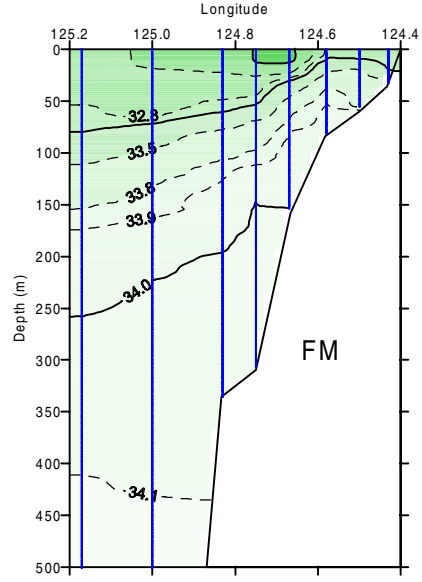


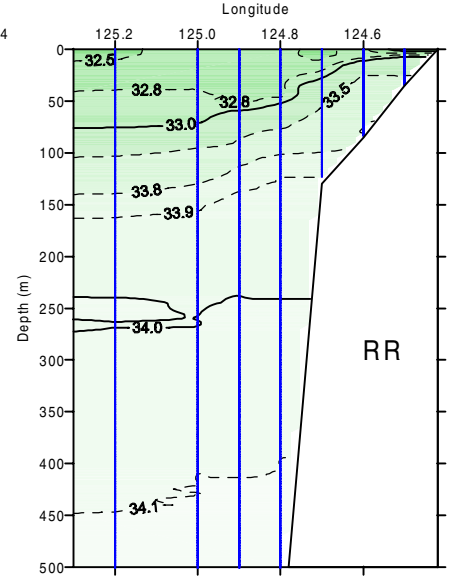
Salinity, April 2000



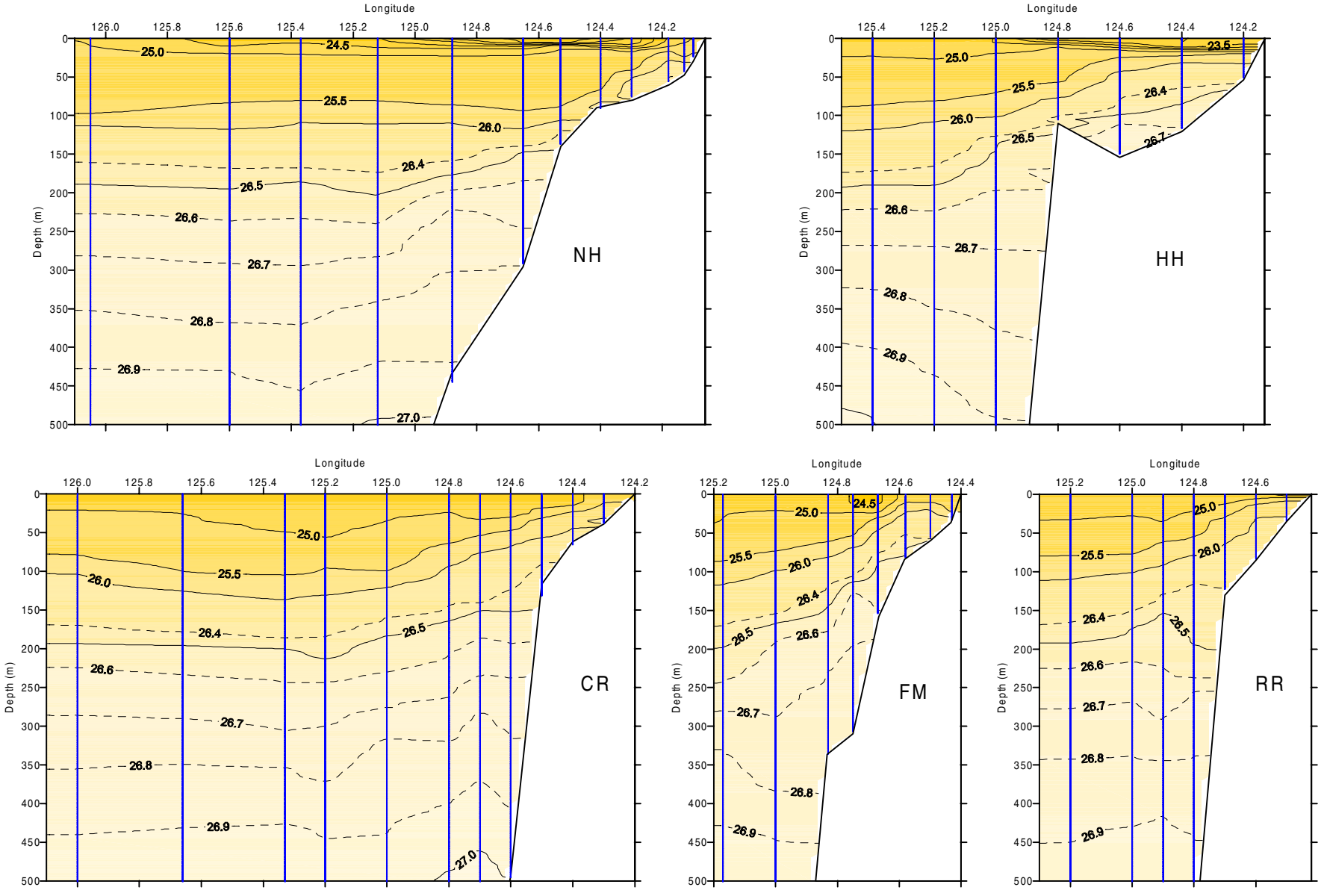




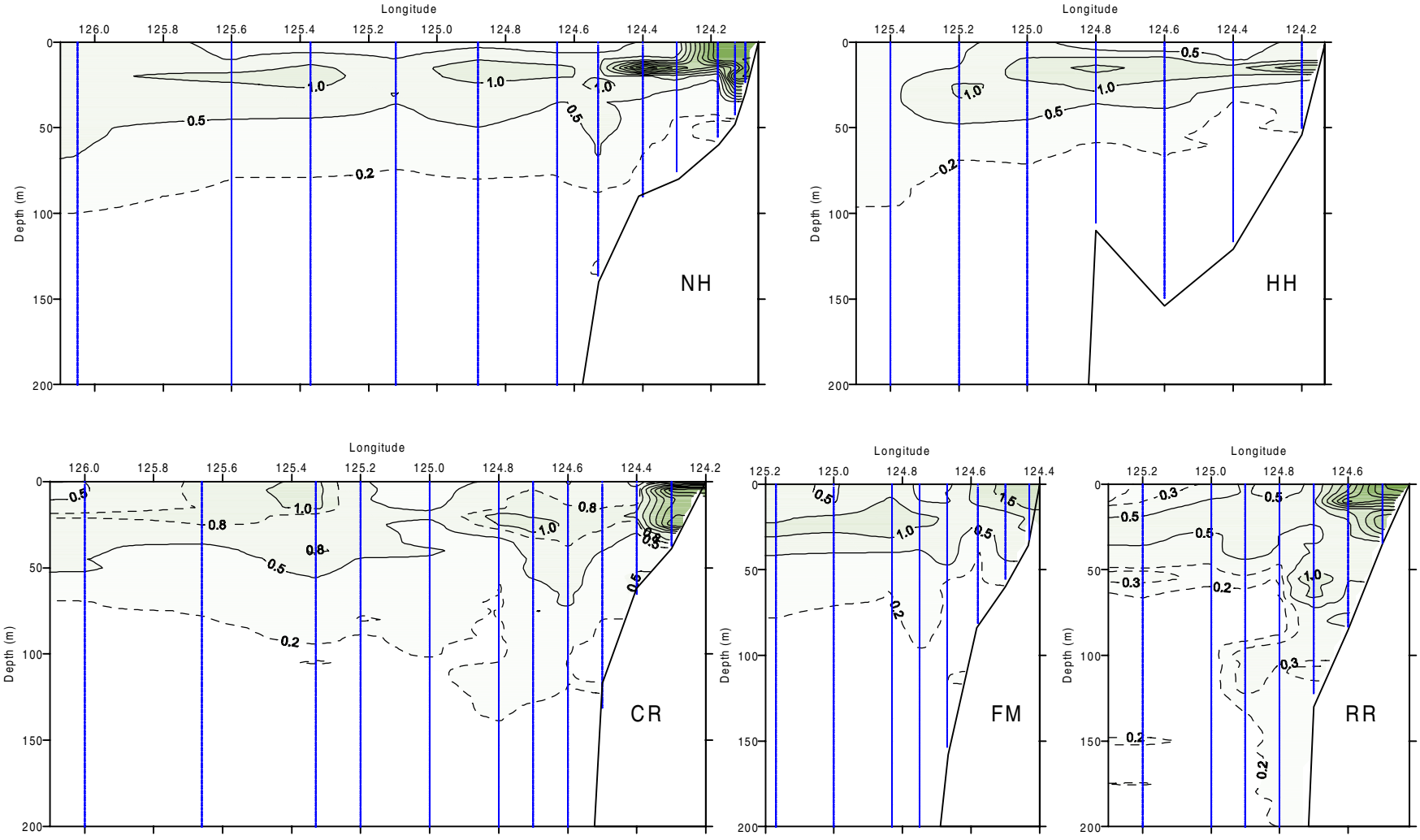




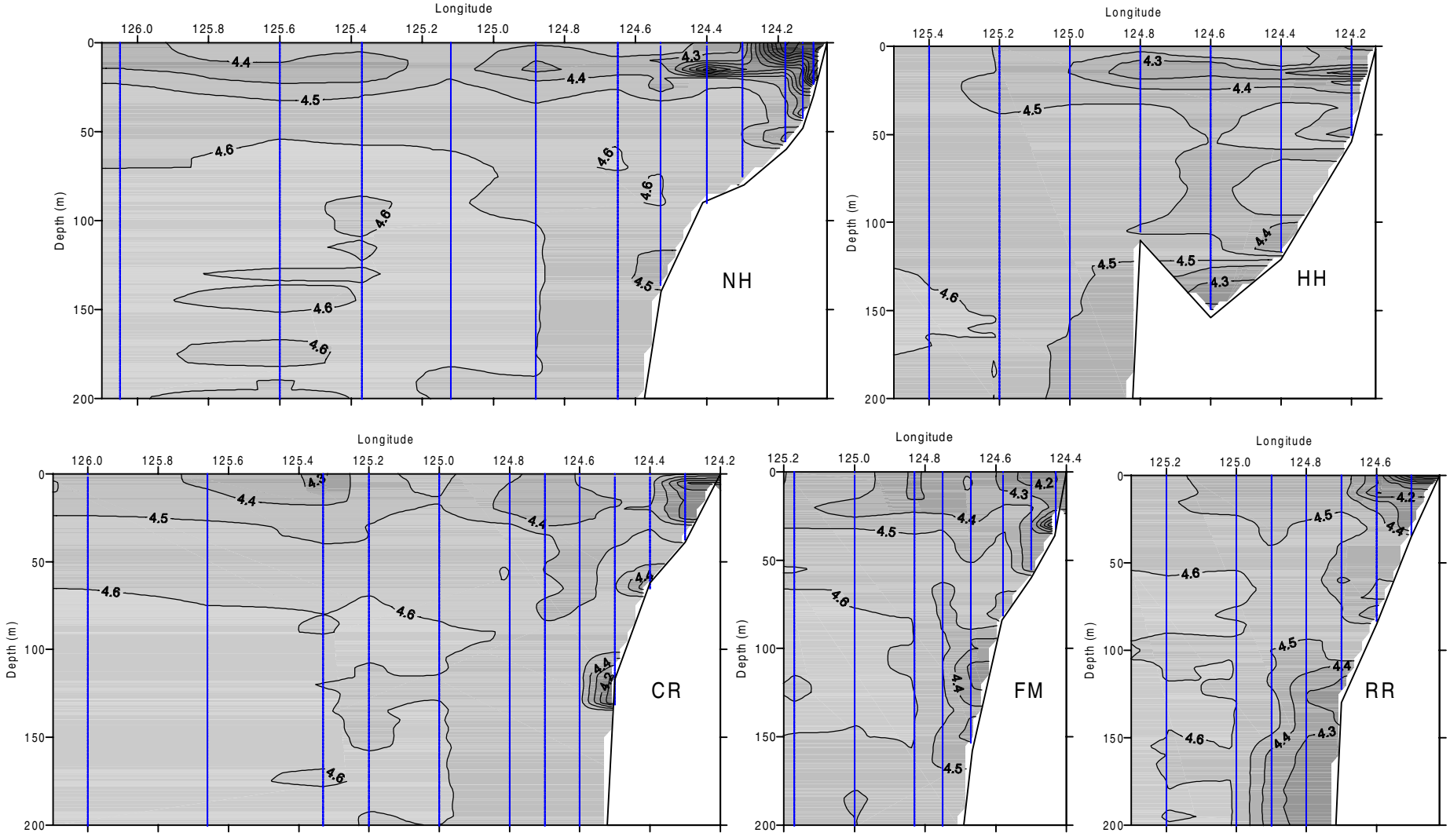
Density (sigma-theta), April 2000



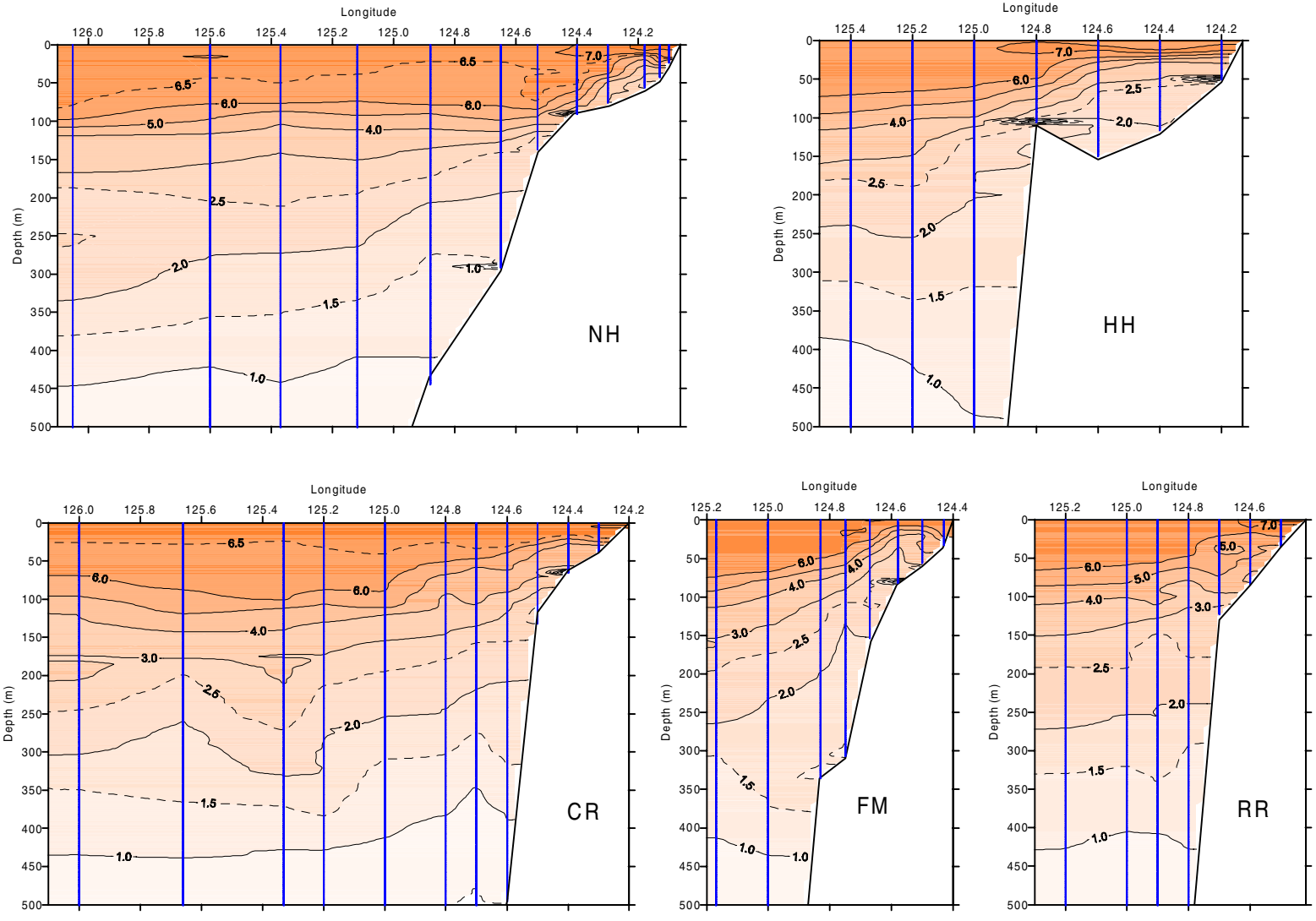
Fluorescence Voltage, April 2000



Transmissivity Voltage, April 2000



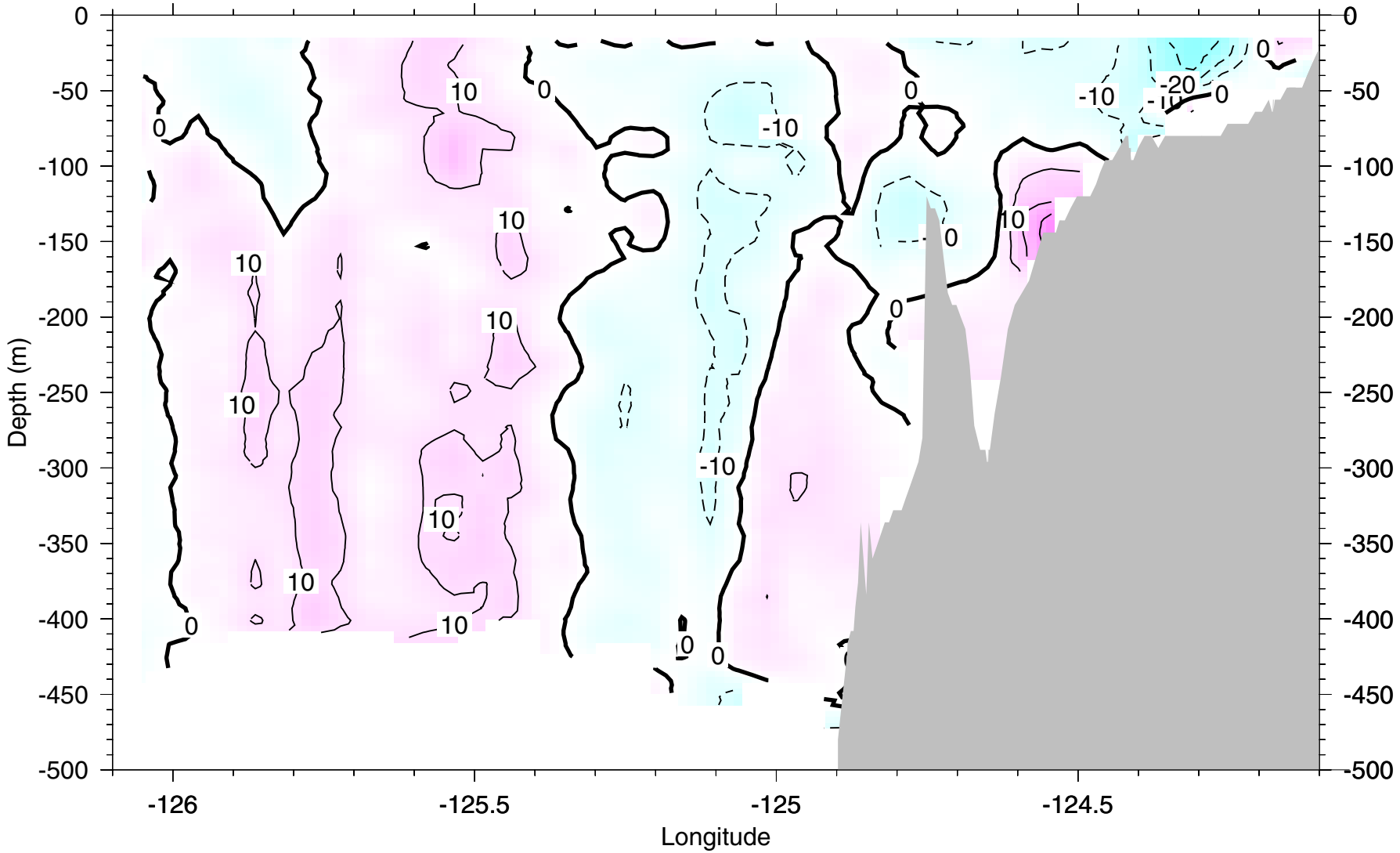
Oxygen ml/l, April 2000



Newport Hydrographic Line 44.6°N

11-13 April 2000

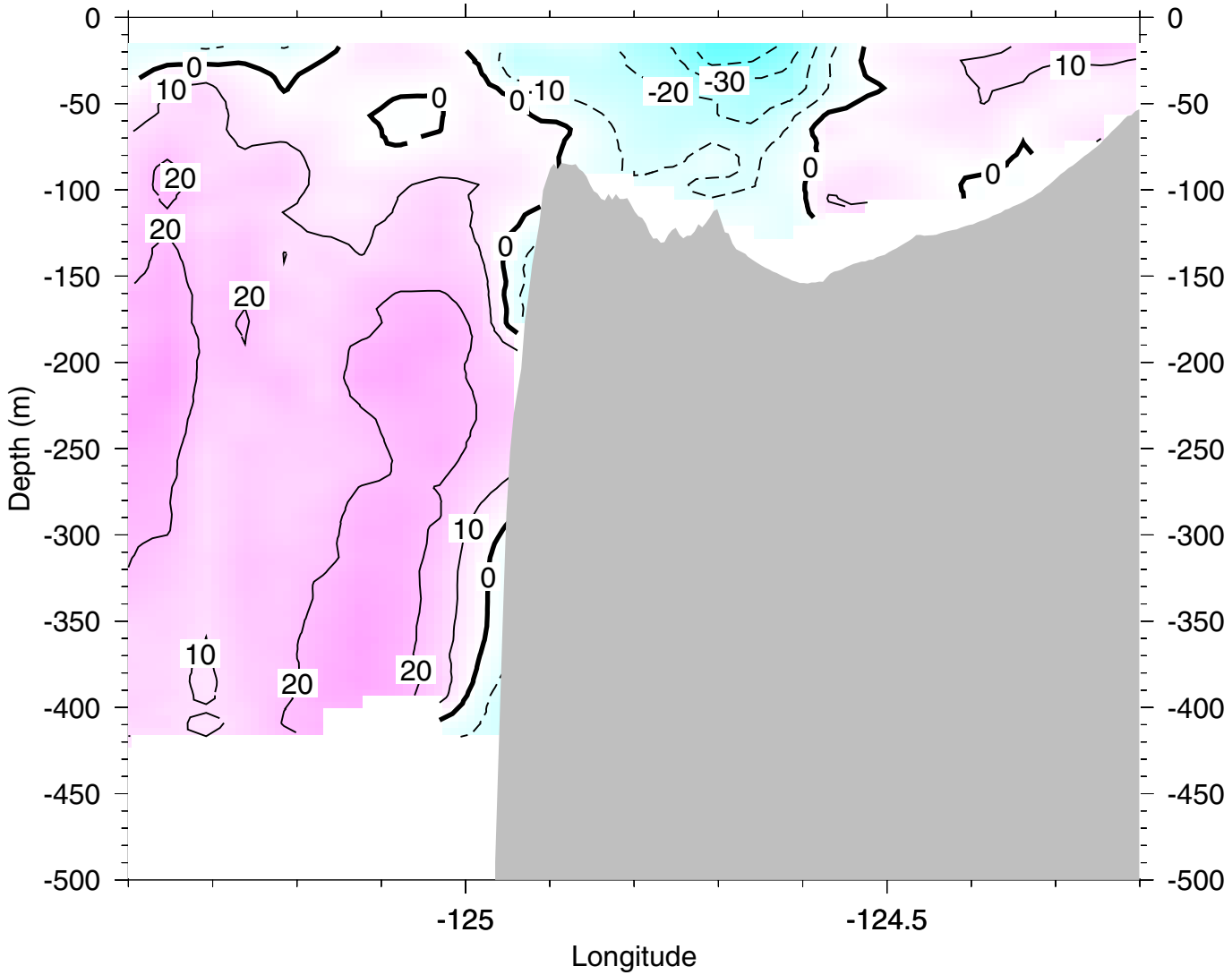
ADCP: Northward current (cm/s)



Heceta Head ADCP Line 44.0°N

16-17 April 2000

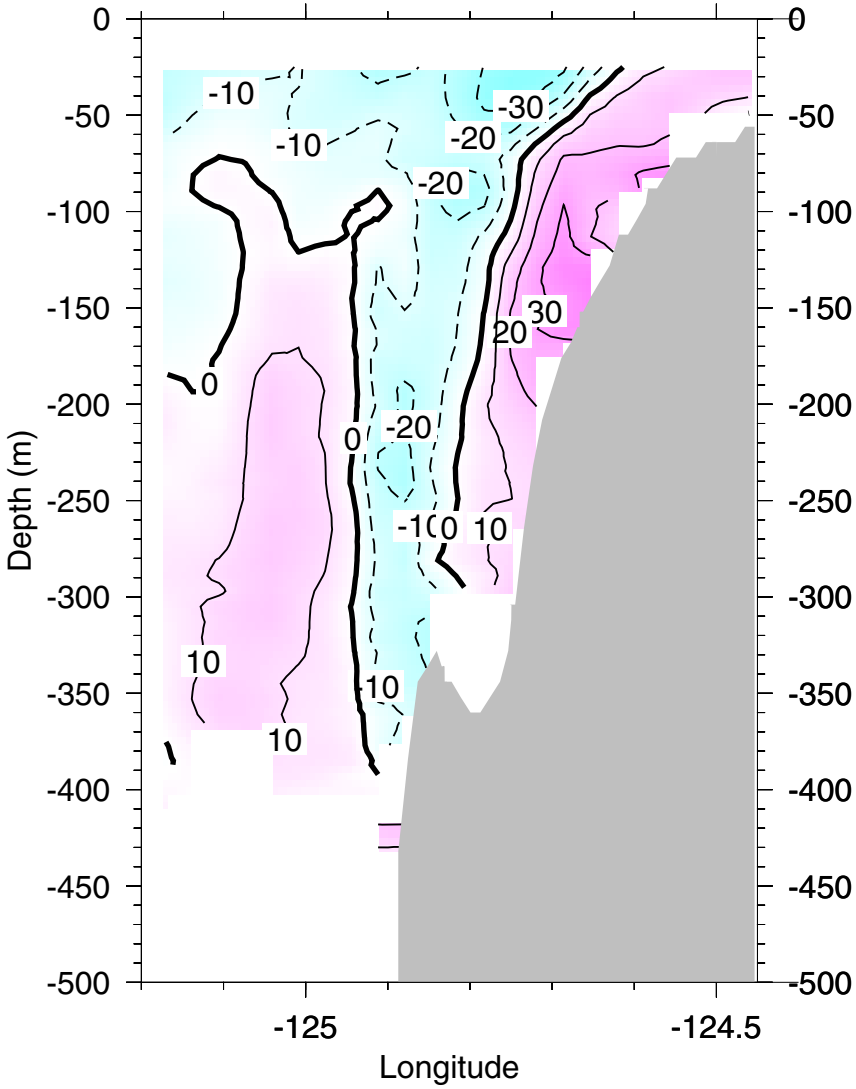
ADCP: Northward current (cm/s)



Five Mile Hydrographic Line 43.2°N

14 April 2000

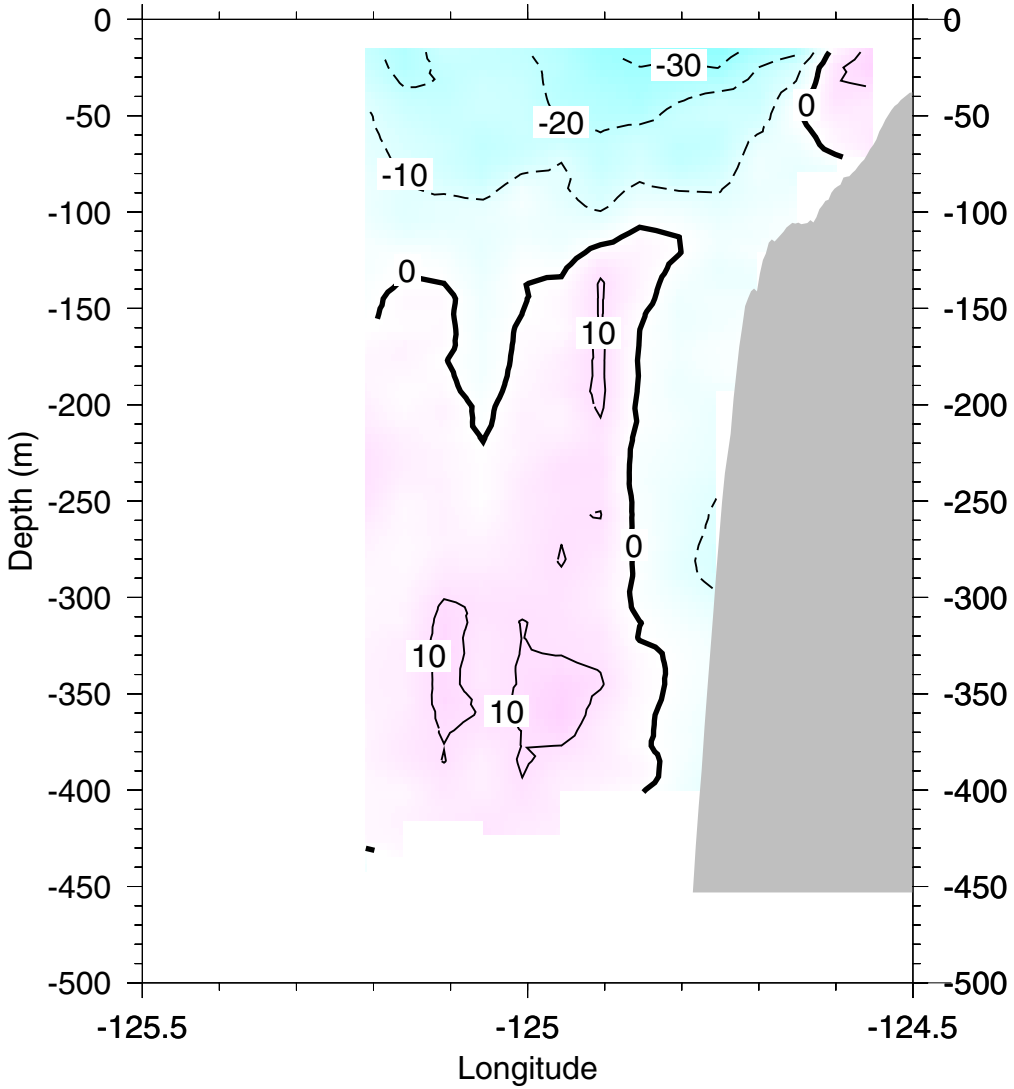
ADCP: Northward current (cm/s)



Rogue River Line 42.5°N

15-16 April 2000

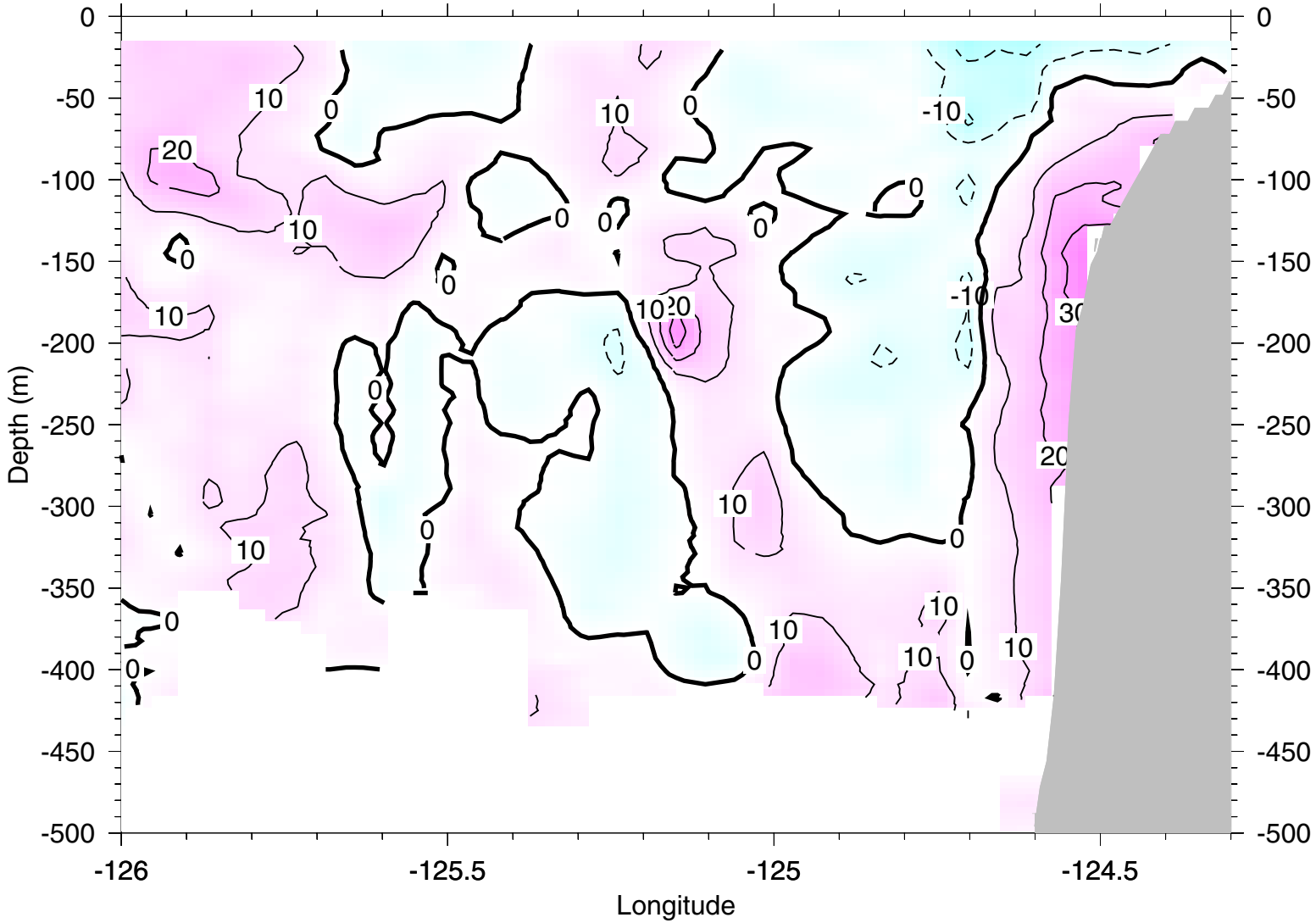
ADCP: Northward current (cm/s)

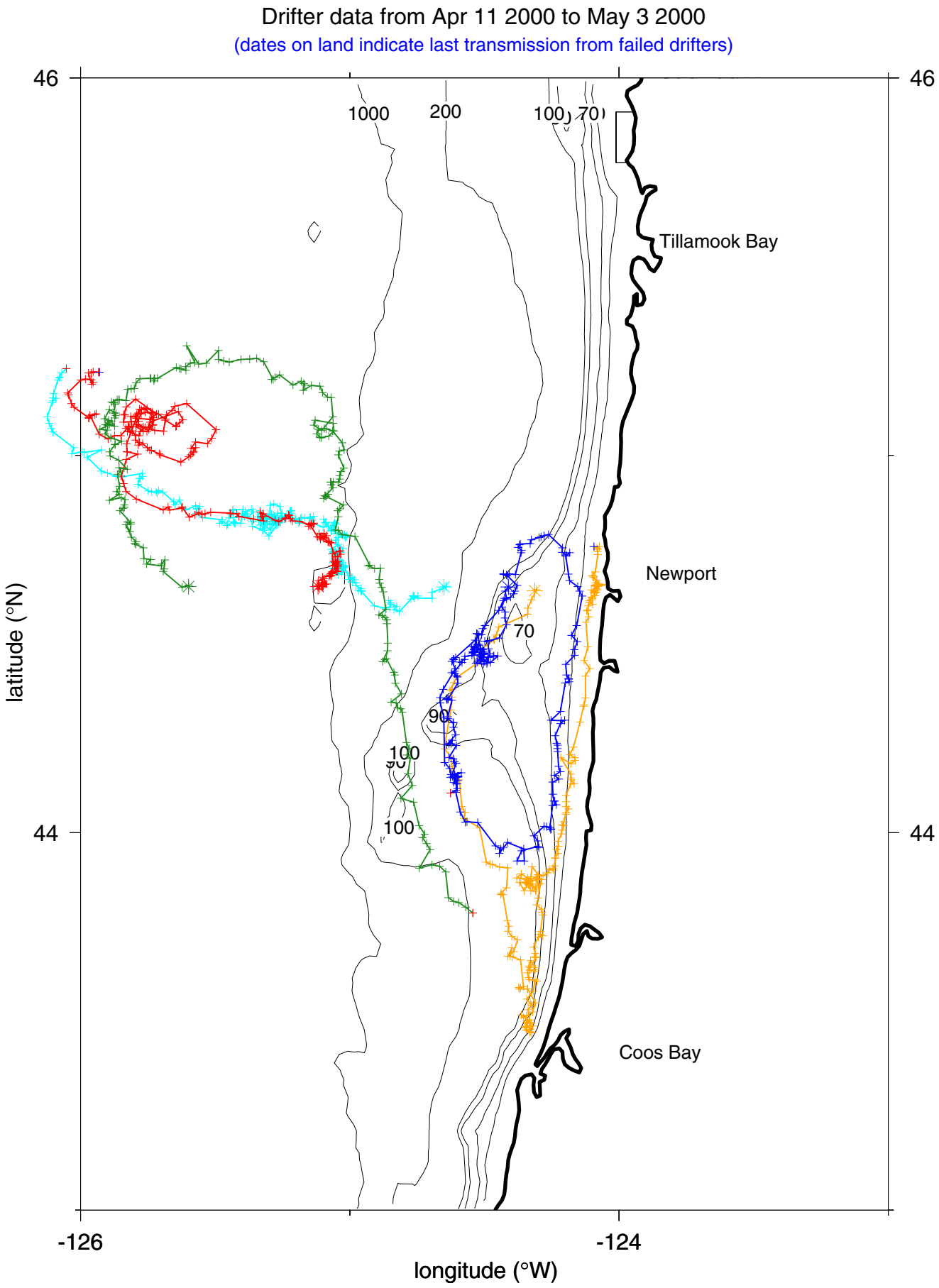


Crescent City Hydrographic Line 43.2°N

14-15 April 2000

ADCP: Northward current (cm/s)




Drifter data from Apr 11 2000 to May 3 2000
(dates on land indicate last transmission from failed drifters)
46
44
-126
-124
latitude (°N)
longitude (°W)
1000
200
100
70
90
100
100
Tillamook Bay
Newport
Coos Bay

Cruise Report – Wecoma 0004B – April 2000 L-TOP Cruise

Zooplankton

Methods. Zooplankton was sampled along five transect lines across the continental shelf and slope off Oregon and Northern California from 11-17 April 2000. Depth-stratified sampling was carried out at a subset of stations with a 1 m^2 MOCNESS fitted with 333 um mesh nets. We completed 20 MOCNESS tows. This was our first cruise using this piece of equipment. We also continued with our routine sampling of zooplankton at all stations with a ½ m diameter 202 um mesh net hauled vertically from near the sea floor to the sea surface (at stations where water depth was less than 100 m) or from 100 m to the surface at deep water stations. All totaled, we completed 34 vertical tows. In addition, euphausiids with a "purple band" were picked from selected tows and incubated for measurement of egg production rates. Some animals were also picked for measurement of gut pigment content; others were frozen for later analysis of lipid content (for R. Harvey, Univ. of Maryland, NEP-GLOBEC PI).

With the MOCNESS sampling it was our hope that we would be able to learn something about diel changes in vertical distributions at shelf and slope stations but L-TOP cruises are not well suited for such studies. These are survey cruises, so when you arrive at a station you work, regardless of time of dayu. Thus, on this trip, by chance, most of our sampling was during daylight hours: 14 tows by day, 6 by night. The positive spin though is that most sampling was by day allowing unbiased comparison of vertical distributions among most of the stations.

Miscellaneous Comments.

<u>*Neocalanus plumchrus*</u>. This species of copepod was abundant in samples offshore of Newport (at NH 35 and NH 45 with water depths of 435-700 m). Few to none were observed off Coos Bay. We found them again off Crescent City but here they were on the shelf, at the inshore stations (CR 2 and CR 3 with water depths of 65-117 m). Coincidentally, we also observed Black-Footed Albatross at NH 35/45, and CR 2/3. Given that albatross are generally "offshore" birds, it would seem that perhaps the same water type observed 35-45 miles off Newport was found on the shelf of Crescent City. Was this due to a downwelling event off Crescent City or shoreward deflection of the inshore arm of the California Current?

Neocalanus continued to be very abundant all along the Crescent City line at CR 4, 6, 7, and 9. Large numbers were also taken along the Rogue River transect , but only at stations RR4, 6 and 7. These are all offshelf stations (deeper than 500 m), so in terms of shelf vs. slope distribution, the RR transect resembled the NH transect . A few were collected on Heceta Bank, at a station near the shelf break (HH4), in the 8-16 m strata.

I've been sampling the Newport Line since 1996 and we've been sampling the L-TOP transects (NH, FM, and CR) since Nov 1997 and we've never seen this many *Neocalanus* before. Densities are several orders of magnitude higher than what has been seen to date. What can all of this mean? Perhaps a greater than normal amount of subarctic water was advected into the northern California current this spring? We also saw greater numbers of *Thysanoessa spinifera* as well – this is another indicator of subarctic water.

<u>Alongshore differences in euphausiid densities</u>. We observed an alongshore gradient in density of *Thysanoessa spinifera* in shelf waters. Many were found off Newport; appreciable numbers off Coos Bay; and along the Rogue River transect, but virtually none were caught on the shelf off Crescent City or along the Heceta Transect Line. What can this mean?

Euphausiid vertical distributions. *Thysanoessa spinifera*. were found chiefly at the surface at NH 5 (daytime), but in both the upper layers and bottom layers at NH 15 (night). Off Coos Bay, *T. spinifera* were throughout the water column at FM 4 (day), but at mid-depth at FM 5 (day). Few to none were found along the Crescent City line. Off Rogue River the *Thysanoessa spinifera* were found between 15-65 m at the nearshore station (RR2, night, water depth 80 m) and 15-50 m at the midshelf station (RR3, night, 130 m). Only a few were taken along the Heceta line and only at mid-depth (12-60 m) at HH 2 (day, 120 m water depth). The only generalization that we think hold is that by day this species remains below the upper wind-mixed layer. Our night time sampling in shelf waters was only along the Rogue River line and here *T. spinifera* again avoided the upper mixed layer suggesting that this species does not perform a strong diel vertical migration in shelf waters.

There was a more consistent pattern in the daytime deep-water vertical distributions of *Euphausia pacifica* . At NH 35 and 45, FM 7 and CR 5, *E. pacifica* were found in the 150-300 m strata. At CR 4, juvenile *E. pacifica* were found in the 100-200 m strata. By night, adults were at 100-250 m and juveniles in the upper 100 m. A classical diel vertical migration was seen for this species at NH 25 (adults 0-50 m), RR 4 (0-50 m).

Cross-shelf Zonation. We saw clear evidence for cross-shelf zonation between the two dominant euphausiid species. *Thysanoessa spinifera* was present only in inner-mid shelf waters and *Euphausia pacifica* only in offshore deep waters along all transects (although recall that very few *T. spinifera* were found off Crescent City). Both species were at the shelf break, although *T. spinifera* was the clear dominant. As for the copepods, *Calanus marshallae* was found only on the shelf but *Pseudocalanus* was both in shelf waters as well as deep water offshore.

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Summary of 20 MOCNESS Tows.

NH 5 Day 2000 h Water Depth = 60 m

1	20 - 40 m	Pink, Pleurobrachia, Cal. marshallae, Pseudocalanus, 30 Thysanoessa spinifera
2	10 - 20 m	Pink, C. marshallae, Pseudocalanus, 30 T.spinifera
3	10 - 0 m	Pink, C. marshallae, Pseudocalanus, Pleurobrachia
4	0 m	Small copepods, jellies

NH 15 Night 2200 h Water depth = 93 m

1	0 - 75 m	Pink, Large sample, Pseudocalanus, marshallae, Pleurobrachia, 80 T. spinifera
2	75 m	Pink, Small sample, Pseudocalanus, 10 huge T. spinifera
3	50 – 75 m	yellowish jelly crud (salps?), 20 huge T. spinifera
4	19 – 50 m	Greenish, Pseudocal anus, marshallae, Pleurobrachia, 50 T. spinifera
5	9 – 19 m	Pink, Pseudocalanus, marshallae, Pleurobrachia, 10 T. spinifera
6	0 – 9 m	Pink, Pseudocalanus, marshallae, Pleurobrachia, 10 T. spinifera

NH 25 Night 0050 h Water depth = 295 m

1	0 – 260 m	Limacina, siphonphores, 100's of Euphausia pacifica
2	200-260 m	Some Cal. plumchrus, Euchaeta, chaetognaths
3	150-200 m	Some plumchrus & cristatus, Eucalanus, an expoded brownish medusa
4	100-150 m	Pink, marshallae, Pseudocalanus, 5 T. spinifera
5	50-100 m	Pink, marshallae, Pseudocalanus, 10 T. spinifera, big Limacina, sand eels
6	20- 50 m	Pink, 100's of Euphausia pacifica + a few T. spinifera
7	10- 20 m	Pink, 100's of Euphausia pacifica, marshallae, Pleurobrachia
8	0- 10m	Pink, 200 E. pacifica, marshallae, Pleurobrachia

NH 35 Day 1105 h Water depth = 435 m

1	395-300 m	3 myctophids, 1 viper eel, 200 Euchaeta
2	200-300 m	200 Euphausia pacifica, 100's of large chaetognaths, 30 siphonophores
3	140-200 m	100 Euphausia pacifica, a few plumchrus
4	90-140 m	Chock full of plumchrus, 300-400 Limacina
5	50- 90 m	Chock full of plumchrus, 50 Euphausia pacifica
6	20- 50 m	A few plumchrus, 12 circular (6 cm) jellies, 1 Beroe, 2 T. spinifera
7	10- 20 m	500 Euphausia pacifica, 50 Pleurobrachia, 1 Beroe
8	0-10 m	100 Pleurobrachia

NH 45 Day 1435 h Water depth = 700 m

1	300-500 m	14 Myctophids, 1000 Euphausia pacific, 1 Beroe, 3 Red medusae
2	200-300 m	200 Euphausia pacifica, 100's of large chaetognaths, 30 siphonophores
3	150-200 m	30 Euphausia pacifica, some Cal. Plumchrus
4	100-150 m	4 Euphausia pacifica, some plumchrus, small Limacina, 12 Sag. Scrippsae
5	50-100 m	1 large Clio, "spiral" colony of salps (2 strings each 10 cm in length)
6	20- 50 m	some gooey jellies, 20 amphipods
7	10- 20 m	15 large Limacina, 1 E. pacifica, 1 Beroe, 6 Pleurobrachia
8	0- 10 m	30 Pleurobrachia, 1 Beroe

Coos Bay (Five Mile Point) Hydrographic Line

FM 3 Day 1045 h Water depth = 60 m (no euphausiids)

1	45 m	Small copepods
2	45 – 20 m	Spiral salps, 3 giant pyrosomes, Phialidium, Pleurobrachia
3	10 – 20 m	Phialildium, Pleurobrachia
4	0 – 10 m	Very little sample; Phialidium, Pleurobrachia

FM 4 Day 0809 h Water depth = 84 m

1	70 m	Very little sample; small copepods
2	50 – 70 m	20 Pleurobrachia, 80 Thysanoessa spinifera
3	20 – 50 m	200 Pleurobrachia, 2 Thysanoessa spinifera, 1 Ammodytes
4	10 – 20 m	50 Pleurobrachia, 35 Thysanoessa spinifera
5	0 – 10 m	2 adult Thysanoessa

FM 5 Day 1310 h Water depth = 158 m (both species of euphausiids here)

1	100-140 m	50 chaetognaths, Cal. Marshallae, 5 euphausiids
2	50-100 m	some adult euphausiids, Pleurobrachia, Limacina
3	20- 50 m	15 cm hotdog ctenophore, 100 euphausiids, Pleurobrachia
4	10- 20 m	Pleurobrachia, euphausiids
5	0 - 10 m	50 Pleurobrachia
6	0 m	Very little sample, 10 Pleurobrachia

FM 7 Day 1740 h Water depth = 336 m)

1	200-280 m	juvenile euphausiids, copepods, myctophids
2	150-200 m	siphonophores, Limacina, copepods
3	100-150 m	siphonophores, Limacina, chaetognths
4	50-100 m	Limacina, jellies, a few euphausiids
5	20 - 50 m	NO NOTES
6	10 – 20 m	Limacina, Pleurobrachia, amphipods
7	0 – 10 m	Limacina, Pleurobrachia, Beroe, small copepods

Crescent City Hydrographic Line

CR 2 Day 1011 h Water Depth = 65 m (very light catches)

1	55 m	Pink, Pseudocalanus, marshallae, plumchrus, some jellies
2	35 - 55 m	Pink, Pseudocalanus, marshallae, plumchrus
3	19 - 35 m	Pleurobrachia, Limacina, plumchrus, jelly ooze, amphipods, 1 Clione
4	10 – 19 m	15 Pleurobrachia, jelly ooze, amphipods
5	0 – 10 m	18 Pleurobrachia, 1 Dungeness crab megalopa, Limacina, 2 Clione, little else
6	0 m	Qualitative surface net; 1 Clione, a few copepods and amphipods

CR 3 Day 0750 h Water Depth = 117 m (very light catch)

1	100-125 m	Pink, plumchrus, marshallae, 5 5 cm diameter jellies
2	50-100 m	Pink, Pseudocalanus, Limacina
3	35- 50 m	Pink, Pseudocalanus, 1 Beroe, 1 Pleurobrachia, 1 amphipod
4	15- 35 m	Clio, megalopae, jelly, amphipods, Pleurobrachia
5	7- 15 m	2 Pleurobrachia, plumchrus
6	0- 7 m	plumchrus, Phialidium

CR 4 Day 1432 Water depth= 500 m (all nets full)

1	300-500 m	Sergetes (pelagic shrimp), 3 Atolla (deep-sea jelly), 3 Cyclostome (fish), 4 Gaussia (copepod), amphipod, blue egg clusters, siphonophores
2	200-300 m	36 Sergestes, 2 myctophids, many siphonophores
3	150-200 m	100 juvenile Euphausia pacifica, salps,. Chaetognaths
4	100-150 m	A few juv. E. pacifica, chaetognaths, 2 circular jellies
5	50-100 m	Spiral yellowish salps, 1 Clio pyrimadata, 2 big pyrosomes
6	22 - 50 m	7 Dungeness meglopae, large Limacina, jelly ooze
7	11- 22 m	Neocalanus plumchrus galore!!!, 10 Pleurobrachia
8	0 - 11 m	Plumchrus, plumchrus, plumchrus, Pleurobrachia, Paracalanus

CR 5 Day 1825 Water depth = 645 m

1	300-500 m	1 “hula” fish; myctophids, some other fish, large copepods, Sergestes
2	200-300 m	Euphausiids, Segestes, amphipods, chaetognaths, Pleurobrachia
3	150-200 m	Small euphausiids, Siphonphores
4	100-150 m	Siphnophore, 1 circular jelly
5	50-100 m	Spiral yellowish salps, Limcina
6	20-50 m	plumchrus, Dungeness megalopae, Beroe, Limacina, amphipods
7	10-20 m	plumchrus, Dungeness megalooae
8	0-10 m	plumchrus, 1 Segestid (contaminant?)

CR 7 Night 2310 Water depth = 852 m

1	350-500 m	Gaussia, gumdrop jellies, 5 Sergestes, Cyclothone
2	250-350 m	plumchrus, some cristatus, 3 euphausiids, large copepods
3	150-250 m	Chaetognaths, 10 Euphausiids, 2 Sergestes, 1 Squid larva, amphipods, siphonophores, Circular jelly, 1 Beroe
4	100-150 m	3 Sergestes, 20 Euphausia pacifica, 50 large Limacina, Fish
5	50-100 m	3 myctophids, small Limacina, Furcilia, 1 circular jelly
6	30- 50 m	2 myctophids, 4 circular jellies, furcilia, copepods, chaetognaths
7	10- 30 m	1 myctophid, furcilia, copepods, many circular jellies
8	0- 10 m	plumchrus, small Limacina, furcilia, 2 circular jellies

RR 2 Night 2130 h Water depth = 87 m

1	65 m	Thysanoesa spinifera, Pleurobrachia
2	50 - 65 m	100 T. spinifera, 100 Pleurobrachia, 3 juv. sand eels
3	20 - 50 m	1000's T. spinifera, 200 Pleurobrachia, Dungeness megalopa, 6 cm long flatfish
4	15 - 20 m	30 purple T. spinifera, Pleurobrachia, 1 juv. Sand eel, chaetognaths
5	7 - 15 m	T. spinifera, 1 dungeness megalopa
6	0 - 7 m	Pleurobrachia, copepods, very few euphausiids

RR 3 Night 2235 h Water Depth = 134 m

1	100-120 m	2 Beroe, 25 juv. Euphausiids, 30 Pleurobrachia
2	50-100 m	2 pyrosomes with attached asexual products, 75 juv. Euph., 100 Pleurobrachia
3	50 20 m	1000 juv. T. spinifera, 100 Pleurobrachia
4	20 - 10 m	1000 furcilia+juv, 9 Pleurobachia, 1 small megalopa
5	10- 0 m	10 T. spinifera, 2 Beroe, Calanus, Jellies
6	0 m	Calanus, Limacina, 15 Pleurobrachia

RR 4 Night 0140 h Water depth = 550 m

1	300-500 m	6 Sergestes, 3 odd Beroe-like, 1 Myctophid, Chaetognaths, Amphipods, 3 circular jellies
2	200-300 m	1 Pandalus, 1 myctophid, chaetognaths, siphonophores, 1 juv. hake
3	150-200 m	2 Pandalus, 2 Sergestes, 1 Myctophid, copepods
4	100-150 m	4 Sergestes, 1 myctophid, sand eel, salps
5	50-100 m	1 myctophid, 1 other fish, 1 Sergestes, 10 euphausiids, copepods
6	20 - 50 m	plumchrus, 1 Sergestes, 5 circ. jellies, 100-200 furcilia
7	10 - 20 m	300 furcilia+juv euphausiids, 8 circ. Jellies, Limacina, Pleurobrchia, megalopae
8	0 - 10 m	Amphipods, gelatinous crap, 200 juv. Euphausiids

HH 2 Day 1358h Water depth = 120 m

1	105 m	Pink. 5 Pleurobrachia, 10 chaetognaths, Calanus
2	68-105 m	Pink. 1 T. spinifera, 1 fish, Peudo/Calanus, spiral sapls
3	50- 68 m	15 T. spinifera, 25 Pleurobrachia
4	35- 50 m	10 T. spinifera, 70 Pleurobrachia, 5 circular jellie, copepods
5	12- 35 m	3 T. spinifera, 350 Pleurobrachia, 10 cm Beroe, 1 small fish
6	6- 12 m	350 Pleurobrachia, several fish larvae, 1 small megalopa
7	0 - 6 m	1 T. spinifera, 350 Pleurobrachia, 10 amphipods

HH4 Day 1700 h Water depth = 110 m

1	90 m	Pink. 15 circle jellies, copepods, chaetognaths
2	90 – 72 m	Pink. Calanus marshallae, 10 Pleurobrachia, 1 pyrosome
3	72 – 50 m	Pink. Calanus marshallae
4	35 – 50 m	Small copepods, Limacina
5	16 – 35 m	Salp chain (greenish, 20 cm length), big Limacina, 20 Pleurobrachia, amphipods
6	8 –16 m	Neocalanus plumchrus, 5 Beroe, Clione, big Limacina, amphipods
7	0 - 8 m	Beroe, copepods

HH 5 Dusk 1915 h Water depth = 935 m

1	350-300 m	3 Atolla, 5 circular jellies, 2 Beroe, big chaetognaths, big shrimp
2	200-300 m	3 Sergestes, 1 myctophid, 3 circular jellies, copepods, chaetgnaths
3	150-200 m	3 myctophids, 4 euphausiids, copepod, chaetognaths
4	100-150 m	150 euphausiids, copepods
5	50-100 m	10 euphausiids, copepod; nothing else
6	20- 50 m	4 Limacina, 1 amphipod, mostly jelly goo, 200 copepods
7	12- 20 m	10 large Limacina, 1 Pleurobrachia, mostly jelly goo
8	0 - 12 m	8 Beroe, large Limacina, Clione limacina, 1 Dungeness megalopa

Experimental Work

Gut Pigment

NH 5	Thysanoessa spinifera (n = 8)
NH 45	Euphausia pacifica (n = 6)
FM 4	T. spinifera , Net 2 (n = 8)
FM 4	T. spinifera, Net 4 (n = 7)
RR 2	T. spinifera, (n = 7)
RR 3	T. spinifera (n = 5)

Egg Production

NH 45 8 bottles; Euphausia pacifica

Four of the eight females produced eggs after 24 h. We continued to incubate the other 4, but first changed their water. One of the four which produced eggs also molted. The other 4 did not lay eggs after 48 h.

CR 4 2 bottles; 9 female Pseudocalanus

RR 2 10 bottles, Thysanoessa spinifera. Six of the 10 produced eggs durng the 24 h incubation. The remaining four were incubated for an additional 24 h. These same four were returned to the lab in Newport but none laid any eggs.

Euphausiids Collected and Frozen for Rodger Harvey

NH 35	two replicate vials containing 5 and 3 female *Euphausia pacifica* (MOC-7)
NH 45	three replicate vials of 5 females each of *E. pacifica* (MOC-0)
FM 5	one vial of 5 females of *E. pacifica*
CR 4	one vial of mixed copepods + one vial of “blank” seawater
RR 2	three vials, 5 *Thysanoessa spinifera* in each

Mammal and Other Obsevations

Many Large Velella vellela at NH 5

Two grey whale (blows) sighted off Coos Bay (FM 1)
1 ton (= 40) of Pacific White Sided Dolphins (including some very young ones practicing their leaps) at CR 3
1 bellowing male sea lion at RR 7 at night

Birds:
Not many pelagic birds were seen on this trip. We use the following abbreviations in the table below: Black Footed Albatross (BFA), Sooty Shearwater (SS), Fulmar (F), Leach's Petrel (P), Common Flicker (CF), Unidentified songbird (S). No attempt is made to count gulls, murres, cormorants or auklets. No other species were seen.

	Night	BFA	SS	F	P	CF	S
NH 1							
NH 5							
NH 10							
NH 15	Y						
NH 20	Y						
NH 25	Y						
NH 35		1					
NH 45		2				1	1
NH 65		2					
FM 1							
FM 3							
FM 4							
FM 5							
FM 7		2		1			
FM 8		2					
FM 9	Y				1		
CR 1			1				
CR 2		1					
CR 3		20	2				
CR 4		10					
CR 5		11					
CR 6		9					
CR 7	Y				1		
CR 9	Y						
CR 11		1					
RR 7		1					
RR 6							
RR 5							
RR 4	Y	1		1	1		
RR 3	Y						
RR 2							
RR 1							
HH 1							
HH 2							
HH 3							
HH 4		1					
HH 5	Y						