

PRELIMINARY CRUISE REPORT, W0109A
R/V WECOMA, 4-10 September 2001
GLOBEC NEP Long-Term Observations off Oregon

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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, OR. and Crescent City, CA.), to make continuous bio-acoustic observations between the 50-500m. isobaths along the 5 lines, 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:

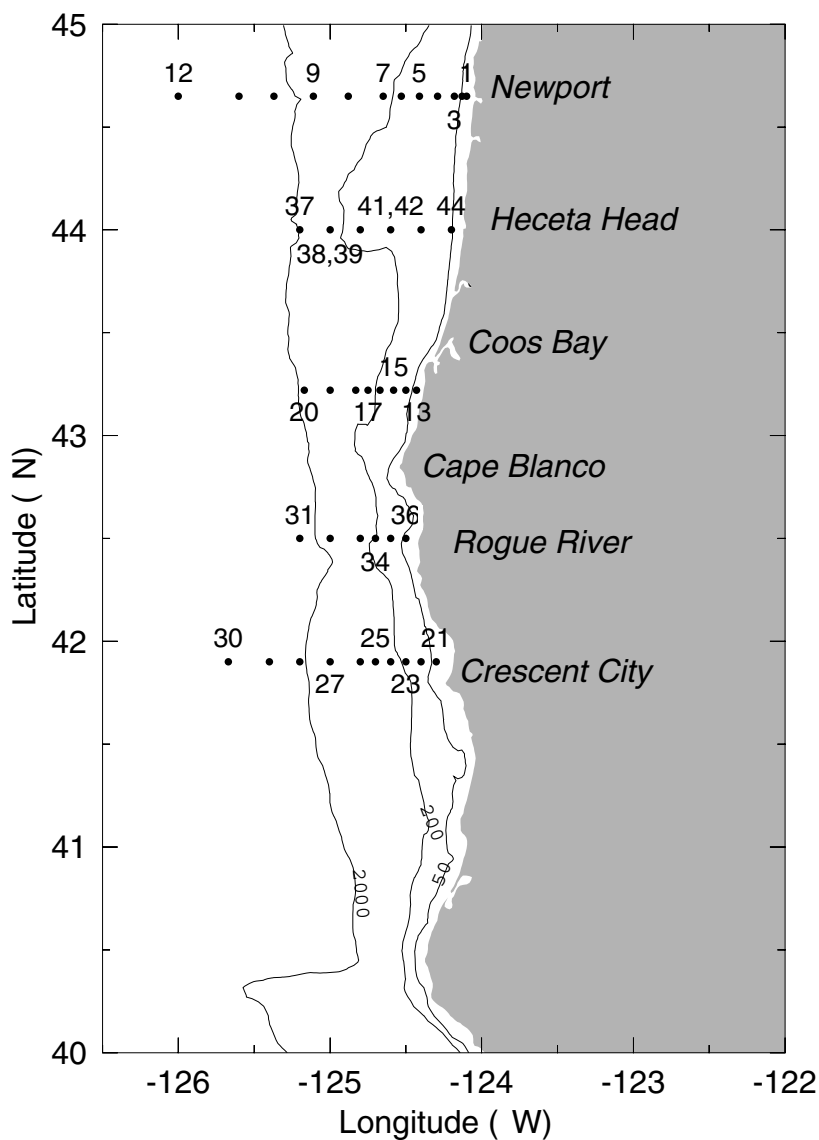
1. Use ship's intake continuously for Temperature, Salinity, and Fluorescence
2. Continuous ADCP Profiling (150 kHz transducer) for water velocity and backscattering for bio-acoustics.
3. Standard CTD Stations using SBE 9/11 plus CTD system for Temperature, Salinity, Fluorescence, Light Transmission, Oxygen, PAR.
4. Rosette sampling: 5 liter bottles for nutrients, chlorophyll, microzooplankton
5. Deploy surface drifters at selected NH-line stations.
6. Vertical net tows: 1/2 meter nets 100 m to surface; Horizontal net tows with 1 m² MOCNESS.
7. Continuous bio-acoustic observations between the 50-500m isobath along 5 sections using a Hydroacoustics Technology, Inc., system towed alongside the ship.

CRUISE NARRATIVE

A brief overview of W0109A is presented here. An event log is provided in Table 3, and participating personnel are listed in Table 4. Wecoma departed Newport at 1000 PDT on 4 September 2001. CTD sampling started at NH-1 and continued out to NH-35. A single vertical net tow was done at NH-1. The HTI (bio-acoustic system) was deployed, and both MOCNESS and vertical net tows were started at NH-35 to have most of the zooplankton sampling along the Newport Line completed in the dark. Net tows continued all night working towards shore along the Newport Line to NH-5. While running back out to resume CTD sampling at NH-45, drifters were released at NH-10, 15, and 25. The NH-line was completed with the usual CTD's and nets out to NH-85, and additional drifters were released at NH-45 and NH-65. The ship slowly began the transit to the inshore

end of the FM-line in order to respool wire on the trawl winch, and arrived in daylight to begin sampling at FM-1 at 0805 PDT, 6 September. The wind began to pick up as the Wecoma worked its way offshore, and the choppy seas caused the CTD wire to pop out of the sheave, putting a minor ding in the wire. The data did not appear to be affected, but to prevent future problems, the CTD wire was reterminated following FM-9 on the run to the Crescent City Line.

Figure 1. CTD stations during W0109B, along the Newport, Five Mile, Heceta Head, Rogue River and Crescent City Hydrographic Lines.



Sampling began at CR-1 in daylight at 0851 PDT on 7 September with the wind and seas continuing to pick up. Following the MOCNESS at CR-2, the ship had to wait on station while sample processing was completed on deck due to the rough seas. At CR-3, power was lost to the MOCNESS, and the net tow was restarted after fixing a loose connector. By the end of the CTD cast at CR-5, winds were steady at 40 kts. (Figure 2), and the seas made it impossible to continue sampling safely. The ship hove to at 1815 PDT on 7 September, waiting for the better weather that was forecast. By daylight the next day, the winds were down to 20-25 kts., and CTD sampling resumed at CR-6 at 0842 PDT on 8 September. The MOCNESS had been damaged overnight by high waves bending its vertical support bars, so the MOCNESS tow was skipped at CR-6. Repairs to the MOCNESS frame were finished following the CTD at CR-7, and a MOCNESS tow was completed. The offshore station (CR-11) was omitted to allow sufficient time to complete the Rogue River and Heceta Head Lines. Sampling along the CR-line was completed at 1850 PDT, 8 September, and we transited to the offshore end of the RR-line, arriving at 2240 PDT.

Winds continued to drop, and the RR-line was completed at 0717 PDT on 9 September with winds remaining below 10 kts. for the entire line. RR-5 and HH-9 were both omitted to ensure sufficient time for zooplankton sampling and the ship transited to HH-7, arriving at 1558 PDT, 9 September. Sampling at HH-1 was completed at 0805 PDT, 10 September and the ship transited to Newport, arriving at the pier at 1233 PDT.

PRELIMINARY RESULTS

Temperature, salinity and density sections during this cruise reflect the wind field. Winds had been moderate in the northern region before and at the beginning of this cruise, and intensified during the cruise. North winds exceeded 40 knots while we were on the Crescent City line, before decreasing again to moderate levels while we sampled the Rogue River and Heceta Head lines (see time series of winds). Surface temperatures off Crescent City (8-13 C) were much lower than off Newport (12-16 C). Surface salinities off Crescent City were higher (32.8-33.9) than off Newport (~32.2). The upwelling front was very weak or absent off Newport, but very broad off Crescent City. The most inshore stations off Crescent City and Rogue River reflect the recent strong upwelling: very cold temperatures (~8.5 C), very high salinity (~33.9), low dissolved oxygen (~3 ml/l), and low fluorescence.

Surface salinities off Newport were very uniform, and not as low as usual at this time of year, probably because of relatively low discharge from the Columbia resulting from the 2000-01 winter drought in the Pacific Northwest.

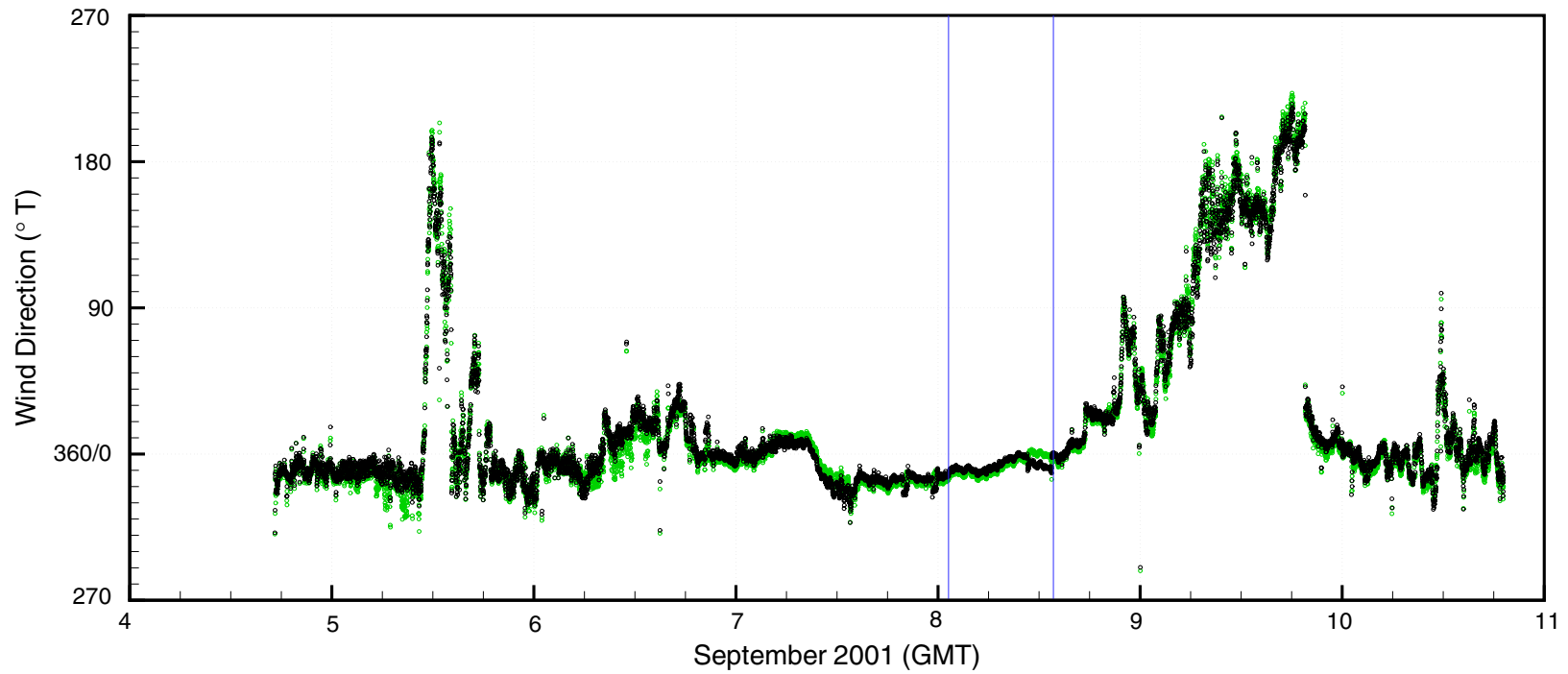
Near surface fluorescence over the shelf was much higher off Newport and Heceta Head than on the southern sections. These high fluorescence values are correlated (as expected) with high concentrations of dissolved oxygen, and with lower values of light transmission. Fluorescence values were particularly high off Heceta Head.

All sections show reduced values of light transmission along the bottom (i. e., a bottom nepheloid layer) over the shelf.

At NH-35 and HH-7 we observed an oxygen minimum centered at about 150 m, that lies within a bank of northward flow on the inshore side a cold-core eddy (see ADCP section and drifter map). The turbidity and low oxygen concentrations suggest this feature may result from an offshore displacement of shelf bottom waters.

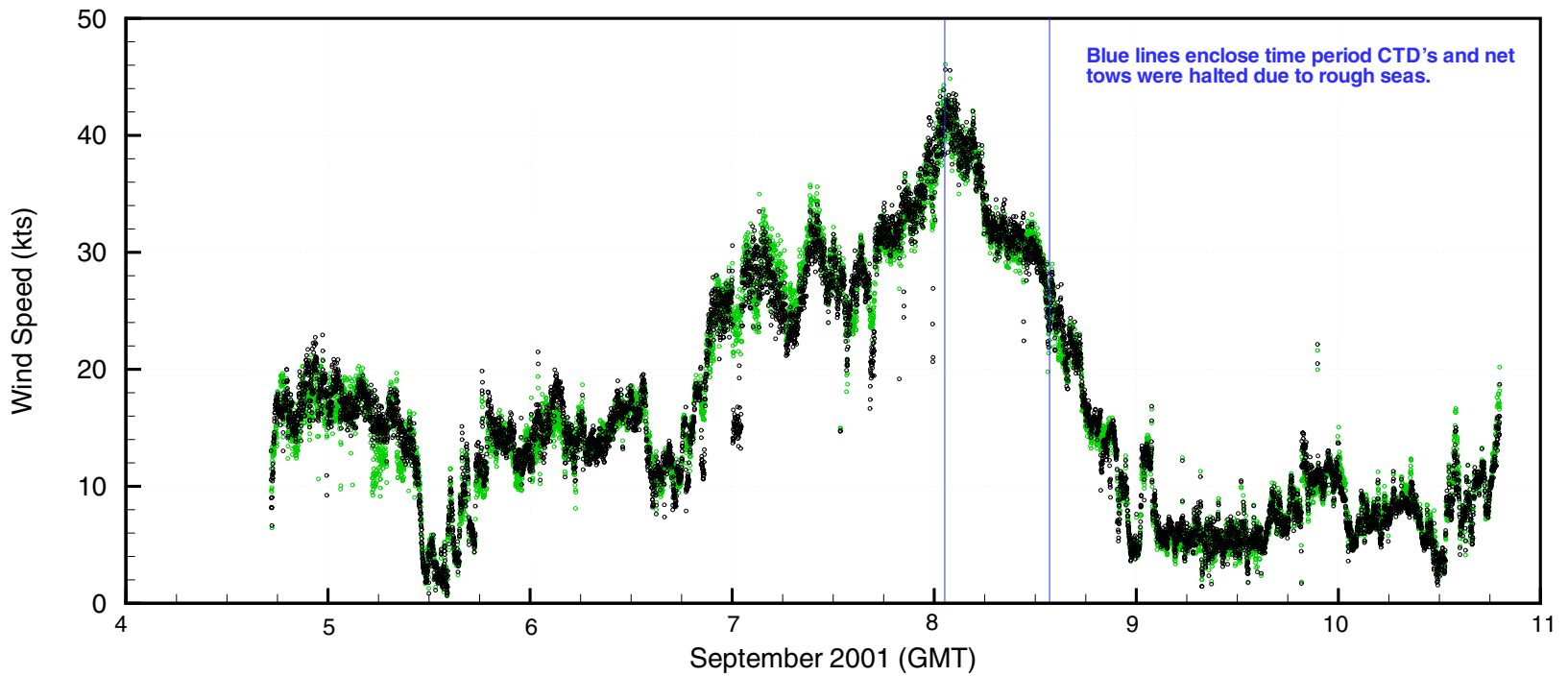
The attached zooplankton report was provided by Dr. Wm. Peterson, and the attached microzooplankton report was provided by the Drs. Evelyn and Barry Sherr.

Figure 2. W0109A Wind Speed and Direction on R/V Wecoma



.... Port

.... Starboard



Blue lines enclose time period CTD's and net tows were halted due to rough seas.

Table 1. CTD station positions during W0109A, and sampling at each station (C: Bio/Chem bottle sampling, N:half-meter vertical net tows, M:Mocness, O:Oxygen samples, D:Drifter, Z:Microzooplankton bottle sampling).

Station		Distance	Lat.	Long.	Bottom	Cast	Sampling
Name	No.	from shore	°N	°W	Depth	Depth	Type
		(km)			(m)	(db)	
NH-1	1	3.0	44.65	-124.10	29	25	N
NH-3	2	5.6	44.65	-124.13	49	42	
NH-5	3	9.1	44.65	-124.18	60	55	C,Z,N,M
NH-10	4	18.3	44.65	-124.29	83	75	N,D
NH-15	5	27.8	44.65	-124.41	92	86	C,Z,N,M,D
NH-20	6	36.7	44.65	-124.53	143	137	N
NH-25	7	46.5	44.65	-124.65	295	283	C,Z,N,M,D
NH-35	8	64.8	44.65	-124.88	436	441	C,Z,N,M
NH-45	9	83.2	44.65	-125.11	694	671	C,Z,N,M,D
NH-55	10	103.2	44.65	-125.37	2868	1006	O2
NH-65	11	121.5	44.65	-125.60	2859	1005	C,Z,N,D
NH-85	12	153.2	44.65	-126.00	2883	1006	C,Z
FM-1	13	3.3	43.22	-124.43	34	34	N
FM-3	14	8.7	43.22	-124.50	63	58	C,Z,N,M
FM-4	15	15.4	43.22	-124.58	85	82	C,Z,N,M
FM-5	16	22.2	43.22	-124.67	158	153	C,Z,N,M
FM-6	17	29.1	43.22	-124.75	318	312	O2
FM-7	18	35.7	43.22	-124.83	343	338	C,Z,N,M
FM-8	19	49.1	43.22	-125.00	1079	1006	C,Z,N
FM-9	20	62.6	43.22	-125.17	1659	1005	C,Z,N
CR-1	21	7.8	41.90	-124.30	41	36	C,Z,N
CR-2	22	16.1	41.90	-124.40	69	62	N,M
CR-3	23	24.4	41.90	-124.50	135	130	C,Z,N,M
CR-4	24	32.6	41.90	-124.60	510	505	C,Z,N,M
CR-5	25	40.9	41.90	-124.70	659	630	C,Z,N
CR-6	26	49.3	41.90	-124.80	697	692	N
CR-7	27	65.7	41.90	-125.00	838	838	C,Z,N,M,O2
CR-8	28	82.2	41.90	-125.20	2716	1006	
CR-9a	29	98.9	41.90	-125.40	3097	1005	C,Z,N
CR-10	30	120.9	41.90	-125.67	2930	1006	C,Z
RR-7	31	64.4	42.50	-125.20	2970	1005	C,Z,N
RR-6	32	48.3	42.50	-125.00	1989	1006	C,Z,N
RR-4	33	31.9	42.50	-124.80	593	591	C,Z,N
RR-3	34	23.5	42.50	-124.70	132	128	C,Z,N
RR-2	35	15.4	42.50	-124.60	87	82	C,Z,N
RR-1	36	7.2	42.50	-124.50	37	37	C,N
HH-7	37	84.8	44.00	-125.20	1701	1007	C,Z
HH-5	38	68.9	44.00	-125.00	936	264	
HH-5	39	68.9	44.00	-125.00	936	903	C,Z,N,M,O2
HH-4	40	53.0	44.00	-124.80	110	105	C,Z,N,M
HH-3	41	36.9	44.00	-124.60	154	147	
HH-3	42	36.9	44.00	-124.60	154	146	C,Z,N,M
HH-2	43	21.1	44.00	-124.40	122	117	C,Z,N,M
HH-1	44	4.8	44.00	-124.20	54	50	C,Z,N

Table 2: Actual sample depths and types of subsamples for biochemical sampling during the Sep.-'01 LTOP GLOBEC cruise.

Station	Sample Collection Depths (m)	Type of Sample Collected
NH-05	55, 50, 47, 40, 30, 24, 20, 15, 5, 4, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
NH-15	86, 71, 60, 50, 40, 30, 24, 20, 12, 10, 6, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
NH-25	251, 200, 150, 100, 70, 50, 40, 30, 21, 12, 10, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 251, 200 and 150 m)
NH-35	420, 176, 151, 100, 70, 50, 30, 20, 18, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 420, 176 and 151 m)
NH-45	501, 230, 150, 99, 70, 50, 40, 30, 20, 10, 3	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 501, 230 and 150m)
NH-65	1005, 790, 150, 100, 70, 50, 40, 35, 30, 20, 10, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1005, 790 and 150m)
NH-85	1005, 780, 150, 100, 70, 50, 45, 40, 30, 20, 10	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 788 and 150 m)
FM-3	56, 50, 43, 40, 30, 25, 22, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
FM-4	82, 70, 65, 60, 50, 40, 30, 20, 15, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl, POC/PON
FM-5	152, 110, 100, 70, 60, 50, 40, 30, 20, 10, 5, 2	TOC (surface), Nutrients, TN (surface), both Chl, POC/PON (except 152m)
FM-7	300, 277, 150, 100, 70, 50, 40, 30, 20, 15, 10, 2	TOC (all depths), Nutrients, TN (all depths) both Chl, POC/PON (except 300, 277, and 150m)
FM-8	1006, 710, 151, 100, 70, 49, 45, 40, 30, 10, 20, 3	TOC (surface), Nutrients, TN (surface) both Chl, POC/PON (except 1006, 710, and 151m)
FM-9	1005, 650, 150, 100, 70, 45, 40, 30, 20, 10, 3.8	TOC (all depths), Nutrients, TN (all depths) both Chl, POC/PON (except 1005, 650, and 150m)

Table 2 cont.

CR-1	36, 30, 25, 24, 20, 15, 9, 5, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
CR-3	100, 86, 70, 60, 20, 10, 5, 2	TOC (surface), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
CR-4	450, 205, 150, 100, 70, 50, 40, 36, 30, 20, 10, 3	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 450, 205 and 150m)
CR-5	624, 501, 149, 99, 70, 50, 31, 20 17, 10	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 624, 501 and 149m)
CR-7	838, 500, 150, 100, 50, 40, 37, 30, 20, 10, 3	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 838, 500 and 150m)
CR-9a	1005, 357, 150, 100, 70, 50, 41, 33, 30, 21, 9.7, 3.2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 357 and 150m)
CR-10	1005, 718, 149, 100, 70, 50, 40, 30, 20, 16, 10, 3.2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1005, 718 and 149m)

RR-1	32, 30, 25, 20, 15, 10, 5, 1	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
RR-2	81, 70, 60, 50, 39, 29, 27, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
RR-3	124, 100, 71, 60, 50, 40, 30, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
RR-4	589, 230, 150, 100, 70, 50, 40, 35, 30, 20, 10, 2.7	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 589, 230 and 150 m)
RR-6	1005, 751, 150, 100, 70, 50, 40, 30, 20, 16, 10, 2.6	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 751 and 150 m)
RR-7	1005, 785, 149, 100, 70, 51, 39, 30, 24, 20, 10, 3.2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1005, 785 and 149)

Table 2 cont.

HH-1	48, 35, 30, 25, 20, 15, 10, 5, 2.2, 1.7	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
HH-2	100, 90, 70, 60, 50, 40, 30, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
HH-3	145, 118, 100, 70, 60, 50, 40, 30, 20, 14, 10, 21	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
HH-4	105, 81, 71, 59, 50, 40, 30, 20, 17, 10, 5.7, 2.6	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
HH-5	500, 320, 150, 100, 70, 49, 40, 30, 20, 16, 10, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 500, 320 and 150 m)
HH-7	1006, 314, 150, 98, 70, 51, 40, 30, 12, 10, 1.3	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1006, 314 and 150)

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

Table 3. R/V WECOMA Cruise W0109A

(UT)	Start Time (UT)	End Time (UT)	Sta. No.	Sta. Name	Latitude (deg) (min)	Longitude (deg) (min)	Bottom Depth (m)	Atmos Press (mbar)	Wind Dir. (deg T)	Wind Speed (kts)	Event	Event ID
4-Sep	1700										Depart Newport	
	1700										Start echosounder	
	1710										Start ADCP	
	1713										Start DAS	
	1730										air calibration of transmissometer	
	1747										Start flo-thru	
	1847		1	NH-1	44 39.1	-124 06.0	29	1018.8	345	18	CTD	WE24701.1
	1857				44 40.0	-124 06.1					vertical net tow, 25	WE24701.2
	1920		2	NH-3	44 39.0	-124 07.9	49	1018.8	345	19	CTD	WE24701.3
	1951		3	NH-5	44 39.0	-124 10.6	60	1018.5	345	19	CTD with biochem, mzp	WE24701.4
	2101		4	NH-10	44 39.1	-124 17.7	83	1018.5	355	14	CTD	WE24701.5
	2152		5	NH-15	44 39.1	-124 24.8	92	1018.9	350	18	CTD with biochem, mzp	WE24701.6
	2301		6	NH-20	44 39.1	-124 31.6	143	1018.9	350	18	CTD	WE24701.7
	2357		7	NH-25	44 39.1	-124 39.0	297	1019.0	350	17	CTD with biochem, mzp	WE24701.8
5-Sep	0137		8	NH-35	44 39.1	-124 52.9	436	1019.4	340	16	CTD with biochem, mzp	WE24801.1
	0216			NH-35	44 39.1	-124 53.1		1019.5	345	16	HTI deployed	WE24801.2
	0223			NH-35	44 39.1	-124 53.0					vertical net tow, 100 m	WE24801.3
	0326			NH-35	44 39.2	-124 53.0		1019.9	350	17	Mocness deployed	WE24801.4
		0502			44 42.4	-124 52.9					Mocness aboard	WE24801.5
	0705			NH-25	44 39.1	-125 39.0		1020.9	345	12	Mocness deployed	WE24801.6
		0759			44 41.3	-124 39.4					Mocness aboard	WE24801.7
	0940			NH-15	44 39.2	-124 24.7		1020.8	345	16	Mocness deployed	WE24801.8
		1006			44 40.1	-124 24.8					Mocness aboard	WE24801.9
	1139			NH-5	44 38.6	-124 10.6		1021.0	355	10	Mocness deployed	WE24801.10
		1209			44 39.7	-124 10.7					Mocness aboard	WE24801.11
	1234	1237		NH-5	44 39.1	-124 10.6		1021.2	var	3-4	vertical net tow, 55 m	WE24801.12
	1243	1245		NH-5	44 39.1	-124 10.6		1021.2	var	3-4	vertical net tow for Ohman, 55 m	WE24801.13
	1333	1637		NH-10	44 39.1	-124 17.8		1021.9	var	4	vertical net tow, 76 m	WE24801.14
	1341			NH-10	44 39.13	-124 17.75		1021.9	var	4	drifter 27641 deployed	WE24801.15
	1431	1435		NH-15	44 39.1	-124 24.8		1022.0	000	6	vertical net tow, 80 m	WE24801.16
	1439				44 39.1	-124 24.7					Secchi disk	WE24801.17
	1445			NH-15	44 39.22	-124 25.07		1022.0	000	6	drifter 27462 deployed	WE24801.18
	1530	1535		NH-20	44 39.2	-124 31.7		1022.9	000	3	vertical net tow, 100 m	WE24801.19
	1538			NH-20	44 39.2	-124 31.7					Secchi disk	WE24801.20
	1630	1636		NH-25	44 39.1	-124 39.0		1023.2	045	11	vertical net tow, 100 m	WE24801.21

	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)		
5-Sep	1637				44	39.1	-124	39.1					Secchi disk	WE24801.22
	1642				44	39.15	-124	39.12					drifter 27463 deployed	WE24801.25
	1921		9	NH-45	44	39.1	-125	06.9		1024.0	010	10	CTD with biochem	WE24801.26
	2003	2009			44	39.1	-125	07.0					vertical net tow, 100 m	WE24801.28
	2021				44	39.2	-125	06.9					Mocness deployed	WE24801.29
		2126			44	41.9	-125	06.8					Mocness aboard	WE24801.30
	2131				44	41.96	-125	06.86					drifter 27464 deployed	WE24801.31
	2303			NH-55	44	39.0	-125	21.8					HTI recovered	WE24801.32
	2311	0017		NH-55	44	39.0	-125	21.8					HTI calibration	WE24801.33
	2320		10	NH-55	44	39.1	-125	22.0	2868	1025.0	330	13	CTD with oxygen	WE24801.34
6-Sep	0118		11	NH-65	44	39.1	-125	36.0	2859	1025.2	350	15	CTD with biochem, mzp	WE24901.1
	0209	0214			44	39.1	-125	36.1					vertical net tow, 100 m	WE24901.2
	0216	0221			44	39.1	-125	36.1					vertical net tow for Ohman, 100 m	WE24901.3
	0224				44	39.18	-125	36.12					drifter 27465 deployed	WE24901.4
	0414		12	NH-85	44	39.1	-126	03.0	2883	1026.0	355	13	CTD with biochem	WE24901.5
													respool wire on trawl winch, transit to FM-Line	
	1453												air calibration of transmissometer	
	1505		13	FM-1	43	13.0	-124	26.0	34	1025.1	005	10	CTD	WE24901.6
	1514	1517			43	13.0	-124	26.0					vertical net tow, 30 m	WE24901.7
	1524				43	13.0	-124	26.0		1025.2	005	10	HTI deployed	WE24901.8
	1150												rinsed CTD sensors with TritonX	
	1601		14	FM-3	43	13.0	-124	30.0	63	1025.3	015	11	CTD with biochem, mzp	WE24901.9
	1616	1620			43	13.0	-124	30.0					vertical net tow, 55m	WE24901.10
	1627				43	13.1	-124	30.2					Mocness deployed	WE24901.11
		1649			43	13.9	-124	30.5					Mocness aboard	WE24901.12
	1726		15	FM-4	43	13.0	-124	35.0	85	1025.7	030	10	CTD with biochem, mzp	WE24901.13
	1743	1748			43	13.0	-124	35.0					vertical net tow, 80m	WE24901.14
	1756				43	13.1	-124	35.0					Mocness deployed	WE24901.15
		1825			43	14.1	-124	34.7					Mocness aboard	WE24901.16
	1905		16	FM-5	43	13.1	-124	40.0	158	1024.8	020	14	CTD with biochem	WE24901.17
	1926	1933			43	12.9	-124	40.2					vertical net tow, 100 m	WE24901.18
	1938				43	12.8	-124	40.2					Mocness deployed	WE24901.19
		2011			43	14.0	-124	40.4					Mocness aboard	WE24901.20
	2049		17	FM-6	43	13.0	-124	45.1	320	1024.0	000	17	CTD with oxygen	WE24901.21
	2151	2158		FM-7	43	13.0	-124	50.0					vertical net tow, 100 m	WE24901.22
	2207		18	FM-7	43	13.0	-124	50.0	345	1023.5	000	20	CTD with biochem, mzp	WE24901.23
	2241				43	12.9	-124	50.1					Mocness deployed	WE24901.24
		2355			43	15.8	-124	50.1					Mocness aboard	WE24901.25

	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)		
7-Sep	0110				43	13.0	-124	59.9					HTI recovered	WE25001.1
	0118	0209	19	FM-8	43	13.0	-124	59.9	1097	1023.0	000	25	CTD with biochem, mzp; pinched cable	WE25001.2
	0214	0218			43	12.9	-125	00.0					vertical net tow, 100 m	WE25001.3
	0322	0410	20	FM-9	43	13.0	-125	10.0	1659	1023.3	000	30	CTD with biochem, mzp	WE25001.4
	0413	0419			43	12.9	-125	10.1					vertical net tow, 100 m	WE25001.5
	0425												begin transit to CR-1	
													reterminated CTD cable	
	1341	1351	21	CR-1	41	54.0	-124	18.0	41	1015.5	345	26	CTD with biochem, mzp	WE25001.6
	1353	1356			41	54.0	-124	18.0					vertical net tow, 35 m	WE25001.7
	1404				41	54.0	-124	18.0		1015.5	345	26	HTI deployed	WE25001.8
	1449	1458	22	CR-2	41	54.0	-124	24.0	69	1016.4	345	27	CTD	WE25001.9
	1501	1505			41	54.0	-124	24.0					vertical net tow, 62 m	WE25001.10
	1513	1517			41	54.0	-124	24.0					vertical net tow, 62 m, for Mark Ohman	WE25001.11
	1524				41	54.2	-124	24.0					Mocness deployed	WE25001.12
		1552			41	54.1	-124	24.1					Mocness aboard	WE25001.13
													remaining on station for zoop sample	
													processing due to rough seas	
	1542												air calibration of transmissometer	
	1546												cleaned flo-thru filter	
	1551												cleaned underway fluorometer	
	1707	1726	23	CR-3	41	54.0	-124	30.0	135	1016.9	345	29	CTD with biochem, mzp; misfired	WE25001.14
	1730	1736			41	54.0	-124	30.0					vertical net tow, 100 m	WE25001.15
	1746	1811			41	54.2	-124	30.1					Mocness - aborted: loose connector	WE25001.16
	1835				41	55.0	-124	30.8					Mocness deployed	WE25001.17
		1917			41	56.1	-124	31.6					Mocness aboard	WE25001.18
	2035	2111	24	CR-4	41	54.0	-124	36.1	515	1016.0	345	33	CTD with biochem, mzp	WE25001.19
	2117	2123			41	54.1	-124	36.5					vertical net tow, 100m	WE25001.20
	2132				41	54.3	-124	36.7					Mocness deployed	WE25001.21
		2234			41	56.3	-124	38.1					Mocness aboard	WE25001.22
8-Sep	0018	0101	25	CR-5	41	53.9	-124	42.0	659	1013.8	345	40	CTD with biochem, mzp	WE25101.1
	0115												hove to, waiting for better weather	
	1342		26	CR-6	41	54.0	-124	48.0	697	1009.9	355	25	CTD	WE25101.2
	1424	1432			41	54.0	-124	48.0					vertical net tow, 100m	WE25101.3
													Mocness omitted (frame bent overnight)	
	1600	1644	27	CR-7	41	54.0	-125	00.0	848	1011.4	005	22	CTD with biochem, mzp, oxygen	WE25101.4
	1650	1657			41	54.0	-125	00.0					vertical net tow, 100 m	WE25101.5
	1759				41	54.1	-125	00.0					Mocness deployed	WE25101.6
		1913			41	56.9	-125	00.7					Mocness aboard	WE25101.7
	2101	2147	28	CR-8	41	54.0	-125	12.0	2763	1012.0	020	16	CTD	WE25101.8

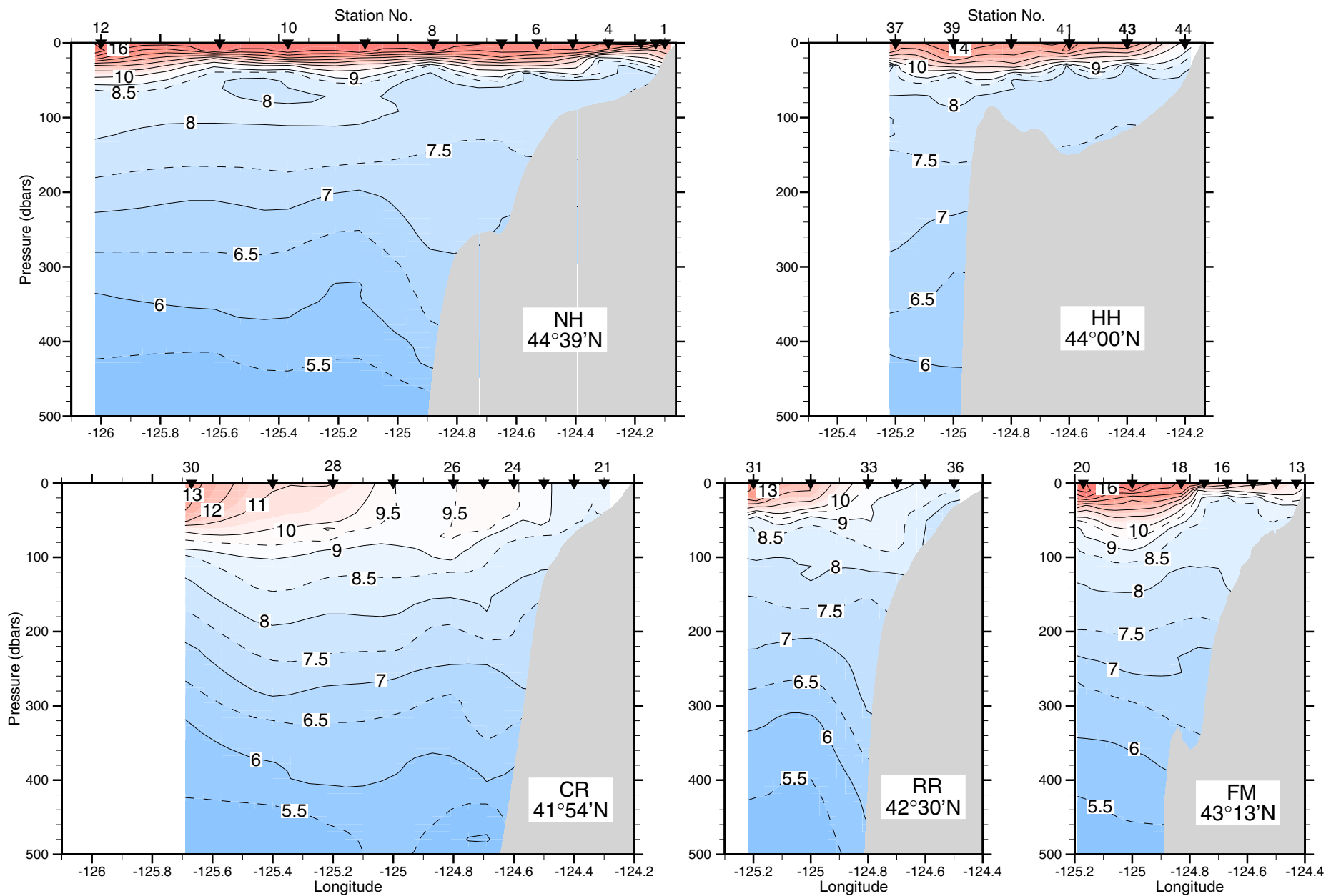
	Start	End	Sta.	Sta.	Latitude		Longitude		Bottom	Atmos	Wind	Wind	Event	Event ID
(UT)	Time	Time	No.	Name	(deg)	(min)	(deg)	(min)	Depth	Press	Dir.	Speed		
	(UT)	(UT)							(m)	(mbar)	(deg T)	(kts)		
8-Sep	2157				41	54.0	-125	12.2					HTI recovered	WE25101.9
	2250	2334	29	CR-9a	41	54.0	-125	24.0	3097	1012.1	050	13	CTD with biochem, mzp	WE25101.10
	2338	2343		CR-9a	41	54.1	-125	24.0					vertical net tow, 100m	WE25101.11
	2345	2351			41	54.1	-125	24.1					vertical net tow, 100m for Mark Ohman	WE25101.12
9-Sep	0101	0146	30	CR-10	41	54.0	-125	40.0	2930	1012.0	020	11	CTD with biochem, mzp	WE25201.1
	0150												begin transit to RR line	
	0540	0627	31	RR-7	42	30.0	-125	11.9	2970	1012.6	075	6	CTD with biochem, mzp	WE25201.2
	0633	0638			42	30.0	-125	11.9					vertical net tow, 100 m	WE25201.3
	0746	0835	32	RR-6	42	30.0	-125	00.0	1989	1012.3	115	7	CTD with biochem, mzp; moth swarm	WE25201.4
	0841	0147			42	30.0	-124	00.0					vertical net tow, 100 m	WE25201.5
	0958	1032	33	RR-4	42	30.0	-124	48.0	593	1012.8	140	6	CTD with biochem, mzp	WE25201.6
	1036	1043			42	29.9	-124	48.0					vertical net tow, 100 m	WE25201.7
	1133	1149	34	RR-3	42	30.0	-124	41.9	132	1012.5	160	6	CTD with biochem, mzp	WE25201.8
	1154	1200			42	30.0	-124	42.0					vertical net tow, 100 m	WE25201.9
	1250	1302	35	RR-2	42	30.0	-124	35.9	87	1012.9	160	6	CTD with biochem, mzp	WE25201.10
	1309	1314			42	30.1	-124	35.9					vertical net tow, 100 m	WE25201.11
	1359	1401			42	30.0	-124	30.0					vertical net tow, 100 m	WE25201.12
	1407	1417	36	RR-1	42	30.0	-124	29.9	37	1013.0	155	5	CTD with biochem	WE25201.13
	1420												begin transit to HH-7	
													(omitting HH-9 to ensure sufficient	
													time for all zooplankton sampling)	
	1454												air calibration of transmissometer	
	2258	2346	37	HH-7	44	00.0	-125	12.0	1701	1013.4	000	12	CTD with biochem, mzp	WE25201.14
	2352				44	00.0	-125	12.1		1013.9	000	12	HTI deployed	WE25201.15
10-Sep	0119		38	HH-5	44	00.0	-125	00.0	936	1013.9	000	12	CTD, aborted at ~285 m	WE25301.1
	0134	0218	39		44	00.0	-125	00.0	936				CTD with biochem, oxygen	WE25301.2
	0221	0227			44	00.0	-124	59.9					vertical net tow, 100 m	WE25301.3
	0321				43	59.2	-125	00.2					Mocness deployed	WE25301.4
		0437			44	02.0	-124	59.8					Mocness aboard	WE25301.5
	0603	0621	40	HH-4	44	00.0	-124	48.0	110	1014.4	000	7	CTD with biochem, mzp	WE25301.6
	0624	0630			44	00.0	-124	48.0					vertical net tow, 100 m	WE25301.7
	0637				44	00.1	-124	47.9					Mocness deployed	WE25301.8
		0715			44	01.4	-124	47.8					Mocness aboard	WE25301.9
	0849	0909	41	HH-3	44	00.0	-124	36.0	154	1014.8	000	8	CTD with biochem, misfired, aborted	WE25301.10
	0915	0931	42		44	00.0	-124	36.0	154				CTD with biochem, mzp	WE25301.11
	0934	0940			44	00.0	-124	36.0					vertical net tow, 100 m	WE25301.12
	0948				44	00.0	-124	36.0					Mocness deployed	WE25301.13
		1027			44	01.5	-124	36.0					Mocness aboard	WE25301.14
	1150	1212	43	HH-2	44	00.0	-124	24.1	122	1014.4	345	8	CTD with biochem, mzp	WE25301.15

	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)		
10-Sep	1216	1221			44	00.0	-124	24.2					vertical net tow, 100 m	WE25301.16
	1227				44	00.0	-124	24.4					Mocness deployed	WE25301.17
		1302			44	01.1	-124	25.4					Mocness aboard	WE25301.18
	1429				44	00.0	-124	11.9					HTI recovered	WE25301.19
	1437	1450	44	HH-1	44	00.0	-124	11.9	54	1014.5	345	7	CTD with biochem, mzp	WE25301.20
	1454	1458			44	00.0	-124	12.0					vertical net tow, 50 m, for Todd Miller	WE25301.21
	1502	1505			44	00.0	-124	12.0					vertical net tow, 50 m	WE25301.22
	1512												begin transit to Newport	
	1545												air calibration of transmissometer	
	1850												shut down flow through system	
	1851												shut down echosounder	
	1909												shut down DAS	
	1909												shut down ADCP	
	1933												arrive at pier in Newport	

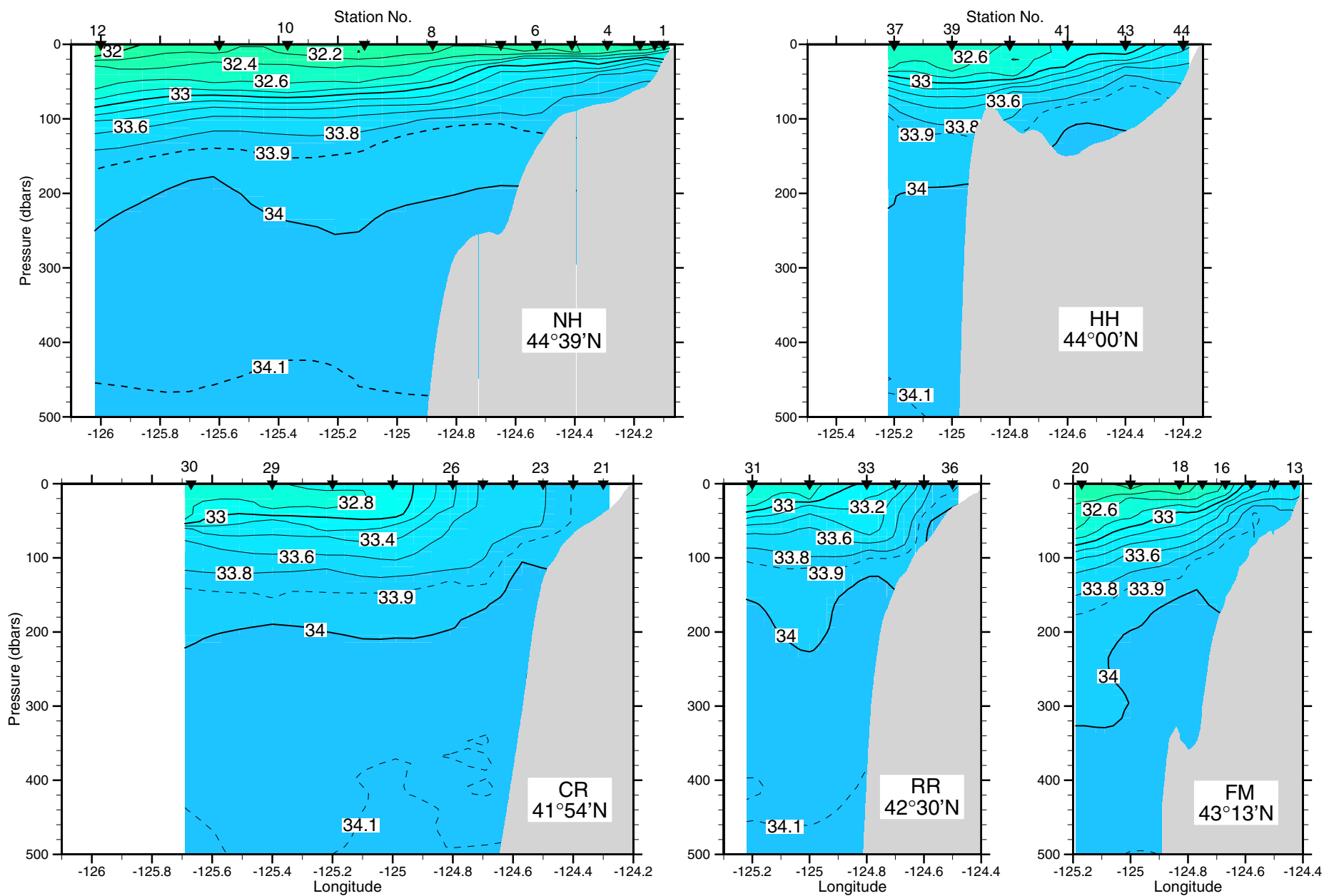
Table 4. Names, affiliations, and responsibilities of scientific personnel participating on W0109A.

Robert L. Smith	Chief Scientist	OSU	CTD
Adriana Huyer	Co-Chief Scientist	OSU	CTD
Jane Fleischbein	Technician	OSU	CTD
Chi Meredith	Technician	OSU	CTD, oxygen
Margaret Sparrow	Technician	OSU	CTD
Woody Moses	Graduate Student	OSU	nuts, chl
Julie Arrington	Technician	OSU	nuts, chl
Jennifer Harman	Student	OSU	nuts, chl
Kaylene Shearing	Student	OSU	nuts, chl
Carlos López	Technician	OSU	microzooplankton
Anders Roestad	Technician	OSU	zooplankton
Todd Miller	Technician	OSU	zooplankton
Carolyn Tracy Shaw	Technician	OSU	zooplankton
Jaime Gomez	Graduate Student	OSU	zooplankton
Linda Fayer	Technician	OSU	martec
Daryl Swensen	Technician	OSU	martec

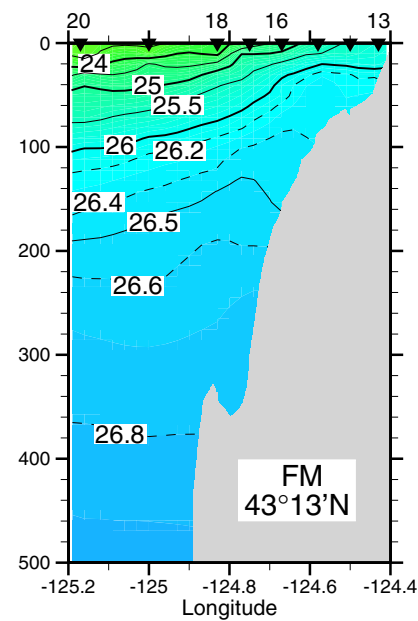
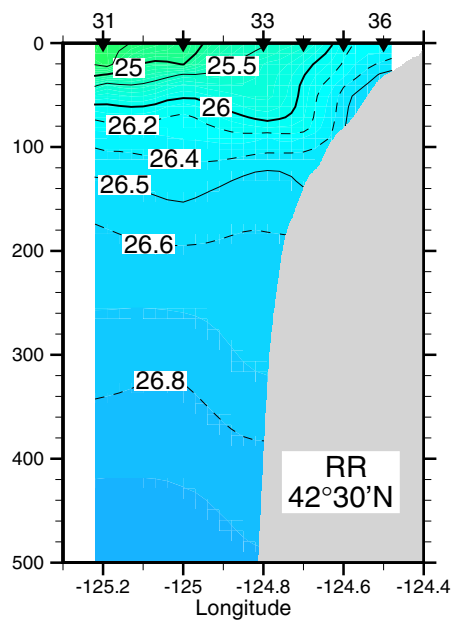
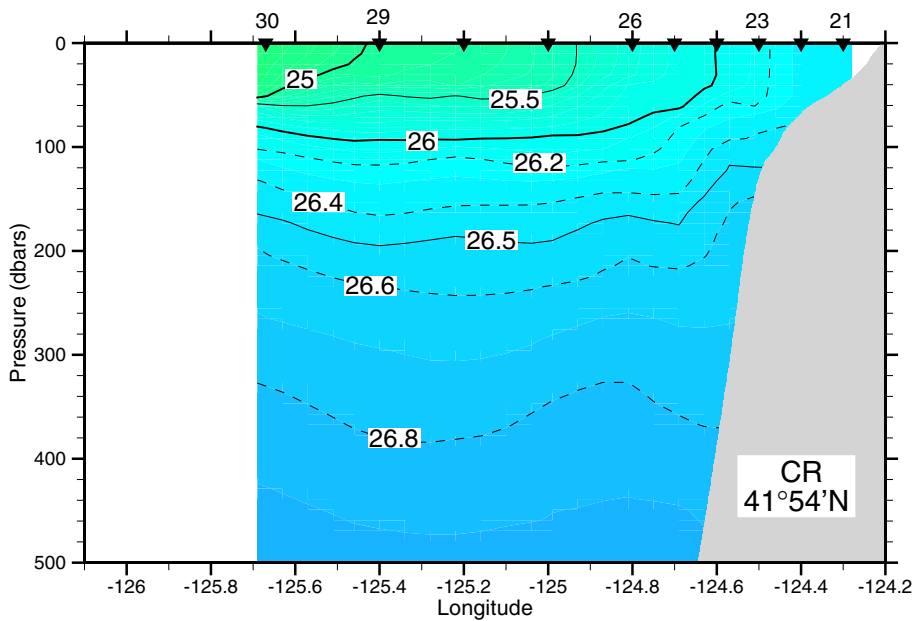
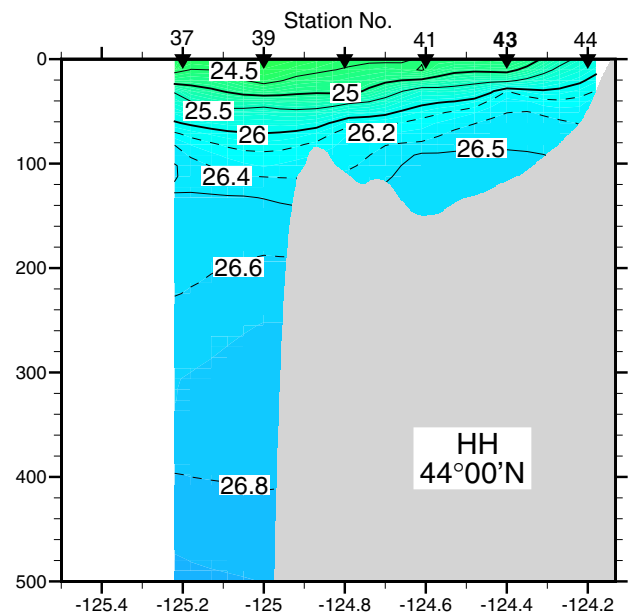
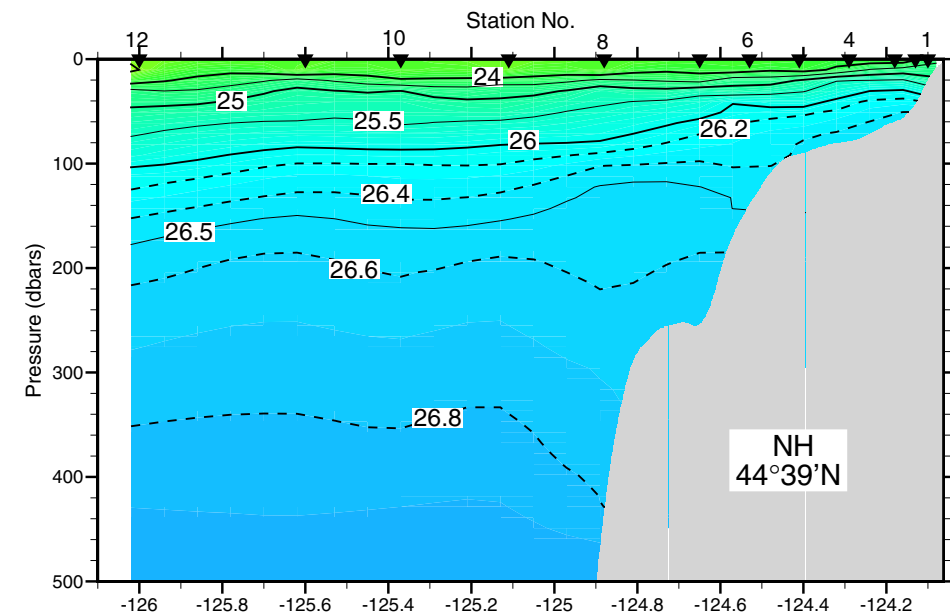
Temperature, 4-10 September 2001



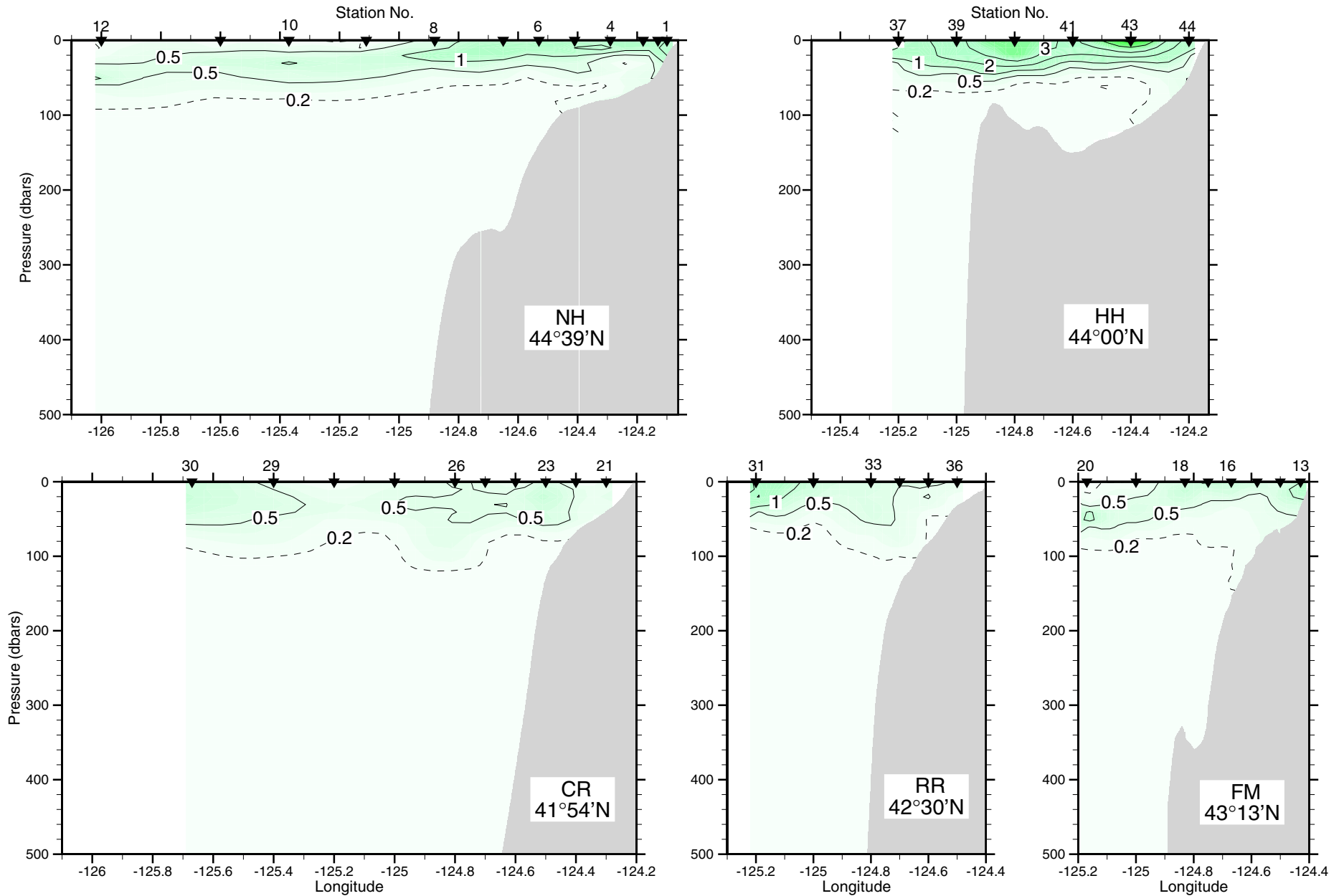
Salinity, 4-10 September 2001



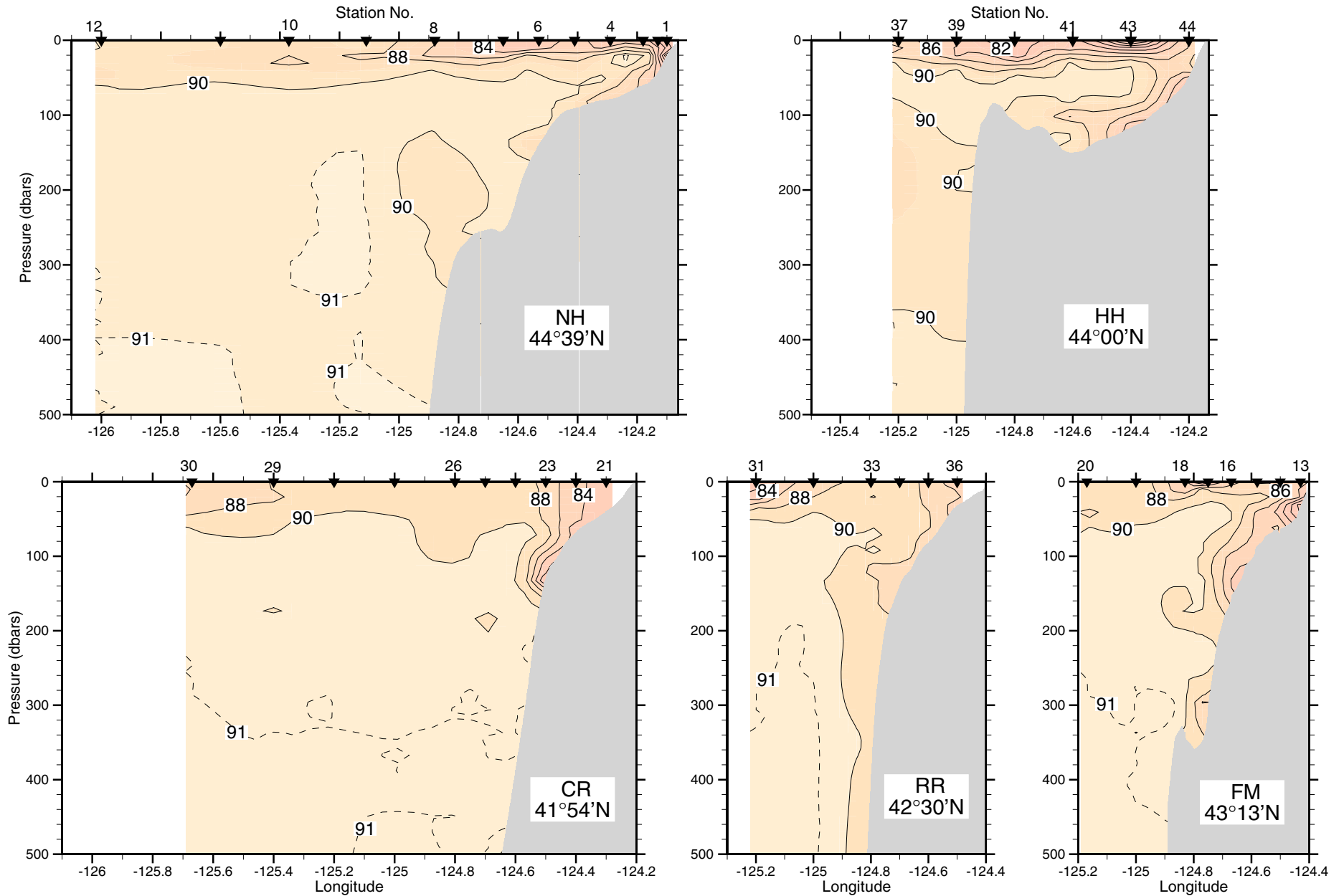
Sigma-theta, 4-10 September 2001



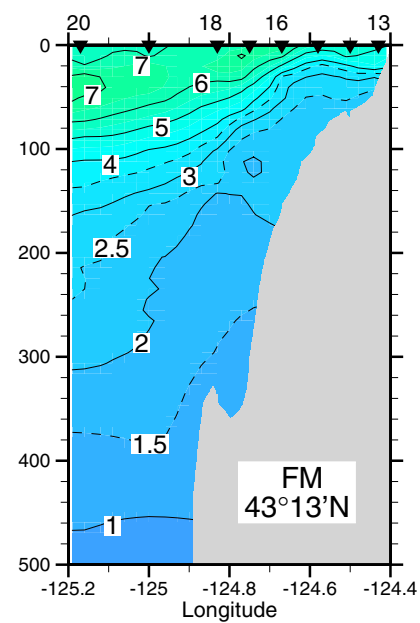
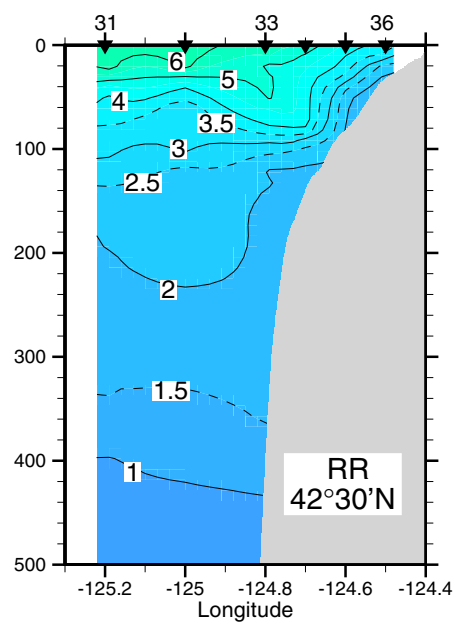
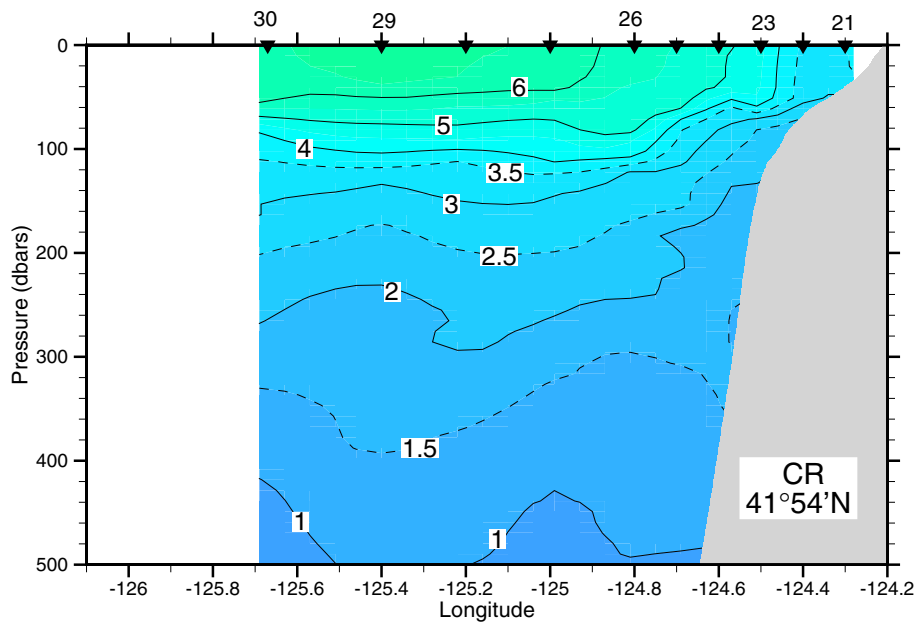
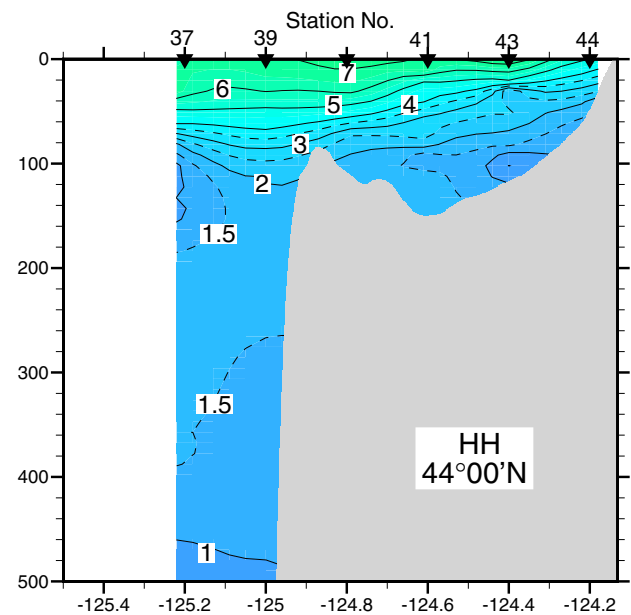
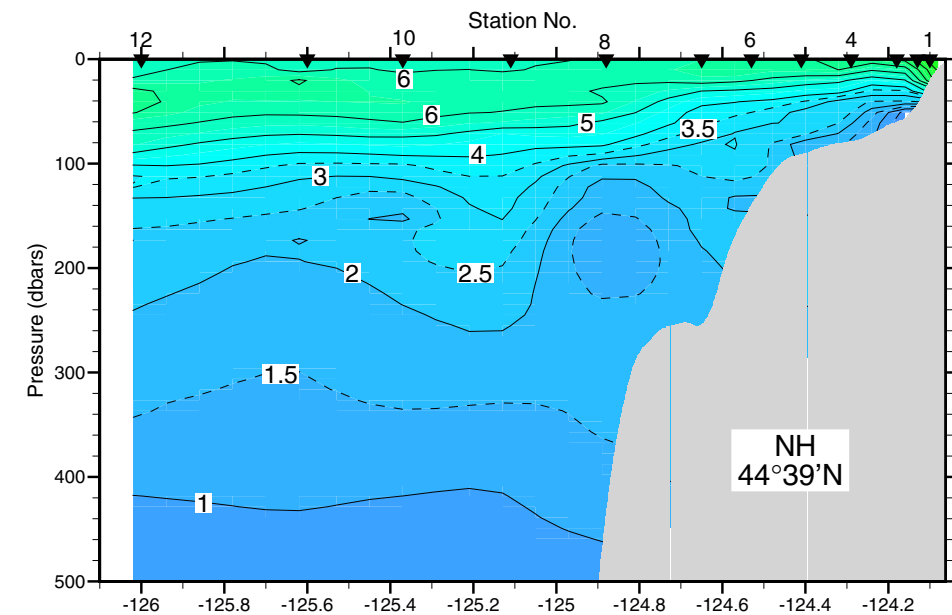
Fluorescence Voltage, 4-10 September 2001



% Light Transmission, 4-10 September 2001



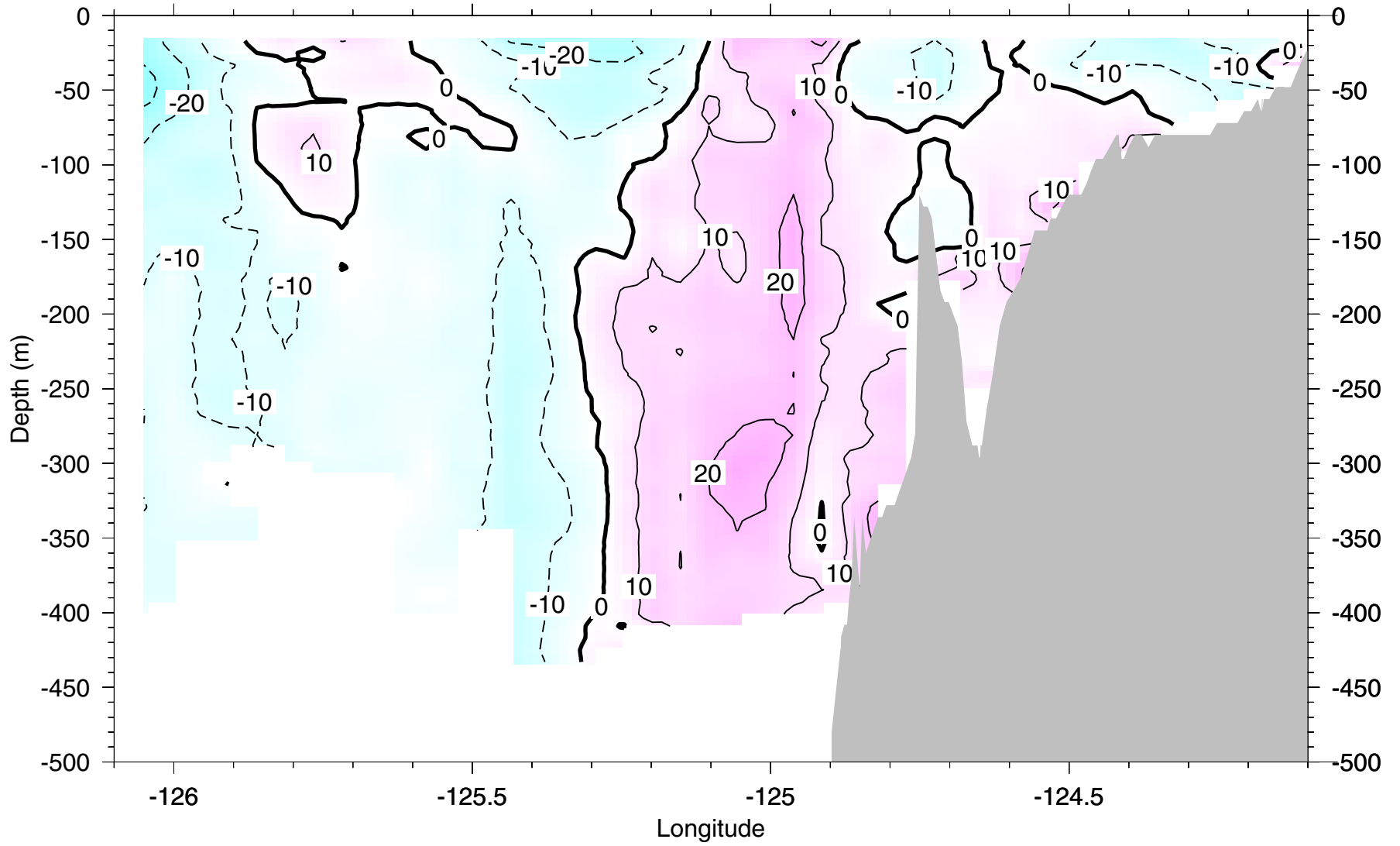
Oxygen, 4-10 September 2001



Newport Hydrographic Line 44.6°N

04-06 Sept 2001

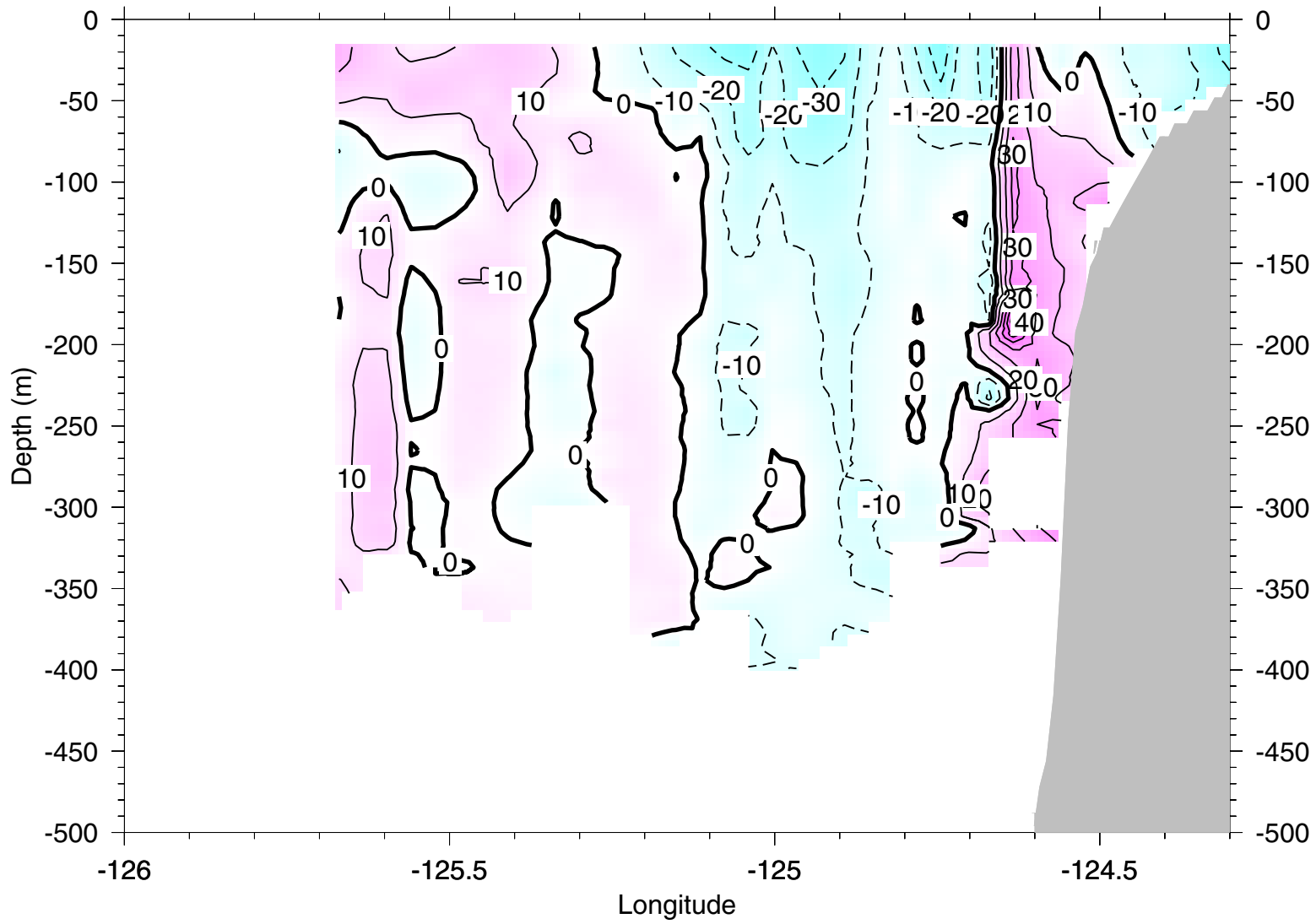
ADCP: Northward current (cm/s)



Crescent City Hydrographic Line 41.9°N

07-09 Sept 2001

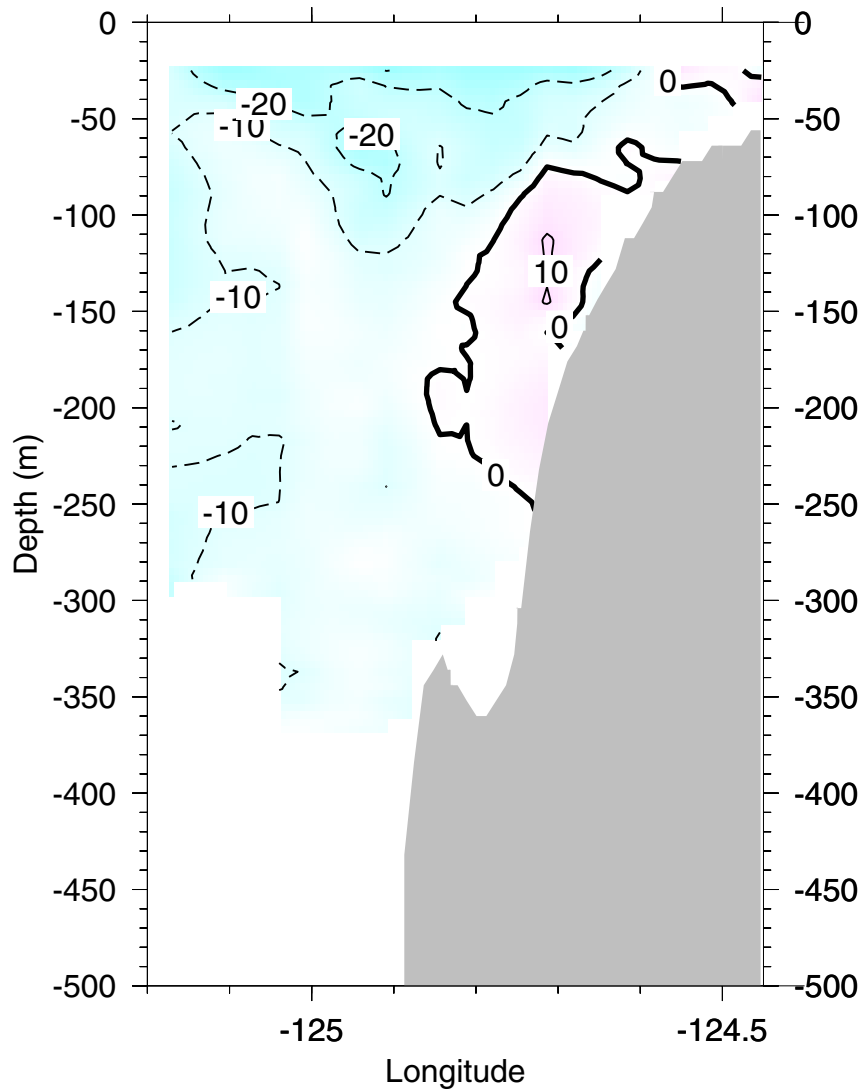
ADCP: Northward current (cm/s)



Five Mile Hydrographic Line 43.2°N

06-07 Sept 2001

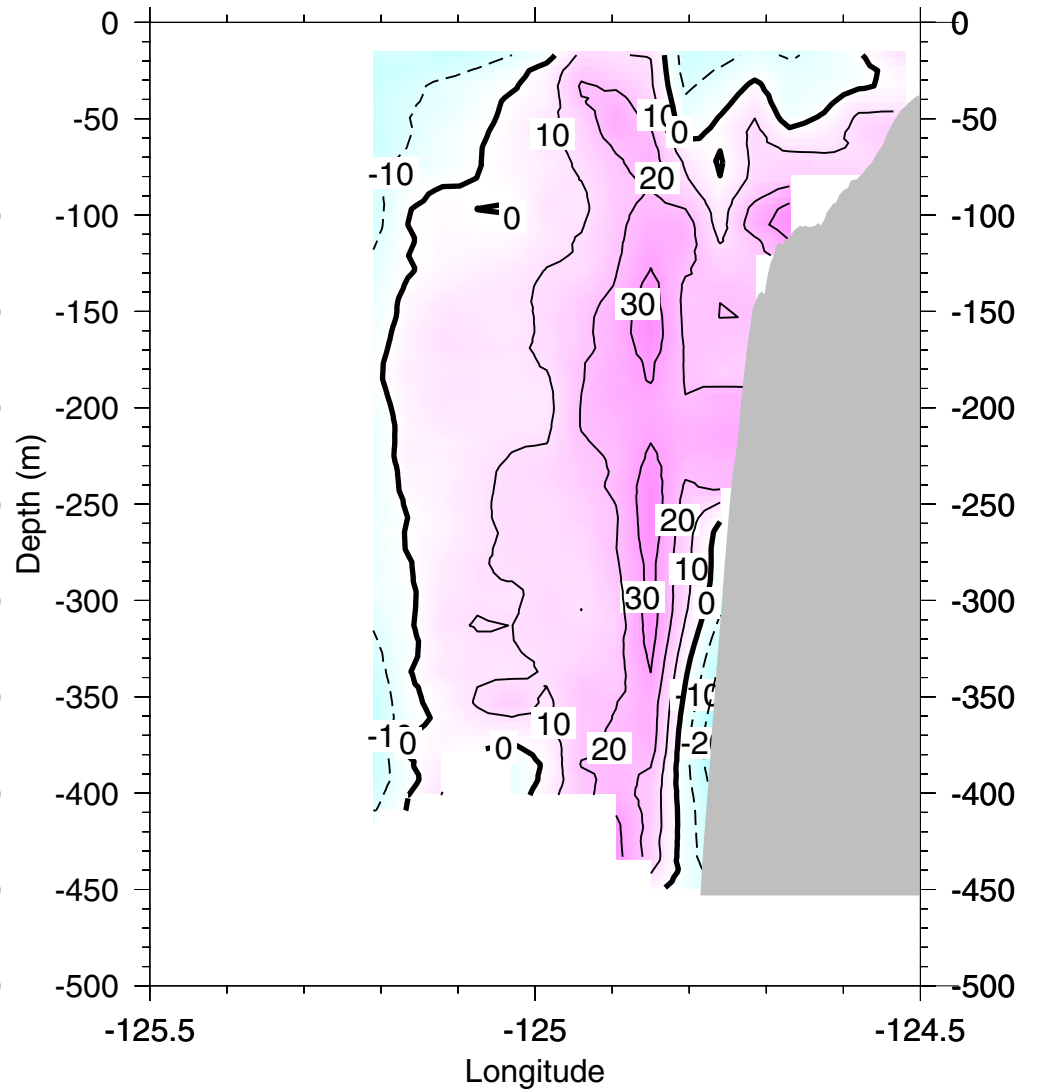
ADCP: Northward current (cm/s)



Rogue River Line 42.5°N

09 Sept 2001

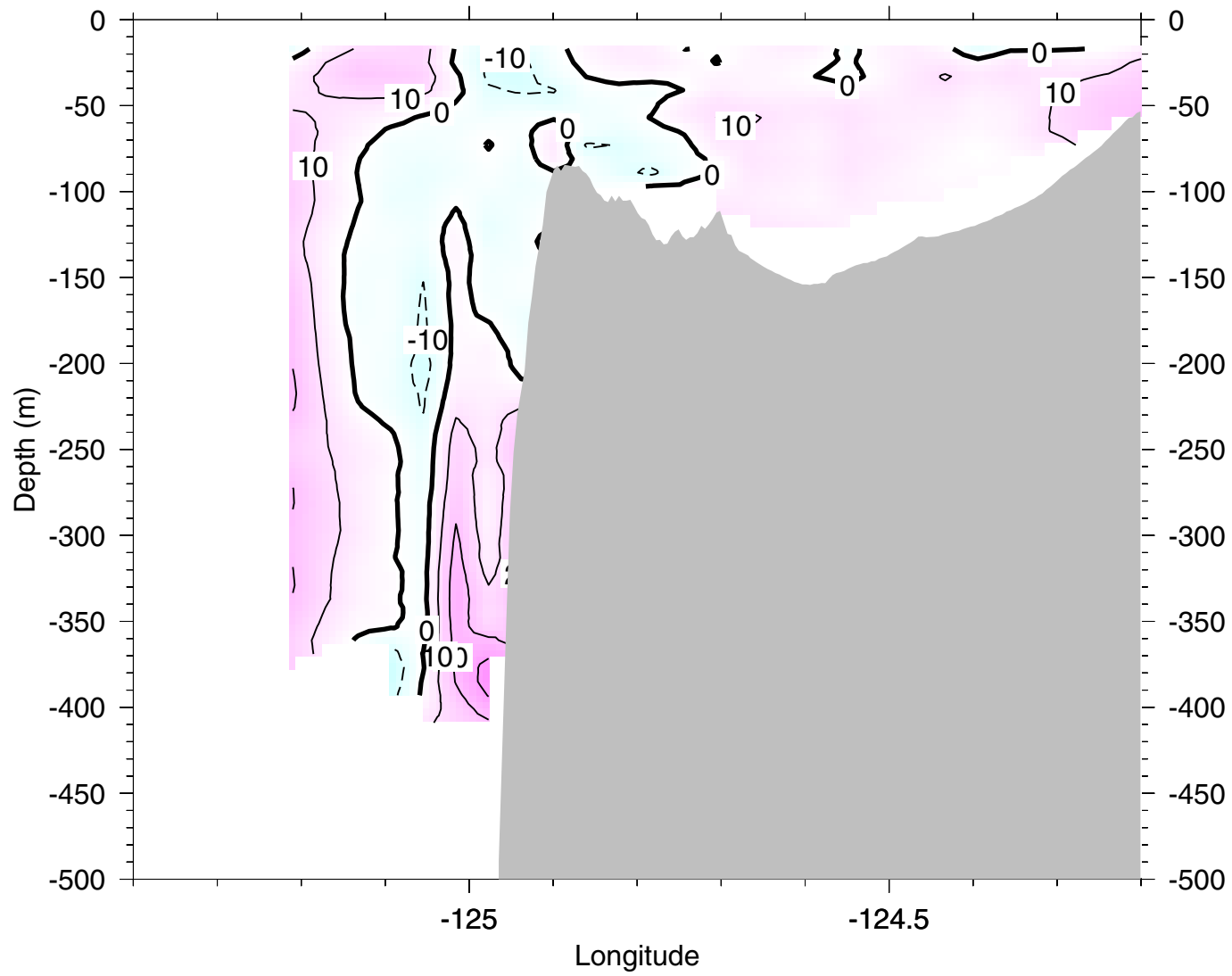
ADCP: Northward current (cm/s)



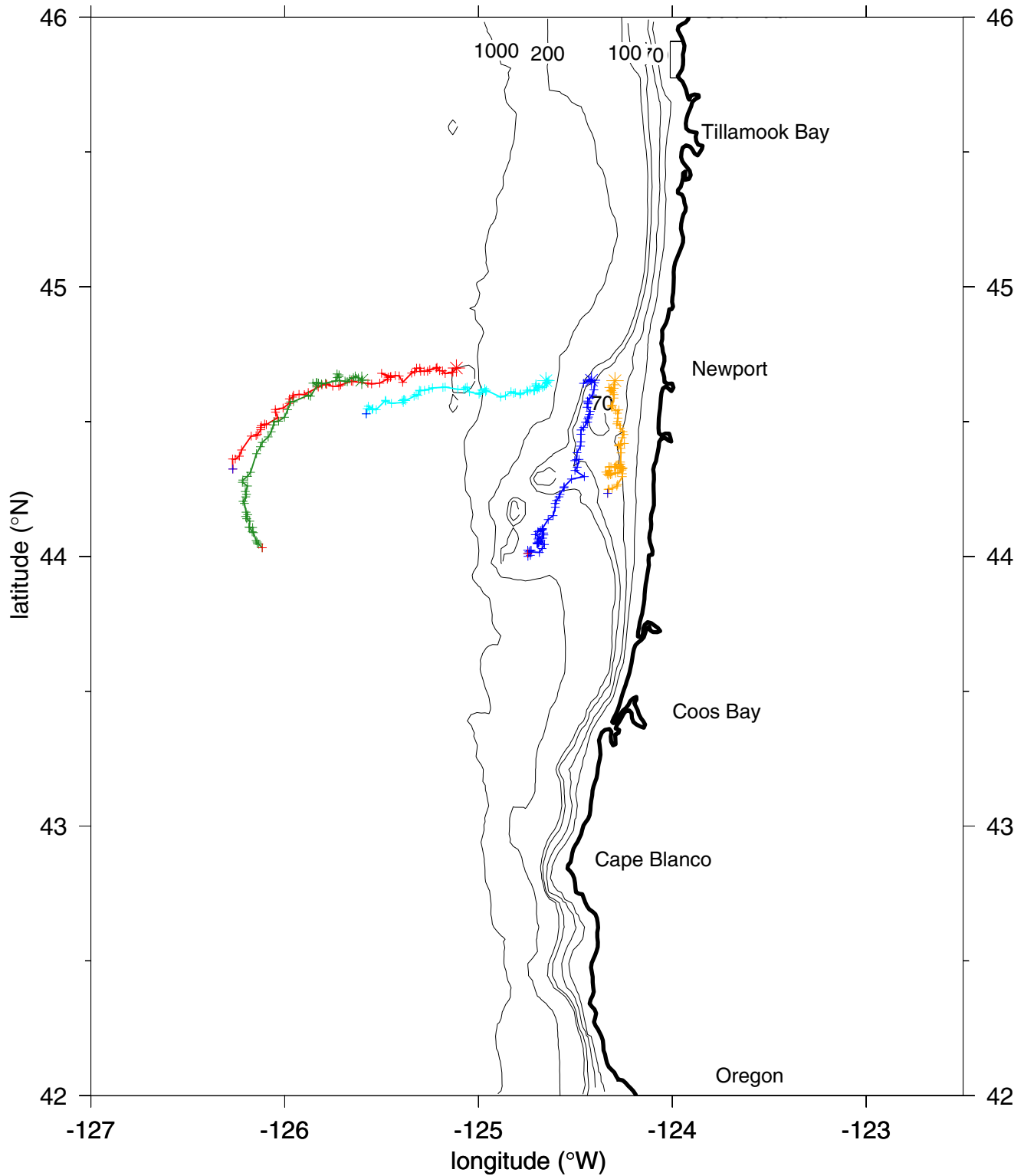
Heceta Head ADCP Line 44.0°N

09-10 Sept 2001

ADCP: Northward current (cm/s)



Drifter data from Sep 5-6 2001 to Sep 11 2001
(dates on land indicate last transmission from failed drifters)
(Courtesy of Jack Barth, Oregon State University)



Zooplankton Report

(Submitted by Anders Roestad and Dr. Wm. Peterson, Oregon State University and NOAA)

MOCNESS DESCRIPTIONS

NH5	04:04 h (local time)	water depth= 60m
50-20 m	1 large jelly, cumaceans	
20-10 m	copepods, Pleurobrachia, furcilia, larval fish	
10-0 m	15 large jellies, Pleurobrachia, amphipods	
NH15	02:41 h	water depth=100m
85-50 m	not recorded	
50-20 m	furcilia, ~20 Pleurobrachia, copepods	
20-10 m	furcilia, ~30 Pleurobrachia, copepods	
10-0 m	furcilia, ~7 Pleurobrachia, copepods	
NH25	00:05 h	water depth=300m
290-200	Pleurobrachia, chaetognaths, euphausiids	
200-150	~200 euphausiids, shrimps, 2 big ctenophores, 1 megalope	
150-100	1 squid, ~100 euphausiids, 1 decapod, larval fish	
100-50	~2000 big euphausiids, 1 squid, Pleurobrachia, copepods	
50-20	~1000 euphausiids, copepods	
20-10	~300 Pleurobrachia, ~50 euphausiids, 1 squid, larval fish	
10-0	~25 Pleurobrachia, 1 squid, 10 euphausiids, furcilia	
NH35	20:48 h	water depth=450m
350-300	Pleurobrachia, 1 squid, 1 myctophid, Muggiaea	
300-200	Pleurobrachia, euphausiids, 1 myctophid	
200-150	euphausiids, chaetognaths	
150-100	~100 euphausiids, 1 salp, chaetognaths	
100-50	~100 euphausiids, 4 sergestiids, copepods, amphipods	
50-20	not recorded	
20-10	~200 Pleurobrachia, ~400 euphausiids, 1 myctophid, 1 decapod	
10-0	euphausiids, 4 Pleurobrachia	
NH45	13:21 h	water depth=670m
350-300	copepods, 8 Muggiaea, 4 Pleurobrachia, 1 larval fish	
300-200	~1000 furcilia, ~ 100 Pleurobrachia, ~10 Muggiaea, 10 pteropods	
200-150	~200 furcilia, ~5 amphipods, big copepods	
150-100	Praya chain, 3 squid, ~10 euphausiids	
100-50	~8 larval fish, ~12 anomuran crabs, Beroe, euphausiids	
50-20	~25 Pleurobrachia, 4 Clione, 3 anomuran crabs, 4 larval fish	
20-10	~200 Pleurobrachia, 2 euphausiids	
10-0	~40 Pleurobrachia, furcilia	

FM3	09:27 h	water depth=64m
50-20	5 Pleurobrachia, ~6 larval fish, ~20 amphipods, ~10 large pteropods	
20-10	6 Pleurobrachia, Limacina	
10-0	copepods, 2 Pleurobrachia	
FM4	10:55 h	water depth=86m
80-50	~50 Pleurobrachia, small copepods, 3 larval fish, 2 large pteropods	
50-20	furcilia, copepods, amphipods	
20-10	1 large jelly, ~20 Pleurobrachia, small copepods	
10-0	copepods, 10 amphipods, 2 Pleurobrachia, 2 large pteropods	
FM5	12:55 h	water depth=165m
155-100	~200 adult euphausiids, copepods	
100-50	copepods, 2 large pteropods, amphipods	
50-20	6 Ophilia, ~10 Pleurobrachia, copepods, 2 amphipods	
20-10	Pleurobrachia, copepods	
10-0	~200 Pleurobrachia, copepods, amphipods	
FM7	15:42 h	water depth=345m
340-300	4 myctophids, Muggiaea, 4 sergestiids, euphausiids	
300-200	euphausiids, jellies, myctophids, furcilia	
200-150	chaetognaths, furcilia, 3 larval fish	
150-100	pteropods, 5 euphausiids, 1 larval fish	
100-50	pteropods, 2 euphausiids, 1 larval fish, 1 Pleurobrachia	
50-20	pteropods (Pteria), 3 large jellies, larval fish	
20-10	pteropods(corolla), 3 euphausiids, 1 larval fish	
10-0	copepods, 1 jelly, 1 adult euphausiid	
CR2	08:25 h	water depth=69m
50-20	Praya chain, Pleurobrachia, furcilia	
20-10	Pleurobrachia, furcilia, copepods	
10-0	Pleurobrachia, copepods	
CR3	11:35 h	water depth=140m
125-100	radiolarians, furcilia, copepods	
100-50	Pleurobrachia, Beroe, copepods	
50-20	radiolarians, 3 Beroe, ~10 Pleurobrachia, ~50 furcilia	
20-10	~500 furcilia, 2 Beroe	
10-0	5 Pleurobrachia, small copepods, furcilia	

CR4	14:30 h	water depth=540m
350-300	6 decapods, copepods, 10 Muggiaea	
300-200	copepods	
200-150	10 adult euphausiids, smaller euphausiids, radiolarians, chaetognaths	
150-100	euphausiids (~10 adults), furcilia, radiolarians, chaetognaths	
100-50	euphausiids, Pleurobrachia	
50-20	~50 euphausiids, ~10 Pleurobrachia, Eucalanus	
20-10	copepods, 2 euphausiids	
10-0	2 euphausiids, copepods, Pleurobrachia	
CR7	10:59 h	water depth=840m
350-300	5 myctophids, 4 ctenophores, copepods, Muggiaea	
300-200	Euchaeta, furcilia, chaetognaths, Muggiaea, radiolarians, 8 Pleurobrachia	
200-150	4 big chaetognaths, Limacina, furcilia, Muggiaea	
150-100	pteropods, 4 chaetognaths, 2 adult euphausiids, 2 Pleurobrachia,	
100-50	small pteropods, 7 adult euphausiids, Pleurobrachia	
50-20	adult euphausiids, pteropods, Muggiaea	
20-10	20 Muggiaea, furcilia, 1 larval tuna	
10-0	Muggiaea, juvenile euphausiids, 3 medusa, small copepods	
HH2	05:27 h	water depth=120m
110-100	copepods, 3 Pleurobrachia, 15 furcilia, phytoplankton	
100-50	~100 adult euphausiids, 8 shrimp, 10 Pleurobrachia, copepods	
50-20	copepods, adult and juvenile euphausiids, ~50 Pleurobrachia	
20-10	~100 Pleurobrachia, ~50 adult euphausiids, furcilia, copepods	
10-0	~100 Pleurobrachia, phytoplankton, ~20 adult euphausiid, furcilia	
HH3	02:48 h	water depth=153m
140-100	200 euphausiids, furcilia, 2 larval fish, 1 squid, 1 large pteropod	
100-50	furcilia, ~500 adult euphausiids, copepods	
50-20	~500 adult euphausiids, furcilia, copepods	
20-10	~500 adult euphausiids, furcilia, copepods	
10-0	150 Pleurobrachia, ~200 adult euphausiids, furcilia	
HH4	23:40 h	water depth=110m
100-50	~1000 euphausiids, furcilia, ~10 Pleurobrachia	
50-20	~500 adult euphausiids, ~800 juvenile euphausiids, larval fish, copepods	
20-10	~75 Pleurobrachia, copepods, furcilia	
10-0	Pleurobrachia, ~50 euphausiids, copepods, furcilia	

HH5	20:22 h	water depth=924m
350-300	copepods, ~20 euphausiids, 3 myctophids	
300-200	furcilia, Muggiaea, Pleurobrachia, 1 squid, 1 myctophid	
200-150	~100 euphausiids, chaetognaths, copepods, 1 squid	
150-100	~100 euphausiids, 2 sergestiids, chaetognaths, copepods	
100-50	euphausiids, 6 shrimp	
50-20	~1000 euphausiids, 5 myctophids, Pleurobrachia, Muggiaea, shrimp	
20-10	~5000 euphausiids, myctophids, Pleurobrachia	
10-0	euphausiids, Pleurobrachia	

Other zooplankton sampling:

Vertical tows(200 μ m mesh) from 100 meters (or from just above bottom) to surface were completed at stations NH1, NH5, NH10, NH15, NH20, NH25, NH35, NH45, NH65, FM1, FM3, FM4, FM5, FM7, FM8, FM9, CR1, CR2, CR3, CR4, CR5, CR6, CR7, CR9, RR1, RR2, RR3, RR4, RR5, RR6, RR7, HH1, HH2, HH3, HH4 and HH5.

Euphausiids from station NH35, HH4, HH5 were incubated for molting rates. At NH35, HH3 and HH5 adult euphausiids were preserved for gut fluorescence measurements.

Microzooplankton Sampling

(Submitted by Drs. E. and B. Sherr, Oregon State University)

September 4-10, 2001 GLOBEC CRUISE W0109A:

Primary goal: MICROZOOPLANKTON ABUNDANCE, BIOMASS, AND GENERAL TAXONOMIC COMPOSITION:

MICROPROTIST (10 – 200 μm sized heterotrophic protists) BIOMASS -

A) Epifluorescence samples: preserve with Lugol's +Na thiosulfate+ formalin, filter 100 ml subsamples onto 3 μm black filters, stain with DAPI, mount on labeled slide, freeze in slide box.

B) Settling samples: Add 23 ml acid Lugol solution to 240 ml (8 oz) labeled amber bottle, add 207 ml seawater sample, gently mix, cap tightly, store in boxes for later inspection via inverted light microscopy.

Secondary goal: ABUNDANCE OF PHYTOPLANKTON AND BACTERIA

Flow cytometry samples: pipette 3 ml of sample into 4 ml labeled cryovial, add 120 μl of unfrozen, 25% glutaraldehyde (0.5% final conc), cap & mix using vortex mixer, store in liquid nitrogen shipper for later analysis via flow cytometry.

SAMPLING STRATEGY:

Focus on upper 100 m, with emphasis on 0-50 m depth zone, including chlorophyll-a maximum.

Depths to sample: 6 depths per cast

- Depth of chlorophyll-a maximum (will vary from cast to cast)
- 70 m – 100 m depth
- 4 other depths in upper 50 m, more or less evenly spaced; may want to sample the depth nearest the chlorophyll maximum depth

Table 1: Actual sample depths for collection of microzooplankton samples (epifluorescence slide preparations and acid Lugol-fixed samples) and flow cytometry samples during the Sept. '01 LTOP GLOBEC cruise.

Station, Depth, Dist. From Shore	Sample Collection Depths (m)
NH-05, 60m, 10km	55, 47, 30, 20, 10, 4
NH-15, 92m, 28km	71, 50, 40, 20.2, 10
NH-25, 297m, 46km	70, 50, 40, 30, 21, 12
NH-35, 440m, 65km	100, 70, 49, 30, 18, 10
NH-45, 701m, 83km	70, 50, 40, 30, 25, 10
NH-65, 2882m, 121km	70, 50, 40, 30, 20, 10
NH-85, 2906m, 157km	70, 50, 40, 30, 20, 10

FM-3, 63m, 9km	56, 40, 30, 22, 10, 5
FM-4, 87m, 15km	70, 50, 30, 15, 10, 5
FM-5, 158m	70, 50, 30, 15, 10, 5
FM-7, 345m, 36km	70, 50, 30, 20, 15, 10
FM-8, 1097	100, 70, 45, 30, 20, 10
FM-9, 1678	100, 70, 45, 30, 20, 10

CR-1, 41m, 8km	24
CR-3, 135m, 24km	100, 86, 60, 20, 10, 5
CR-4, 515m, 33km	70, 50, 40, 30, 20, 10
CR-5, 667	99, 70, 50, 31, 17, 11
CR-7, 848m, 66km	100, 50, 37, 30, 20, 10
CR-9a, 3120m, 99km	70, 50, 41, 33, 20, 9.7
CR-10, 2953	70, 50, 40, 30, 16, 10

RR-2, 87m, 16km	50, 27, 10
RR-3, 132m, 24km	60, 40, 20
RR-4, 599m	50, 35, 20
RR-6, 2011m	70, 30, 10
RR-7, 2993m	50, 24, 10

HH-1, 54m	2.2
HH-2, 122m	20, 5
HH-3, 154m	50, 30, 20, 10
HH-4, 110	30, 17
HH-5, 947m	49, 30, 16
HH-7, 1721	51, 30, 12