PRELIMINARY CRUISE REPORT, W0304A
R/V WECOMA, 1-6 April 2003
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 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 m^2 MOCNESS.

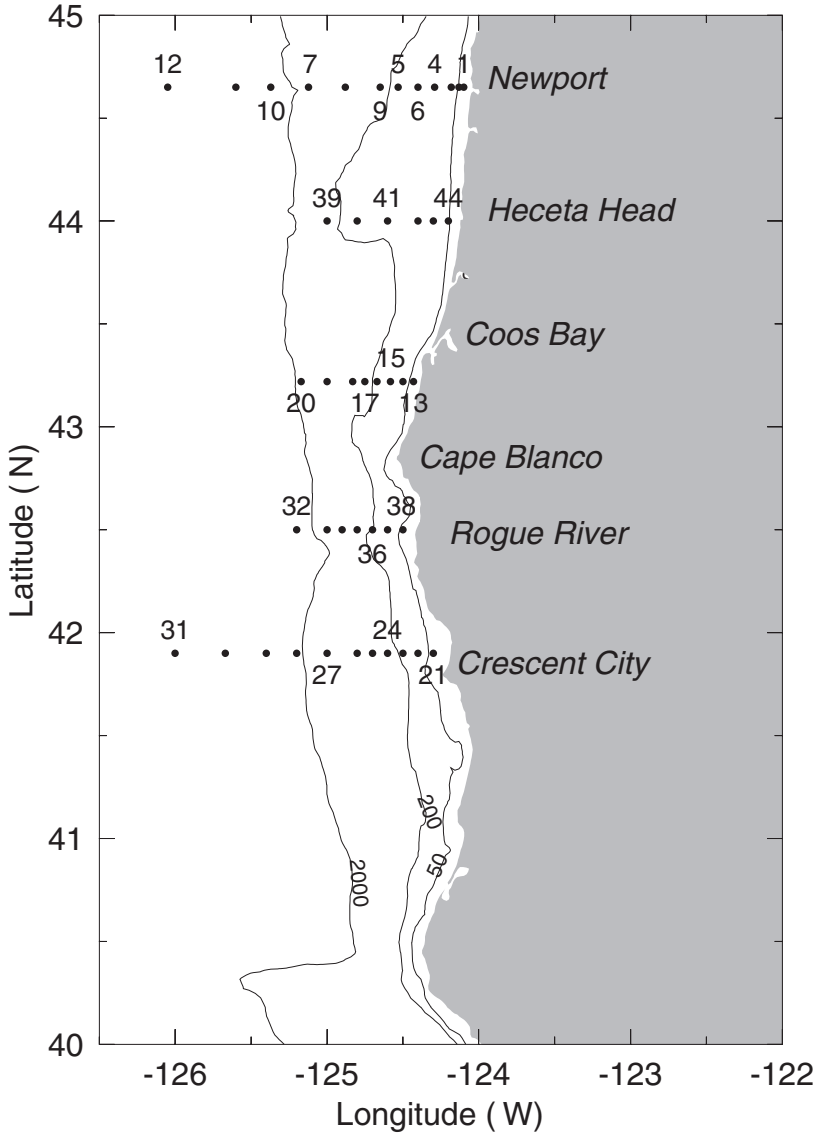
CRUISE NARRATIVE

A brief overview of W0304A is presented here. An event log is provided in Table 3, and participating personnel are listed in Table 4. Wecoma departed Newport at 1245 PST on 1 April 2002. CTD sampling started at NH-1 and continued out to NH-10. In A single vertical net tow was done at NH-1, and both MOCNESS and vertical net tows were started at NH-5. In order to maximize darkness for the MOCNESS tows, the CTD stations were done out of their usual order. Working out, NH-15 was skipped and then returned to after the CTD at NH-20, so that the MOCNESS could be done in the dark at NH-15. MOCNESS and vertical net tows were done during darkness at NH-15, NH-25, NH-35 and NH-45. At NH-45 the portable winch cable became tangled during the vertical net tow, so the CTD cast was done while the wire was repaired. CTD casts were then completed at NH-35 and NH-25 before running back out to NH-55. CTD casts and vertical net tows were completed in order out to NH-85, finishing the line at 2110 PST on 2 April. Drifters were released at NH-10, 15, 25, 45 and 65. The ship transited to the inshore end of the FM-line in order to be at the

inshore end in daylight, and began sampling at FM-1 at 0712 PST, 3 April, with MOCNESS tows beginning at FM-3. The FM line was finished at 1610 PDT, 3 April, and the ship transited to the inshore end of the Crescent City line to arrive there in daylight.

The ship arrived at CR-1 at 0538 PST on 4 April, with MOCNESS tows beginning at CR-2. Working offshore, the Crescent City line was finished at 0238 PST on 5 April.

Figure 1. CTD stations during W0304A, along the Newport, Five Mile, Heceta Head, Rogue River and Crescent City Hydrographic Lines.



The ship arrived at the offshore end of the Rogue River line at 0710 PST on 5 April, and the RR-line was completed at 1830 PST doing both CTD's and the usual net tows in order. The ship transited to HH-5, arriving at 0412 PDT, 6 April (having switched from PST to PDT at 0200 PST). Because of bad weather forecast for our April 7th morning arrival in Newport at ebb tide, it was decided to change the ETA in Newport to the afternoon of April 6th at high tide; thus the outer stations and MOCNESS tows on the HH-line were skipped in order to finish the inshore stations. Time was sufficient to add an intermediate station, "HH-1.5" between HH-2 and HH-1 to get more sampling on the inshore end of the line. HH-1 was completed at 1215 PDT, 6 April and the ship transited to Newport, arriving at the pier at 1645 PDT.

PRELIMINARY RESULTS

Winds For several weeks prior to our cruise, predominant winds had been favorable for downwelling, and these predominantly southwest winds continued during the first half of our cruise. Monthly anomalies of the Coastal Upwelling Index at 45 N, 125 W had been negative in December, January and March (http://las.pfeg.noaa.gov/las/main.pl) though positive in February 2003.

Stratification On all five sections, the pycnocline was roughly level, as expected from the downwelling-favorable winds in March and early April, with little or no upwarping toward the coast. Surface temperatures were nearly uniform (about 11 C). Surface salinities were also nearly uniform (at ~32.3 psu), except for a fresher lens adjacent to the coast. On all sections the thermocline (at 9-10 C) and halocline (32.4-33.8 psu) intersect the bottom near the middle of the continental shelf. These distributions are typical of winter conditions, and indicate that the spring transition had not yet occurred. There was little evidence of upwelling, but several sections showed isopycnals bending upward over the continental slope at greater depth (100-300 m).

Subarctic Anomaly The LTOP cruise in July 2002 had shown evidence of a cold fresh anomaly in and above the halocline (Freeland et al., 2003, http://ltop.coas.oregonstate.edu/~ctd/pdf/FGHSforweb.pdf), indicating enhanced Subarctic influence in the California Current region. Subsequent LTOP cruises (in September, December and February) had shown it persisting along the NH-line off Newport; in February 2003, it was particularly strong at NH-45, NH-35 and NH-25. An extra NH-line section that was made on on 28-29 March during the LTOP mooring cruise clearly showed the anomaly still present at NH-85 (P. M. Kosro, pers. comm.).

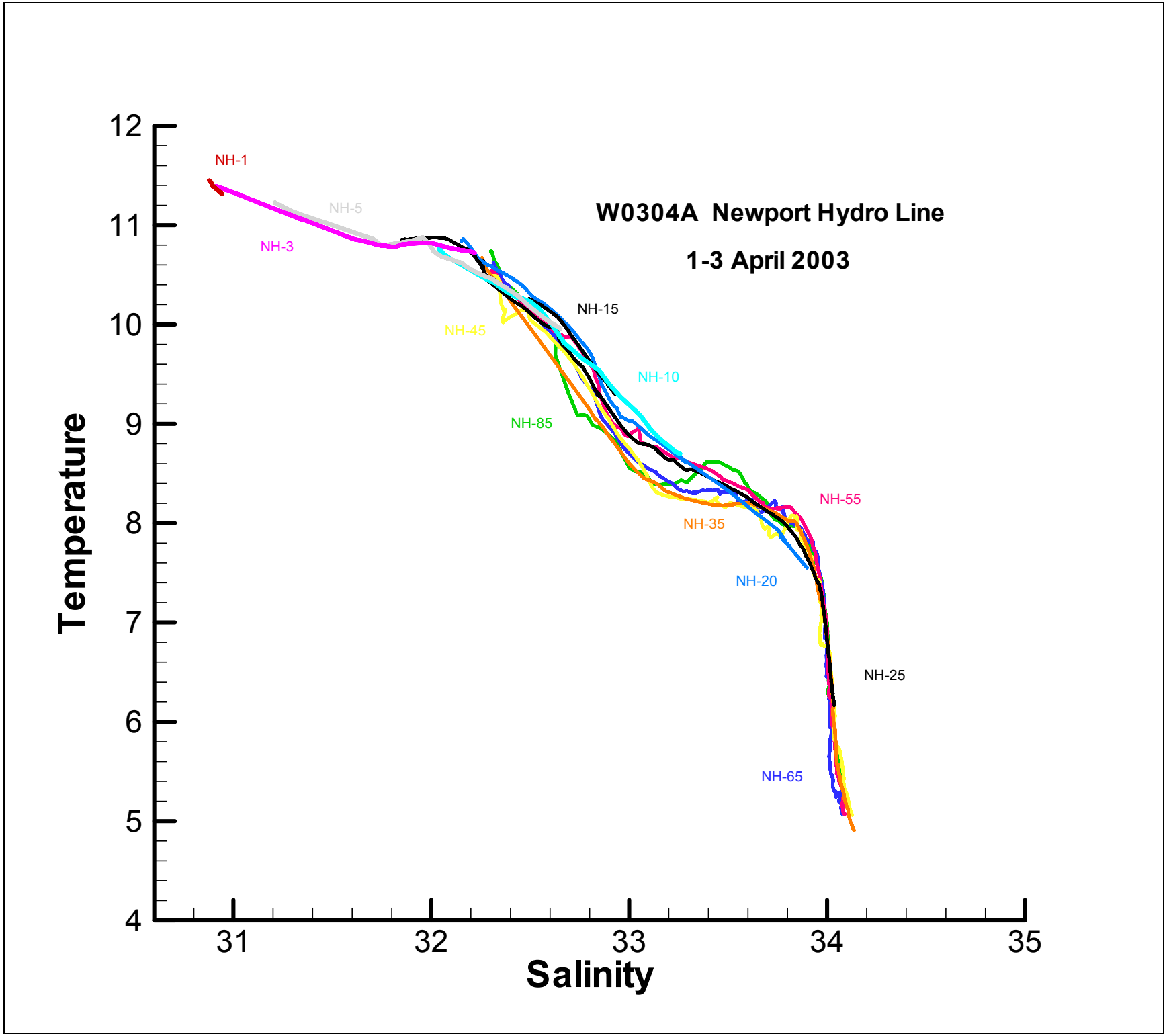
T-S diagrams from this cruise showed that the same or a very similar cold, fresh anomaly was strong off Coos Bay, Rogue River and Crescent City. The signal was particularly strong and clear along the FM-line off Coos Bay, but even off Coos Bay, the inshore stations were of relatively high temperature and salinity. The cross-shelf gradient reflects the influence of Equatorial Water moving northward along the coast in winter. On both the RR- and CR-Lines, there was evidence of a lot of interleaving between Subarctic Water and Equatorial Water. T-S curves from stations on the HH-line have a nearly straight segment in the thermocline and halocline separating the surface (at 10.6 C, 32.3 psu) water from the water at the bottom over Heceta Bank (7.8 C, 33.8 psu); this suggests that mixing over the bank is sufficiently vigorous to erase advective water-mass anomalies. T-S characteristics from the NH-line off Newport resemble those from the HH-line, except that offshore stations exhibit mild curvature within the pycnocline. This implies that pycnocline waters off Newport are a mixture of Heceta Bank water (advected northward) with remnants of the Subarctic anomaly.

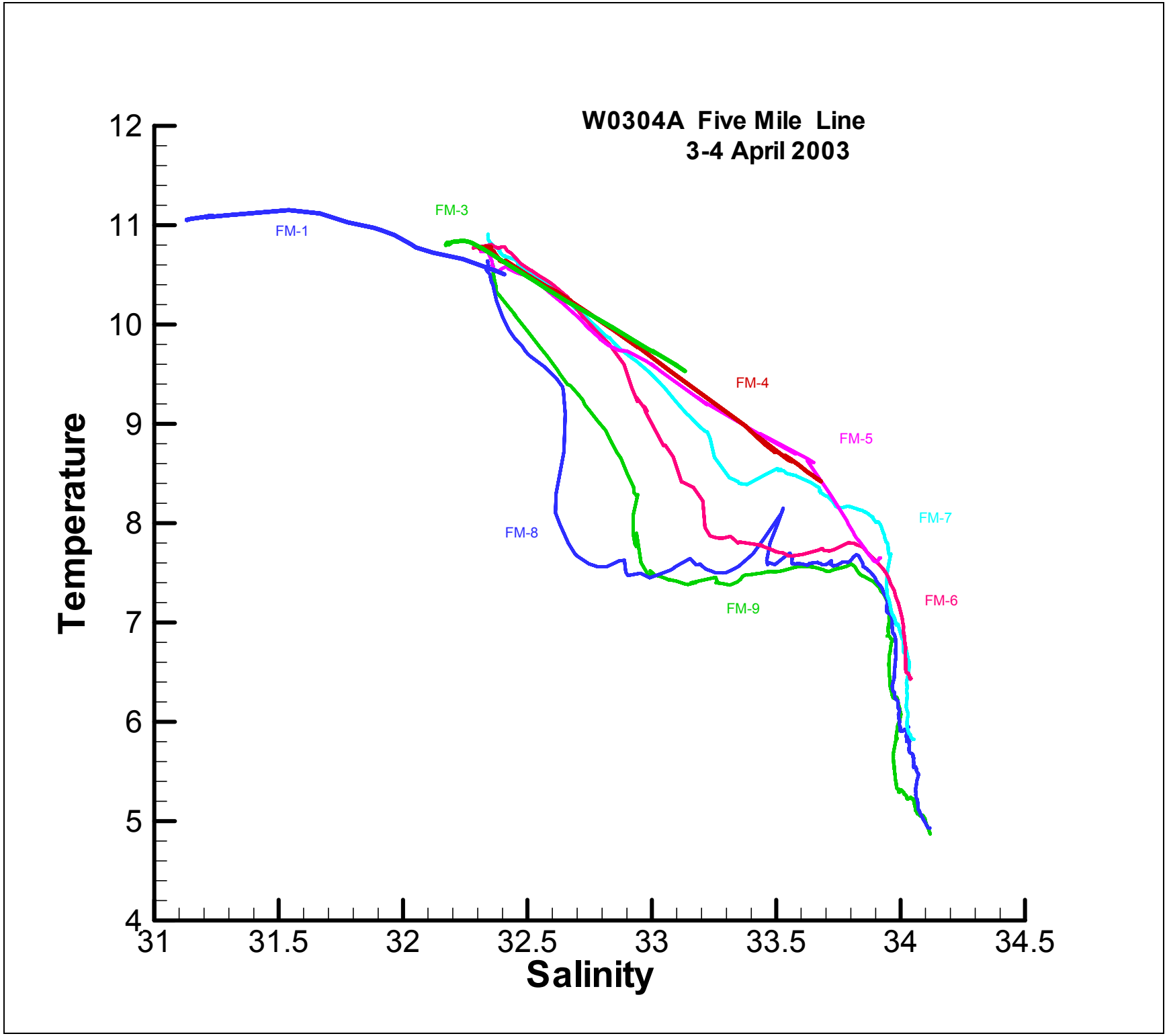
A deeper water-mass anomaly seemed to be present at the most offshore station off Crescent City (Station 31 at CR-11), where temperature in a thick layer (250 m to 770 m) were about 0.2 to 0.5 C lower than at similar depth and salinity of the adjacent station (Station 30 at CR-10).

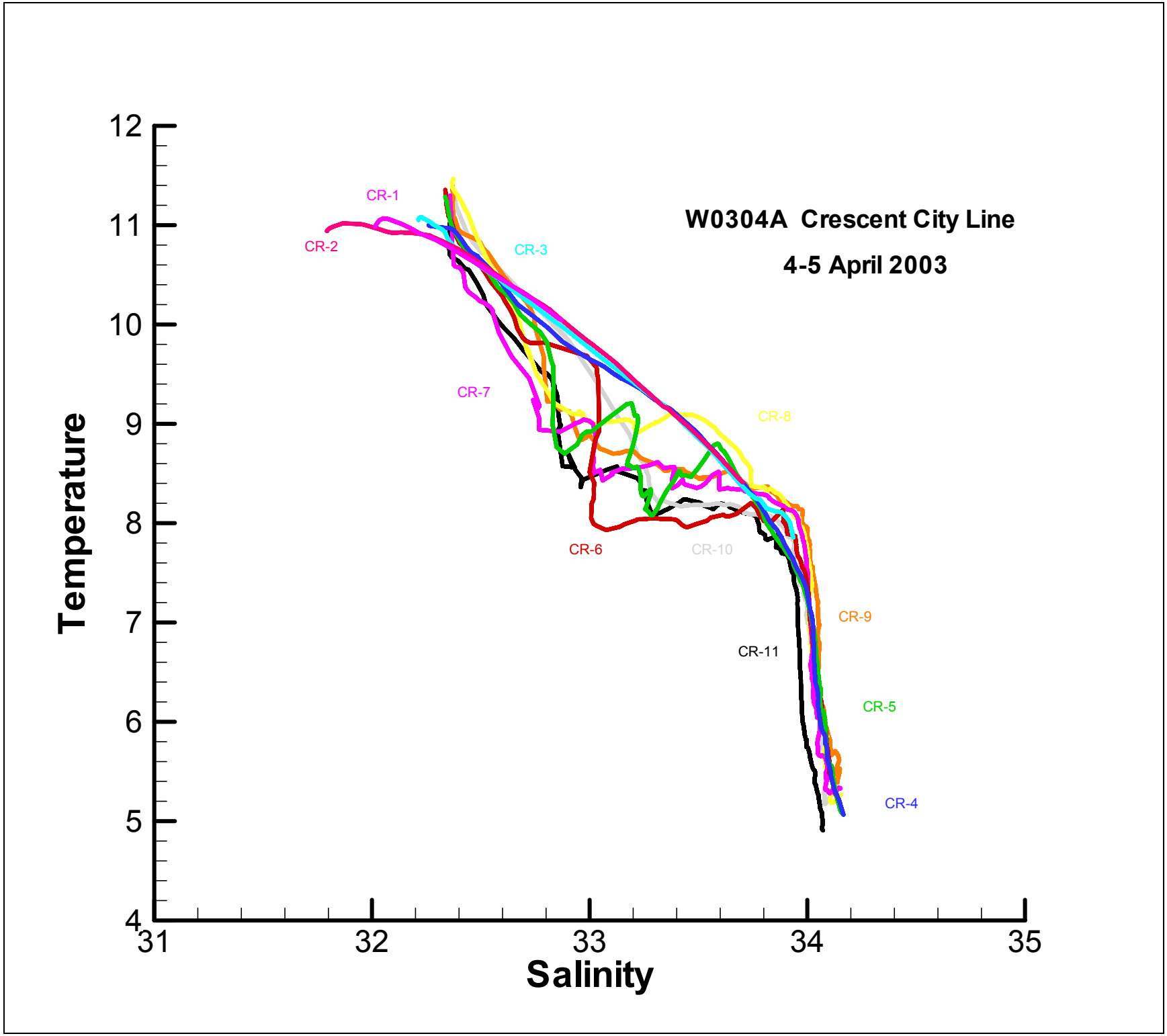
Fluorescence Values of CTD fluorescence voltage were low (<1.5 V) everywhere except over Heceta Bank (HH-1 to HH-4) , near Stonewall Bank (NH-10 and NH-15) and the inshore stations on each line (NH-1, 3, 5; FM-1, 3; RR-1 2,3; CR-1, 2). These relatively high values suggest that vertical mixing over Heceta and Stonewall Banks and over the inner shelf is sufficient to mix nutrients up into the photic zone in winter.

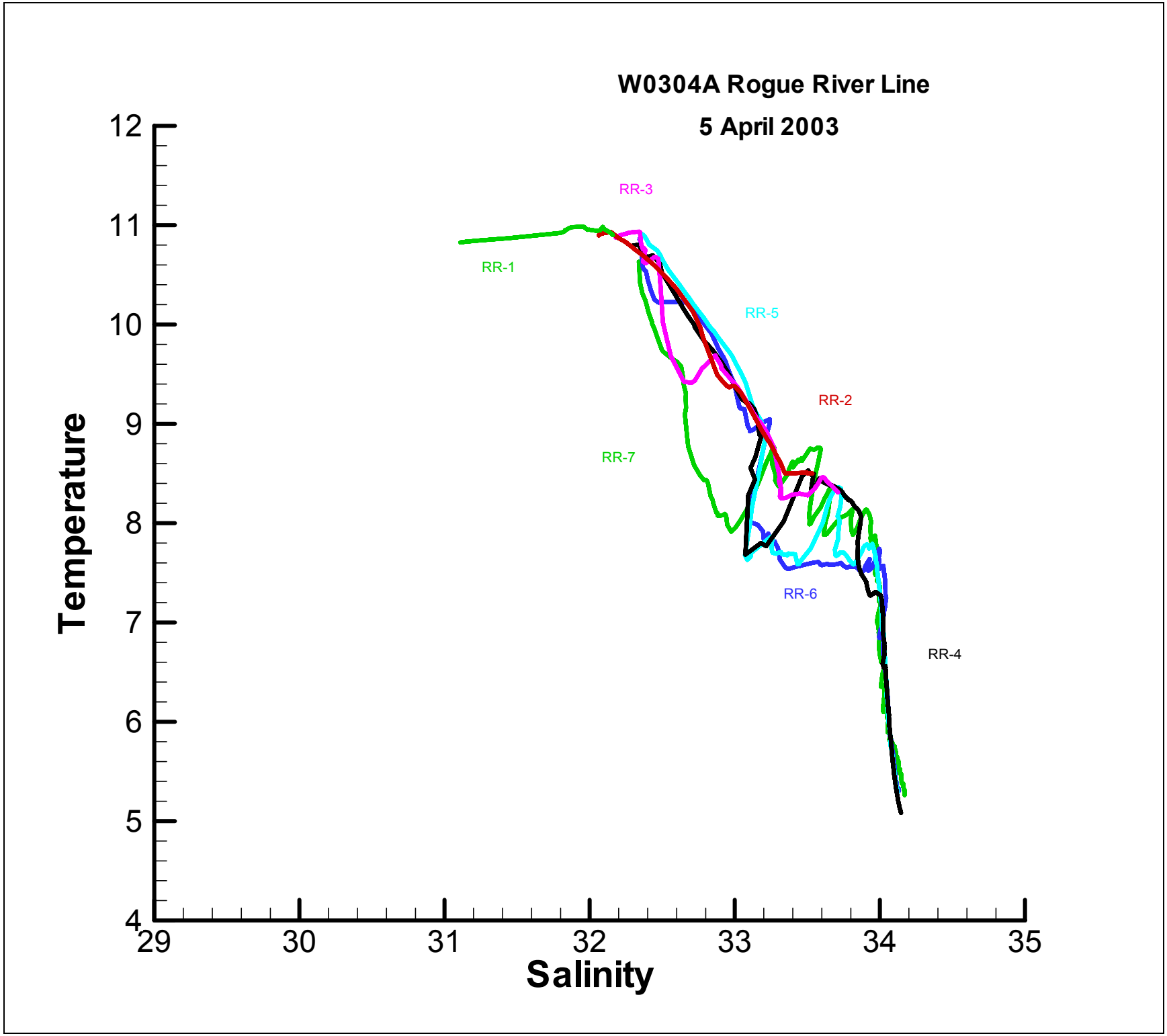
Currents Geostrophic velocity calculations indicate that flow over the shelf off Newport was 10-20 cm/sec over the outer shelf. Satellite-tracked drifters show a maximum southward displacement of about 50 km in the first 5-6 days, indicating a speed of about 10 cm/sec.

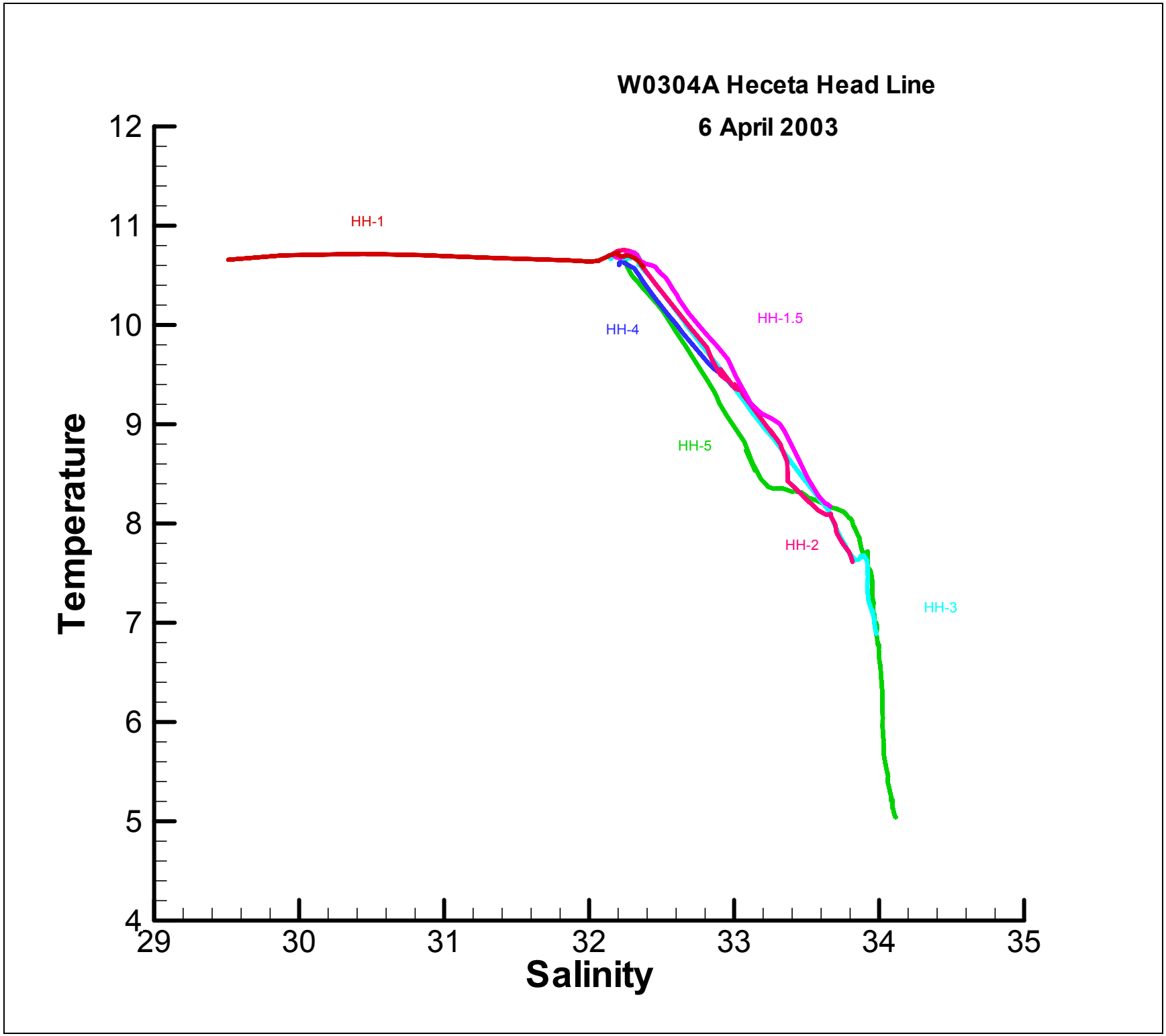
The attached microzooplankton report was provided by the Drs. Evelyn and Barry Sherr.
The attached drifter plots were provided by Dr. Jack Barth.

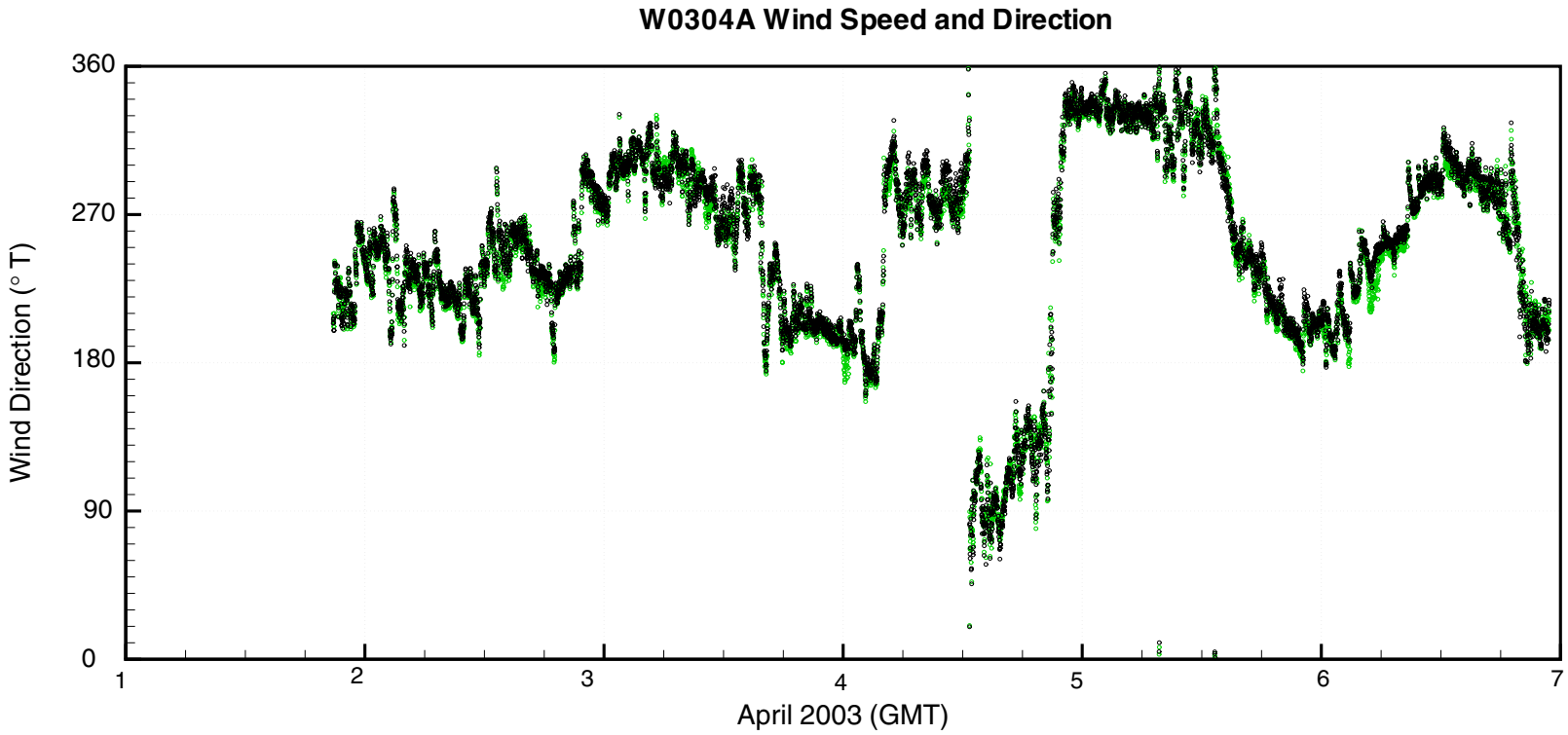

W0304A Newport Hydro Line
1-3 April 2003
NH-1
NH-5
NH-3
NH-15
NH-45
NH-10
NH-85
NH-55
NH-35
NH-20
NH-25
NH-65
Temperature
Salinity
12
11
10
9
8
7
6
5
4
31
32
33
34
35


W0304A Five Mile Line
3-4 April 2003
Temperature
Salinity
12
11
10
9
8
7
6
5
4
31
31.5
32
32.5
33
33.5
34
34.5
FM-1
FM-3
FM-4
FM-5
FM-6
FM-7
FM-8
FM-9


W0304A Crescent City Line
4-5 April 2003
Temperature
Salinity
12
11
10
9
8
7
6
5
4
31
32
33
34
35
CR-1
CR-2
CR-3
CR-7
CR-8
CR-6
CR-10
CR-9
CR-11
CR-5
CR-4


W0304A Rogue River Line
5 April 2003
Temperature
Salinity
12
11
10
9
8
7
6
5
4
29
30
31
32
33
34
35
RR-1
RR-3
RR-5
RR-2
RR-7
RR-6
RR-4


W0304A Heceta Head Line
6 April 2003
HH-1
HH-4
HH-1.5
HH-5
HH-2
HH-3
Temperature
Salinity
12
11
10
9
8
7
6
5
4
29
30
31
32
33
34
35


W0304A Wind Speed and Direction
Wind Direction (° T)
360
270
180
90
0
1
2
3
4
5
6
7
April 2003 (GMT)

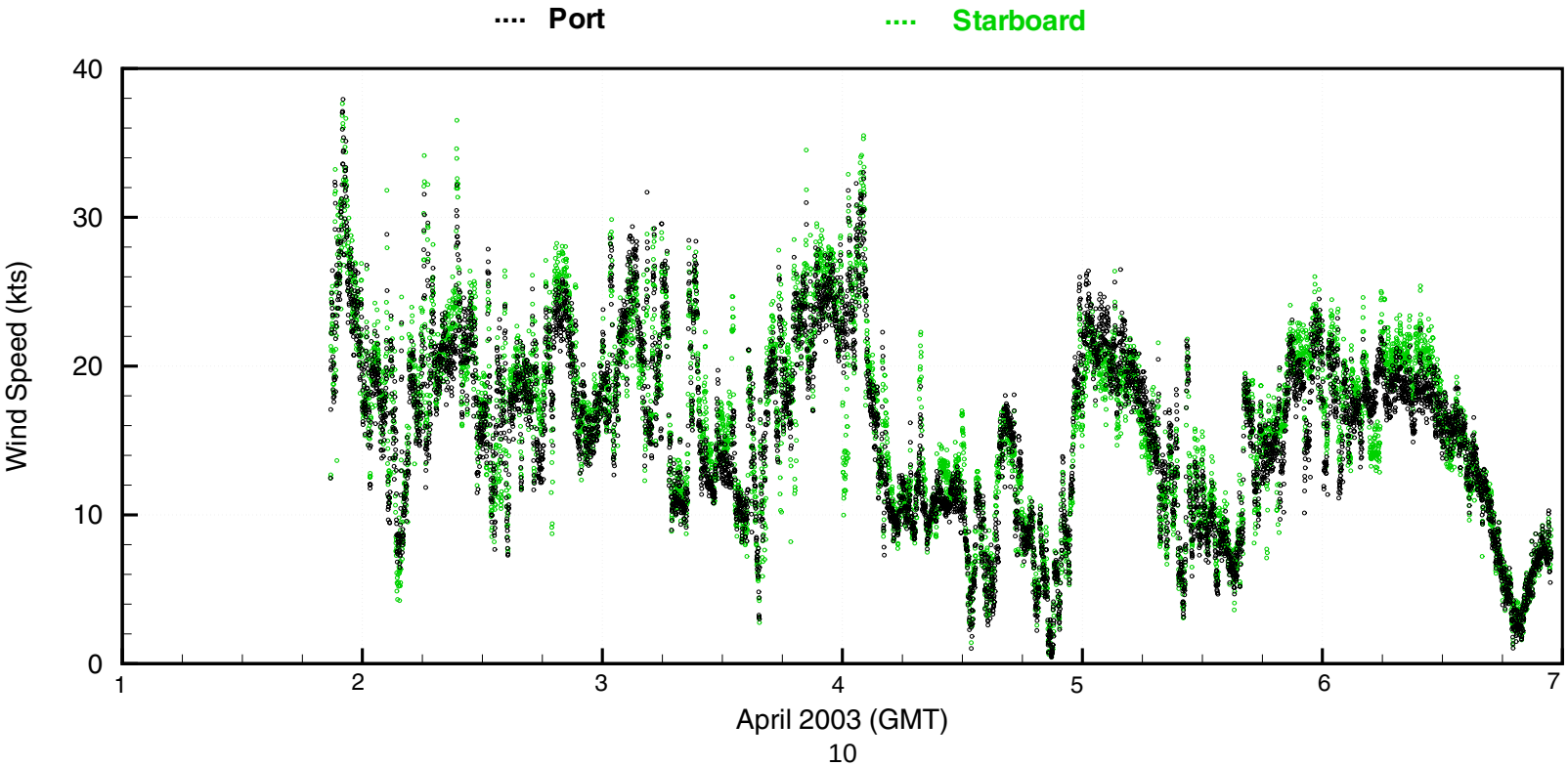

Port
Starboard
Wind Speed (kts)
40
30
20
10
0
1
2
3
4
5
6
7
April 2003 (GMT)

Table 1. CTD station positions during W0304A, 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	44.65	-124.1	29	24	N
NH-3	2	5.2	44.65	-124.13	48	41	
NH-5	3	9.1	44.65	-124.18	58	53	C,Z,N,M
NH-10	4	18.3	44.65	-124.29	80	75	N,D
NH-20	5	36.9	44.65	-124.53	142	136	N
NH-15	6	26.7	44.65	-124.4	95	91	C,Z,N,M,D
NH-45	7	83.3	44.65	-125.12	699	682	C,Z,N,M,D
NH-35	8	64.8	44.65	-124.88	433	430	C,Z,N,M
NH-25	9	46.5	44.65	-124.65	298	294	C,Z,N,M,D
NH-55	10	103.2	44.65	-125.37	2867	1006	O2, N
NH-65	11	121.5	44.65	-125.6	2861	1006	C,Z,N,D
NH-85	12	157	44.65	-126.05	2884	1006	C,Z
FM-1	13	3.3	43.22	-124.43	34	30	N
FM-3	14	8.7	43.22	-124.5	64	59	C,Z,N,M
FM-4	15	15.2	43.22	-124.58	86	80	C,Z,N,M
FM-5	16	22.2	43.22	-124.67	156	150	C,Z,N,M
FM-6	17	28.9	43.22	-124.75	310	306	O2
FM-7	18	35.7	43.22	-124.83	344	339	C,Z,N,M
FM-8	19	49.1	43.22	-125	1080	1007	C,Z,N
FM-9	20	62.6	43.22	-125.17	1654	1006	C,Z,N
CR-1	21	8	41.9	-124.3	41	38	C,Z,N
CR-2	22	16.3	41.9	-124.4	68	64	Z,N,M
CR-3	23	24.4	41.9	-124.5	138	128	C,Z,N,M
CR-4	24	32.6	41.9	-124.6	504	499	C,Z,N,M
CR-5	25	40.9	41.9	-124.7	659	657	C,Z
CR-6	26	49.3	41.9	-124.8	698	695	N,M
CR-7	27	65.7	41.9	-125	835	800	C,Z,N
CR-8	28	82.2	41.9	-125.2	2726	1006	
CR-9a	29	98.9	41.9	-125.4	3096	1006	C,Z,N
CR-10	30	120.9	41.9	-125.67	2929	1005	O2
CR-11	31	148.5	41.9	-126	3325	1005	C,Z,N
RR-7	32	64.6	42.5	-125.2	2973	1007	C,Z,N
RR-6	33	48.3	42.5	-125	1769	1006	C,Z,N
RR-5	34	40	42.5	-124.9	1159	1005	O2
RR-4	35	31.9	42.5	-124.8	600	591	C,Z,N,M
RR-3	36	23.5	42.5	-124.7	132	125	C,Z,N,M
RR-2	37	15.4	42.5	-124.6	86	81	C,Z,N,M
RR-1	38	7.2	42.5	-124.5	37	33	C,Z,N
HH-5	39	68.9	44	-125	933	901	C,Z,N
HH-4	40	53	44	-124.8	111	105	C,Z,N
HH-3	41	36.9	44	-124.6	153	146	C,Z,N
HH-2	42	20.9	44	-124.4	120	114	C,Z,N
HH-1.5	43	13	44	-124.3	93	87	C,Z,N
HH-1	44	5	44	-124.2	53	47	C,Z,N

Table 2: Actual sample depths and types of subsamples for biochemical sampling during the April '03 LTOP GLOBEC cruise.

Station, Depth, Dist. From Shore	**Sample Collection Depths (m)**	**Type of Sample Collected**
NH-05, 60m, 9km	53, 50, 40, 30, 25, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
NH-15, 90m, 28km	85, 70, 60, 51, 40, 30, 20, 10.5, 5.3, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
NH-25, 295m, 46km	285, 200, 150, 100, 70, 50, 40, 30, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 200 and 150 m)
NH-35, 673m, 65km	429, 320, 150, 100, 70, 50, 40, 30, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 427, 250 and 150 m)
NH-45, 700m 83km	680, 499, 150, 100, 69, 50, 40, 30, 25, 21, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 680, 499 and 150m)
NH-65, 288m, 121km	1004, 948, 400, 150, 100, 70, 50, 40, 30, 21, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1005, 600 and 150m)
NH-85, 2900m, 157km	1006, 628, 149, 101, 70, 52, 38, 30, 28.8, 20, 10, 3	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 285 and 150 m)
FM-3, 60m, 9km	57, 50, 41, 30, 25, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), Chl, POC/PON
FM-4, 84m, 15km	80, 70, 60, 50, 40, 30, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl, POC/PON
FM-5, 158m, 22km	149, 130, 100, 70, 60, 50, 40, 30, 20, 15, 10, 1	TOC (surface), Nutrients, TN (surface), both Chl, POC/PON (except 151m)
FM-7, 336m, 35km	300, 165, 150, 100, 70, 50, 40, 30, 27, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths) both Chl, POC/PON (except 300 and 150m)
FM-8, 1078m, 49km	1006, 451, 150, 100, 70, 50, 42, 40, 30, 20, 10, 2	TOC (surface), Nutrients, TN (surface) both Chl, POC/PON (except 1000, 850, and 150m)
FM-9, 1722m, 49km	1004, 510, 149, 102, 71, 51, 45, 40, 30, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths) both Chl, POC/PON (except 1000, 965, and 150m)

Table 2 cont.

CR-1, 39m, 8km	35, 30, 25, 20, 15, 10, 7, 5, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
CR-3, 117m, 23km	116, 100, 70, 60, 49, 40, 30, 20, 15, 10, 5, 1	TOC (surface), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
CR-4, 495m, 31km	450, 250, 150, 100, 70, 50, 40, 30, 20, 12, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 495, 450, and 150m)
CR-5, 645m, 41km	550, 500, 150, 100, 70, 50, 40, 30, 20, 10, 1	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 645, 500, 400 and 150m)
CR-7, 852m, 66km	799, 500, 150, 100, 69, 50, 40, 30, 26, 20, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 835, 500 and 150m)
CR-9a, 3089m, 93km	979, 390, 150, 99, 70, 50, 40, 30, 26.5, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 770 and 150m)
CR-11, 3400m, 147km	1006, 385, 150, 100, 71, 50, 40, 30, 20, 10, 3	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1000, 390 and 150m)

RR-1, 35m, 7km	31, 25, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
RR-2, 80m, 15km	82, 70, 60, 48, 39, 30, 20, 14, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
RR-3, 130m, 23km	120, 70, 60, 50, 41, 30, 26, 20, 10, 5, 1	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
RR-4, 550m, 33km	590, 500, 151, 100, 70, 50, 40, 30, 20, 15, 10, 1	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 500, 450, and 150 m)
RR-6, 1800m, 47km	1005, 150, 100, 70, 50, 40, 30, 20, 10, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 1005, 200, and 150 m)
RR-7, 3060m, 64km	1005, 880, 510, 150, 100, 71, 51, 40, 30,, 20, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths) (except 1006, 830 and 150)

Table 2 cont.

HH-1, 52m, 7km	46, 40, 30, 25, 20, 15, 10, 5, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
HH-2, 115m, 16km	113, 100, 70, 60, 50, 40, 30, 20, 10, 5, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
HH-3, 150m, 24km	145, 100, 70, 60, 50, 39, 30, 25, 20, 10, 2	TOC (surface), Nutrients, TN (surface), both Chl and POC/PON (all depths)
HH-4, 100m, 32km	100, 95, 70, 60, 50, 40, 30, 25, 20, 10, 5, 1	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths)
HH-5, 950m, 40km	770, 552, 500, 150, 100, 70, 50, 40, 30,, 20, 9, 2	TOC (all depths), Nutrients, TN (all depths), both Chl and POC/PON (all depths) (except 820, 500, and 150 m)

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

Table 3. R/V WECOMA Cruise W0304A

	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)		
1-Apr	1700												air calibration of transmissometer	
	2045												Depart Newport	
	2049												Start DAS	
													Start echosounder	
													Start ADCP	
	2049												Start flo-thru	
													Start flo-thru fluorometer	
	2203	2212	1	NH-1	44	39.2	-124	06.0	29	1005.0	200	30	CTD	WE09103.1
	2217	2221			44	39.4	-124	05.9					vertical net tow, 22m	WE09103.2
	2249	2246	2	NH-3	44	39.1	-124	07.6	48	1005.0	200	31	CTD	WE09103.3
	2330	2343	3	NH-5	44	39.1	-124	10.6	58	1004.5	215	23	CTD with biochem, mzp	WE09103.4
	2347	2349			44	39.1	-124	10.6					vertical net tow, 55 m	WE09103.5
	2359	0004			44	39.1	-124	10.7					2nd vertical net tow, 55 m	WE09103.6
2-Apr	0007				44	39.1	-124	10.7					Secchi disk (6m)	WE09203.1
	0013				44	39.0	-124	10.7					Mocness deployed	WE09203.2
		0034			44	38.6	-124	11.5					Mocness aboard	WE09203.3
	0145	0156	4	NH-10	44	39.0	-124	17.7	80	1005.0	240	25	CTD	WE09203.4
	0202	0208			44	39.0	-124	17.8					vertical net tow, 75 m	WE09203.5
	0209				44	39.04	-124	17.81					drifter 40172 deployed	WE09203.6
	0320	0332	5	NH-20	44	39.1	-124	31.7	142	1003.8	240	17	CTD	WE09203.7
	0339	0344			44	39.1	-124	31.7					vertical net tow, 100 m	WE09203.8
	0439	0459	6	NH-15	44	39.1	-124	24.7	95	1004.1	240	15	CTD with biochem, mzp	WE09203.9
	0504	0510			44	39.1	-124	24.7					vertical net tow, 90 m	WE09203.10
	0519				44	39.0	-124	24.8					Mocness deployed	WE09203.11
		0541			44	38.7	-124	25.7					Mocness aboard	WE09203.12
	0552				44	38.75	-124	26.07					drifter 40173 deployed	WE09203.13
	0714	0720		NH-25	44	39.1	-124	39.0		1012.2	260	26	vertical net tow, 100 m	WE09203.14
	0728				44	39.1	-124	39.0					Mocness deployed	WE09203.15
		0816			44	37.8	-124	40.4					Mocness aboard	WE09203.16
	0940	0947		NH-35	44	39.1	-124	52.9		1002.2	200	25	vertical net tow, 100 m	WE09203.17
	0955				44	38.9	-124	52.9					Mocness deployed	WE09203.18
		1055			44	37.2	-124	53.4					Mocness aboard	WE09203.19
	1226			NH-45	44	39.1	-125	06.9					Mocness deployed	WE09203.20
		1324			44	36.4	-125	06.9		1001	200	15	Mocness aboard	WE09203.21
	1405	1435			44	39.1	-125	06.9					aborted vertical tow (wire tangled)	WE09203.22
	1448	1524	7	NH-45	44	39.1	-125	07.0	699				CTD with biochem, mzp	WE09203.23
	1527				44	39.1	-125	07.0					vertical net tow, 100 m	WE09203.24
	1535				44	39.11	-125	07.09					Drifter 40175 deployed	WE09203.25
	1543												cleaned flo-thru filter	

Table 3 cont.

	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)		
	1550												cleaned Turner fluorometer	
	1644	1718	8	NH-35	44	39.1	-124	52.9	433	1002.2	250	20	CTD with biochem, mzp	WE09203.26
	1825	1853	9	NH-25	44	39.2	-124	39.0	298	1003.5	240	15	CTD with biochem, mzp	WE09203.27
	1900				44	39.21	-124	38.90					drifter 40174 deployed	WE09203.28
	2224	2317	10	NH-55	44	39.0	-125	22.0	2867	1005.0	295	15	CTD with oxygen	WE09203.29
	2330	2326			44	38.9	-125	22.2					vertical net tow	WE09203.30
3-Apr	0041	0131	11	NH-65	44	39.1	-125	36.0	2861	1005.9	290	20	CTD with biochem, mzp	WE09303.1
	0135	0141			44	39.1	-125	36.0					vertical net tow, 100 m	WE09303.2
	0143	0148			44	39.1	-125	36.0					2nd vertical net tow, 100 m	WE09303.3
	0151				44	39.10	-125	36.01					drifter 40176 deployed	WE09303.4
	0405	0501	12	NH-85	44	39.1	-126	03.0	2884	1008.5	310	22	CTD with biochem	WE09303.5
	0510												begin transit to FM-Line	WE09303.6
	1445												cleaned Turner fluorometer	
	1530												air calibration of transmissometer	
	1512	1519	13	FM-1	43	13.0	-124	26.0	34	1015.0	275	9	CTD	WE09303.7
	1524	1527			43	13.0	-124	25.9					vertical net tow, 30 m	WE09303.8
	1556	1610	14	FM-3	43	13.0	-124	30.0	64	1015.8	290	11	CTD with biochem, mzp	WE09303.9
	1614	1619			43	13.0	-124	30.0					vertical net tow, 60m	WE09303.10
	1626				43	13.0	-124	30.2					Mocness deployed	WE09303.11
		1646			43	12.5	-124	30.7					Mocness aboard	WE09303.12
	1725	1740	15	FM-4	43	13.1	-124	34.9	86	1015.8	240	21	CTD with biochem, mzp	WE09303.13
	1743	1749			43	13.1	-124	34.9					vertical net tow, 80m	WE09303.14
	1755				43	13.1	-124	35.1					Mocness deployed	WE09303.15
		1819			43	12.7	-124	36.0					Mocness aboard	WE09303.16
	1853	1914	16	FM-5	43	13.0	-124	40.0	156				CTD with biochem	WE09303.17
	1918	1924			43	13.1	-124	40.0					vertical net tow, 100 m	WE09303.18
	1931				43	13.3	-124	40.2					Mocness deployed	WE09303.19
		2014			43	12.1	-124	41.2					Mocness aboard	WE09303.20
	2058	2132	17	FM-6	43	13.0	-124	45.0	312	1015.0	210	25	CTD with oxygen	WE09303.21
	2208	2237	18	FM-7	43	13.0	-124	50.0	346	1014.0	195	26	CTD with biochem, mzp	WE09303.22
	2242	2249			43	13.0	-124	50.0					vertical net tow, 100 m	WE09303.23
	2255				43	12.9	-124	50.1					Mocness deployed	WE09303.24
		2353			43	10.9	-124	51.3					Mocness aboard	WE09303.25
4-Apr	0110	0158	19	FM-8	43	13.0	-125	00.0	1080	1011.5	200	30	CTD with biochem, mzp	WE09403.1
	0203	0210			43	13.0	124	59.9					vertical net tow, 100 m	WE09403.2
	0310	0400	20	FM-9	43	13.0	-125	09.9	1654	1010	170	20	CTD with biochem, mzp	WE09403.3
	0401	0408			43	13.0	-125	09.9					vertical net tow, 100 m	WE09403.4
	0410												begin transit to CR-1	
	1338	1338	21	CR-1	41	54.0	-124	18.1	41	1013.8	095	7	CTD with biochem, mzp	WE09403.5
	1350	1354			41	54.0	-124	18.1					vertical net tow, 35 m	WE09403.6
	1429	1433		CR-2	41	53.9	-124	24		1014.0	130	10	vertical net tow, 63 m	WE09403.7

Table 3 cont.

	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)		
	1435	1440											2nd vertical net tow, 63 m	WE09403.8
	1451	1500	22	CR-2	41	53.9	-124	24.1	68				CTD, mzp	WE09403.9
	1510												cleaned flo-thru filters	
	1510				41	54.1	-124	24.1					Mocness deployed	WE09403.10
	1515												cleaned Turner fluorometer	
		1532			41	54.9	-124	24.6					Mocness aboard	WE09403.11
	1532												air calibration of transmissometer	
	1615	1636	23	CR-3	41	54.0	-124	30.0	138	1014.9	090	18	CTD with biochem, mzp	WE09403.12
	1639	1645			41	54.0	-124	30.0					vertical net tow, 100m	WE09403.13
	1652				41	54.1	-124	30.1					Mocness deployed	WE09403.14
		1723			41	55.0	-124	31.1					Mocness recovered	WE09403.15
	1800	1835	24	CR-4	41	54.0	-124	36.0	504	1016.5	095	12	CTD with biochem, mzp	WE09403.16
	1839	1844			41	54.0	-124	36.0					vertical net tow, 100 m	WE09403.17
	1850				41	54.1	-124	36.2					Mocness deployed	WE09403.18
		2001			41	56.9	-124	38.6					Mocness aboard	WE09403.19
	2038	2120	25	CR-5	41	53.9	-124	42.0	659	1018.0	-	lt. Airs	CTD with biochem, mzp	WE09403.20
	2156	2204		CR-6	41	54.0	-124	48.0		1018.5	var	10	vertical net tow, 100 m	WE09403.21
	2211	2244	26	CR-6	41	54.0	-124	48.0	705				CTD	WE09403.22
	2251				41	54.0	-124	54.4					Mocness deployed	WE09403.23
		2353			41	54.4	-124	51.2					Mocness aboard	WE09403.24
5-Apr	0048	0128	27	CR-7	41	54.0	-125	00.0	835	1019.0	330	24	CTD with biochem, mzp	WE09503.1
	0131	0137			41	54.0	-125	00.0					vertical net tow, 100 m	WE09503.2
	0242	0322	28	CR-8	41	54.0	-125	12.0	2726	1019.0	335	25	CTD	WE09503.3
	0425	0517	29	CR-9a	41	54.0	-125	24.0	3096	1021.5	335	22	CTD with biochem, mzp	WE09503.4
	0522	0527			41	54.0	-125	24.0					vertical net tow, 100m	WE09503.5
	0530	0536			41	54.0	-125	24.0					2nd vertical net tow, 100m	WE09503.6
	0659	0751	30	CR-10	41	54.0	-125	40.0	2929	1022.2	330	15	CTD with oxygen	WE09503.7
	0933	1024	31	CR-11	41	54.0	-126	00.0	3325	1023.0	340	5	CTD with biochem, mzp	WE09503.8
	1028				41	54.0	-126	00.0					vertical net tow,100m	WE09503.9
	1038												begin transit to RR line	
	1510	1554	32	RR-7	42	30.0	-125	12.0	2973	1021.8	285	8	CTD with biochem, mzp	WE09503.10
	1524												cleaned flo-thru filters	
	1526												cleaned Turner fluorometer	
	1557	1602			42	30.0	-125	12.0					vertical net tow,100 m	WE09503.11
	1640												air calibration of transmissometer	
	1657	1643	33	RR-6	42	30.0	-125	00.0	1769	1022.1	260	17	CTD with biochem, mzp	WE09503.12
	1646	1642			42	30.0	-125	00.0					vertical net tow, 100 m	WE09503.13
	1831	1927	34	RR-5	42	30.0	-124	54.0	1159	1022.5	240	15	CTD with oxygen	WE09503.14
	2017	2051	35	RR-4	42	30.0	-124	48.0	600	1021.5	210	18	CTD with biochem, mzp	WE09503.15
	2053	2100			42	30.0	-124	48.0					vertical net tow, 100 m	WE09503.16

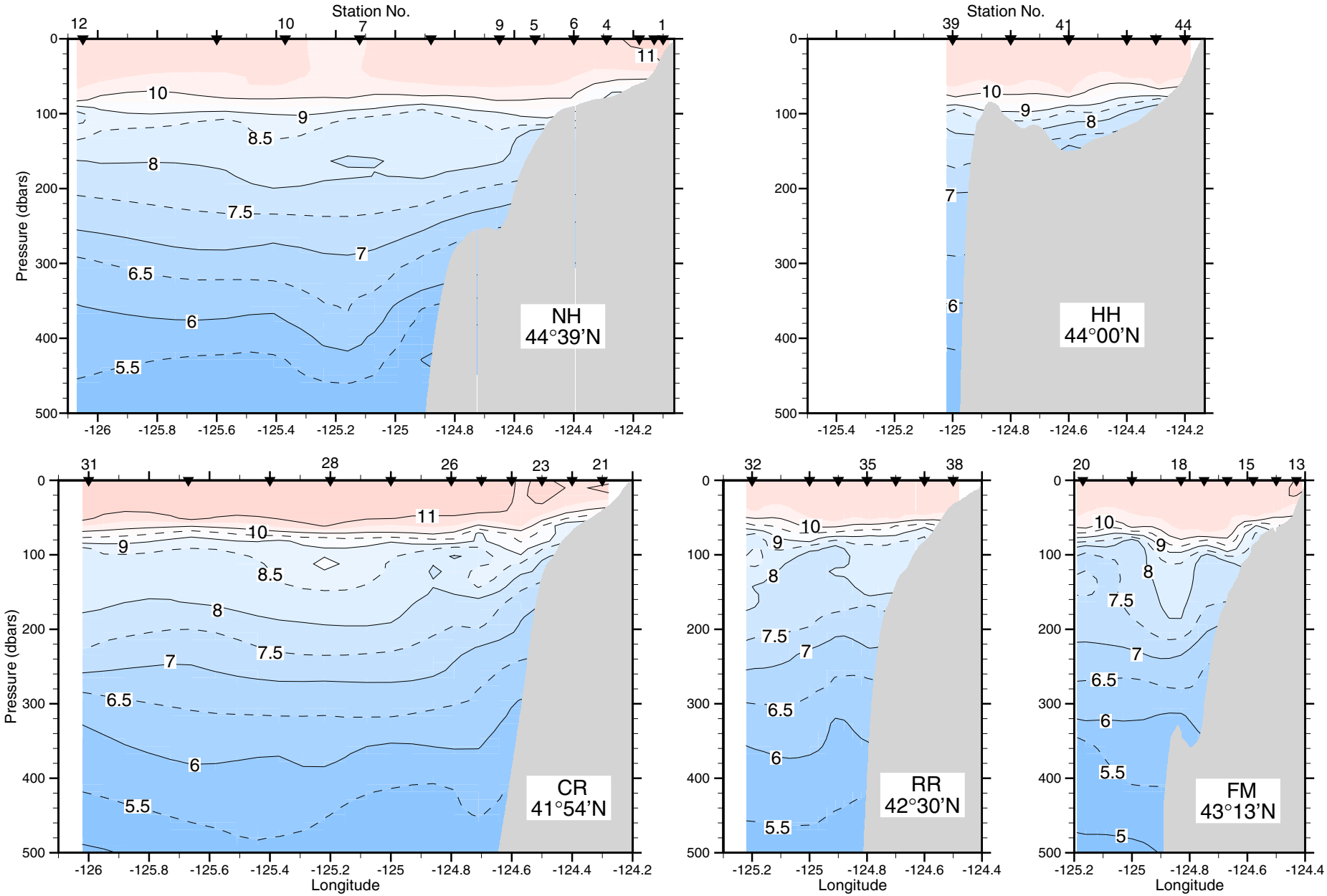
Table 3 cont.

	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)		
	2107				42	29.8	-124	48.1					Mocness deployed	WE09503.17
		2205			42	30.0	-124	51.1					Mocness aboard	WE09503.18
	2255	2313	36	RR-3	42	30.0	-124	41.9	132	1020.5	200	22	CTD with biochem, mzp	WE09503.19
	2317	2322			42	29.9	-124	41.9					vertical net tow, 100 m	WE09503.20
	2328				42	29.8	-124	42.0					Mocness deployed	WE09503.21
6-Apr		0000			42	28.6	-124	42.4					Mocness aboard	WE09603.1
	0040	0055	37	RR-2	42	30.0	-124	35.9	86	1019.5	200	24	CTD with biochem, mzp	WE09503.2
	0057	0102			42	30.0	-124	35.9					vertical net tow, 81 m	WE09503.3
	0109				42	30.0	-124	36.0					Mocness deployed	WE09503.4
		0129			42	29.2	-124	36.6					Mocness aboard	WE09503.5
	0211	0221	38	RR-1	42	30.0	-124	30.0	37	1019.0	225	20	CTD with biochem, mzp	WE09503.6
	0225	0228			42	30.1	-124	30.1					vertical net tow, 32 m	WE09503.7
	0230												begin transit to HH-5	
	1112	1155	39	HH-5	44	00.0	-125	00.0	933	1016.5	290	20	CTD with biochem, mzp	WE09503.8
	1200	1205			44	00.0	-125	00.0					vertical net tow, 100 m	WE09503.9
	1211	1220		HH-5	44	00.0	-125	00.1					meter net tow, 60m for L. Feinberg	WE09503.10
	1318	1335	40	HH-4	44	00.0	-124	48.0	111	1017.1	290	17	CTD with biochem, mzp	WE09503.11
	1338	1343			44	00.0	-124	48.0					vertical net tow, 100 m	WE09503.12
	1352												cleaned Turner fluorometer	
	1440	1500	41	HH-3	44	00.0	-124	36.0	153	1018.1	290	12	CTD with biochem, mzp	WE09503.13
	1502	1508			44	00.0	-124	36.0					vertical net tow, 100 m	WE09503.14
	1604	1624	42	HH-2	44	00.0	-124	24.0	120	1019.8	300	12	CTD with biochem, mzp	WE09503.15
	1625	1630			44	00.0	-124	24.0					vertical net tow, 100 m	WE09503.17
	1750	1803	43	HH-1.5	44	00.0	-124	18.0	93	1020.5	280	8	CTD with biochem, mzp	WE09503.18
	1807	1814			44	00.0	-124	18.0					vertical net tow, 85m	WE09503.19
	1851	1902	44	HH-1	44	00.0	-124	12.0	53	1021.5	260	5	CTD with biochem, mzp	WE09503.20
	1907	1910			44	00.2	-124	11.9					vertical net tow, 50m	WE09503.21
	1915												begin transit to Newport	
													air calibration of transmissometer	
	2237												shut down ADCP	
	2252												shut down DAS	
	2252												shut down flow through system	
													shut down echosounder	
	2345												arrive at pier in Newport	

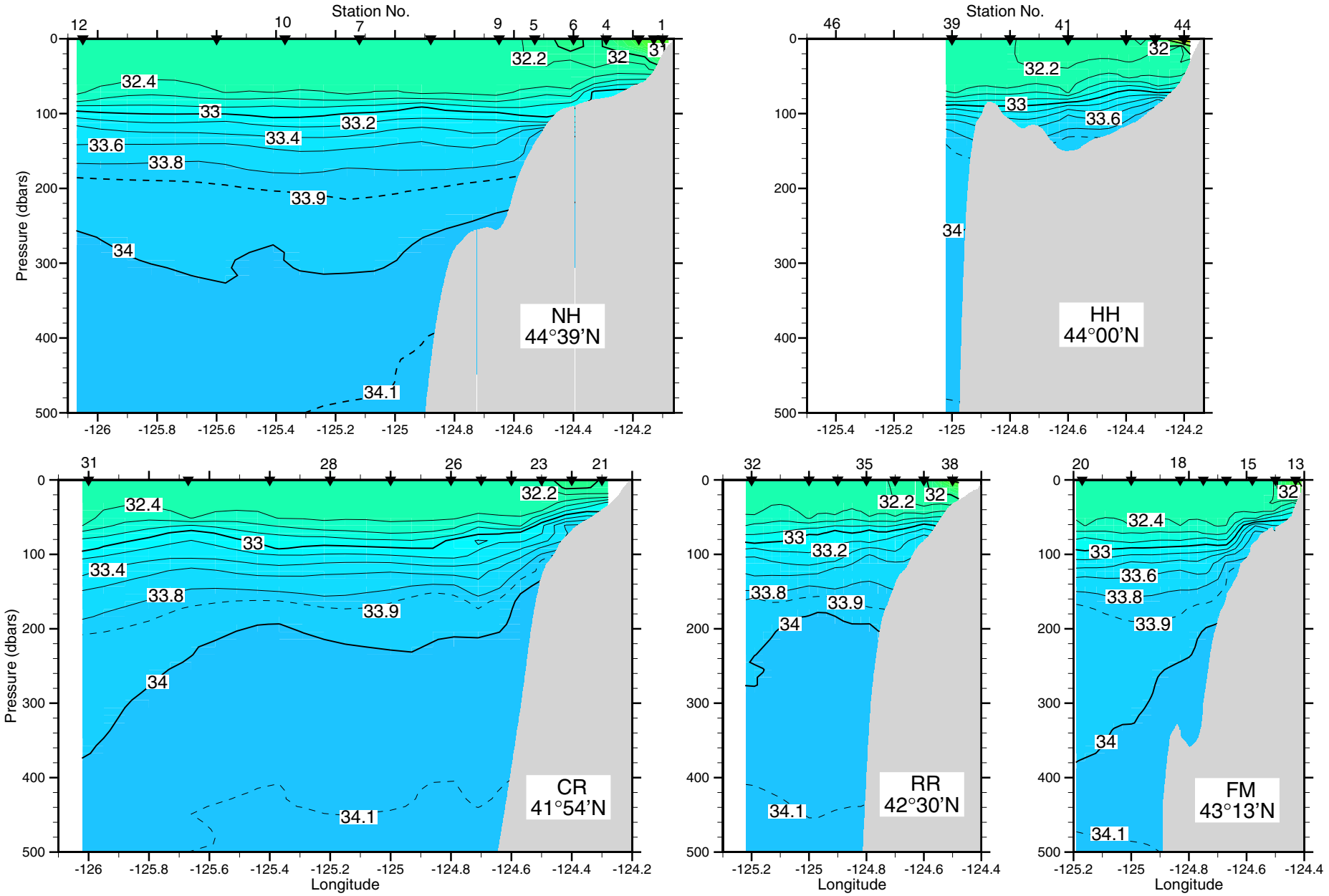
Table 4. Names, affiliations, and responsibilities of scientific personnel participating on W0304A.

Adriana Huyer	Chief Scientist	OSU	CTD
Robert L. Smith	Co-Chief Scientist	OSU	CTD
Jane Fleischbein	Technician	OSU	CTD
Joe Jennings	Technician	OSU	CTD, Oxygen
Dale Hubbard	Technician	OSU	CTD
Julie Arrington	Technician	OSU	nuts, chl
Jennifer Jarrell-Wetz	Technician	OSU	nuts, chl
Jennifer Harman	Technician	OSU	nuts, chl
Mike Wetz	Technician	OSU	nuts, chl
Carlos López	Technician	OSU	microzooplankton
Julie Keister	Technician	HMSC	zooplankton
Leah Feinberg	Technician	HMSC	zooplankton
Mitch Vance	Technician	HMSC	zooplankton
Rian Hooff	Technician	HMSC	zooplankton
Linda Fayler	Technician	OSU	martec
Daryl Swensen	Technician	OSU	martec

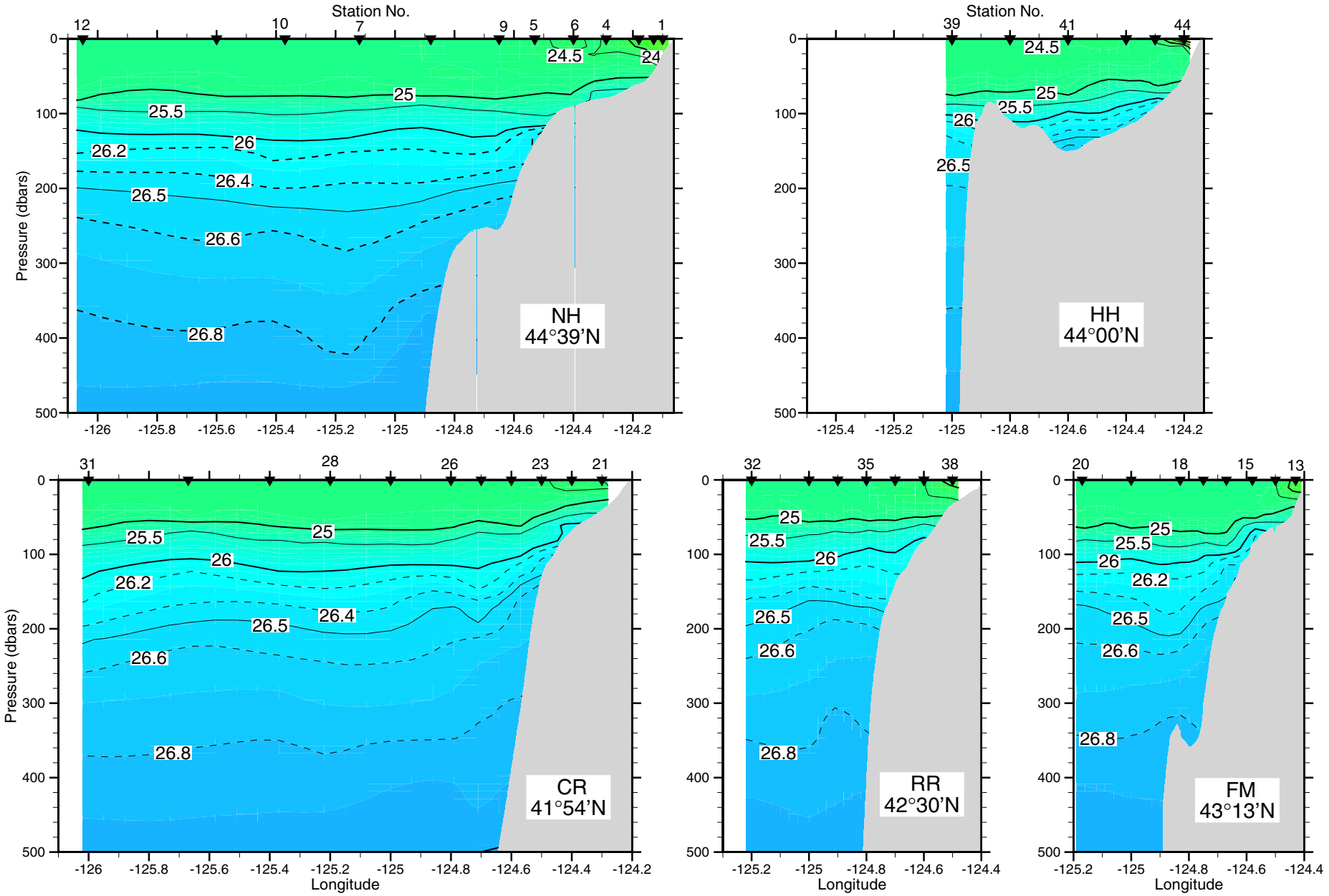
Temperature, 1-6 April 2003



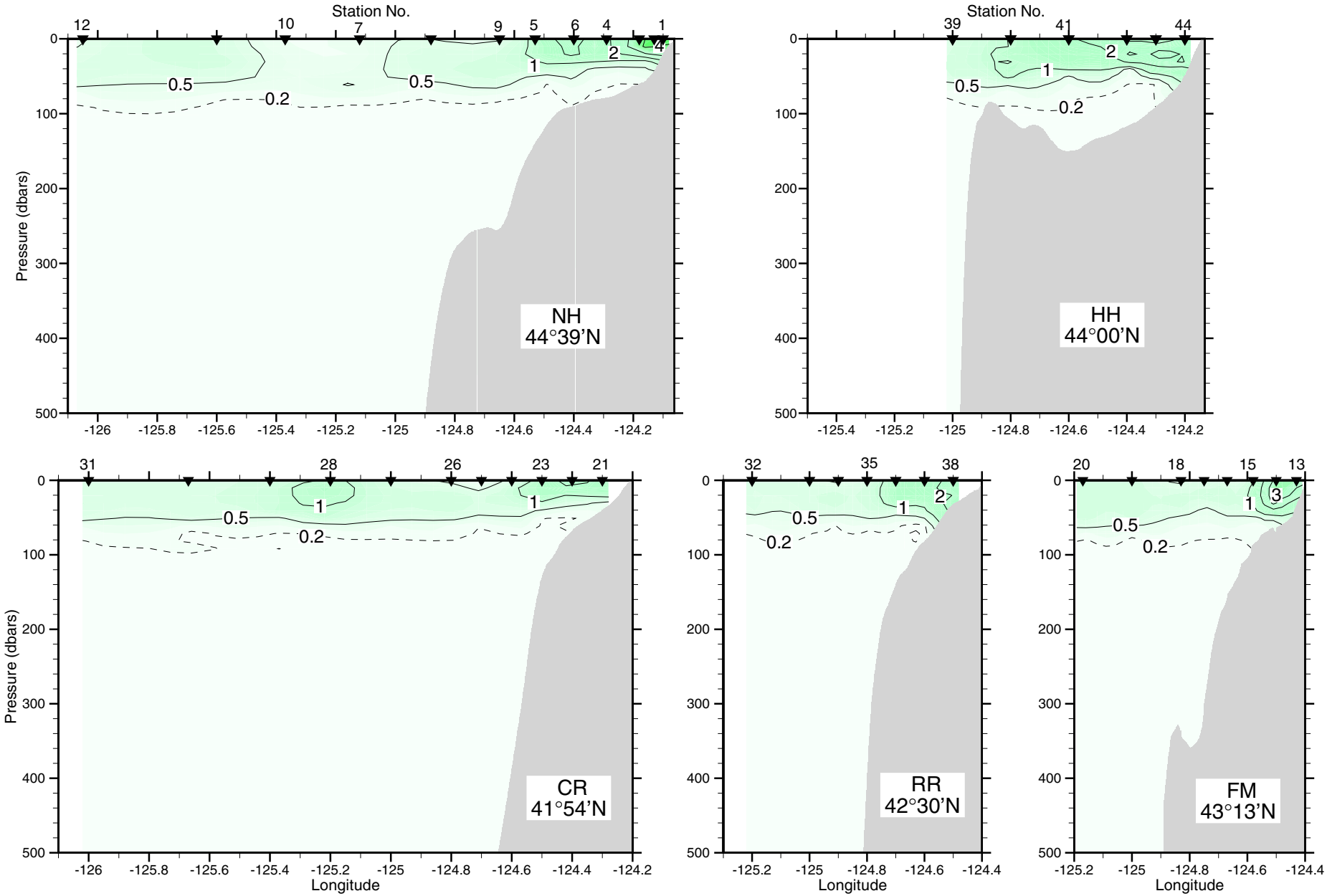
Salinity, 1-6 April 2003



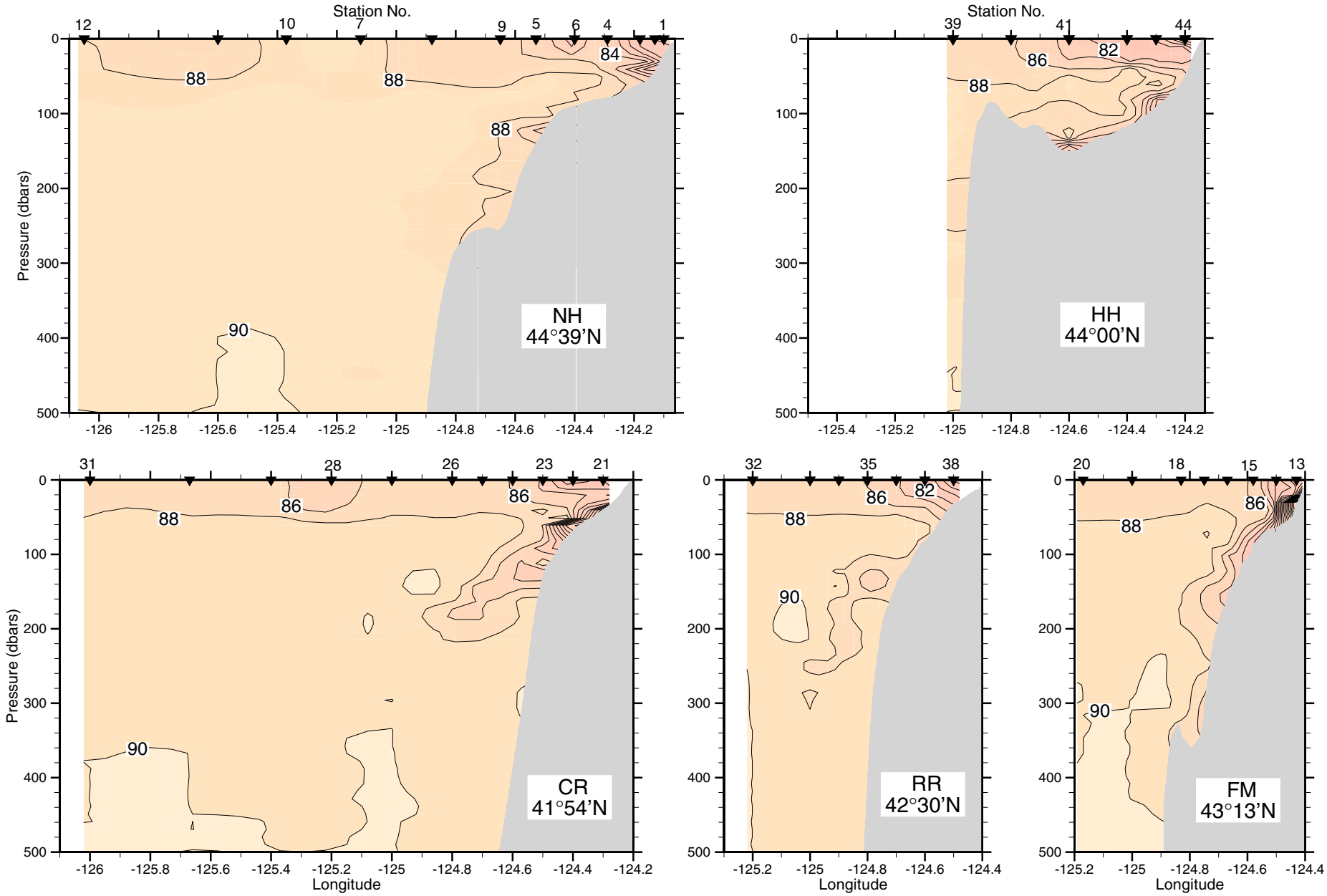
Sigma-theta, 1-6 April 2003



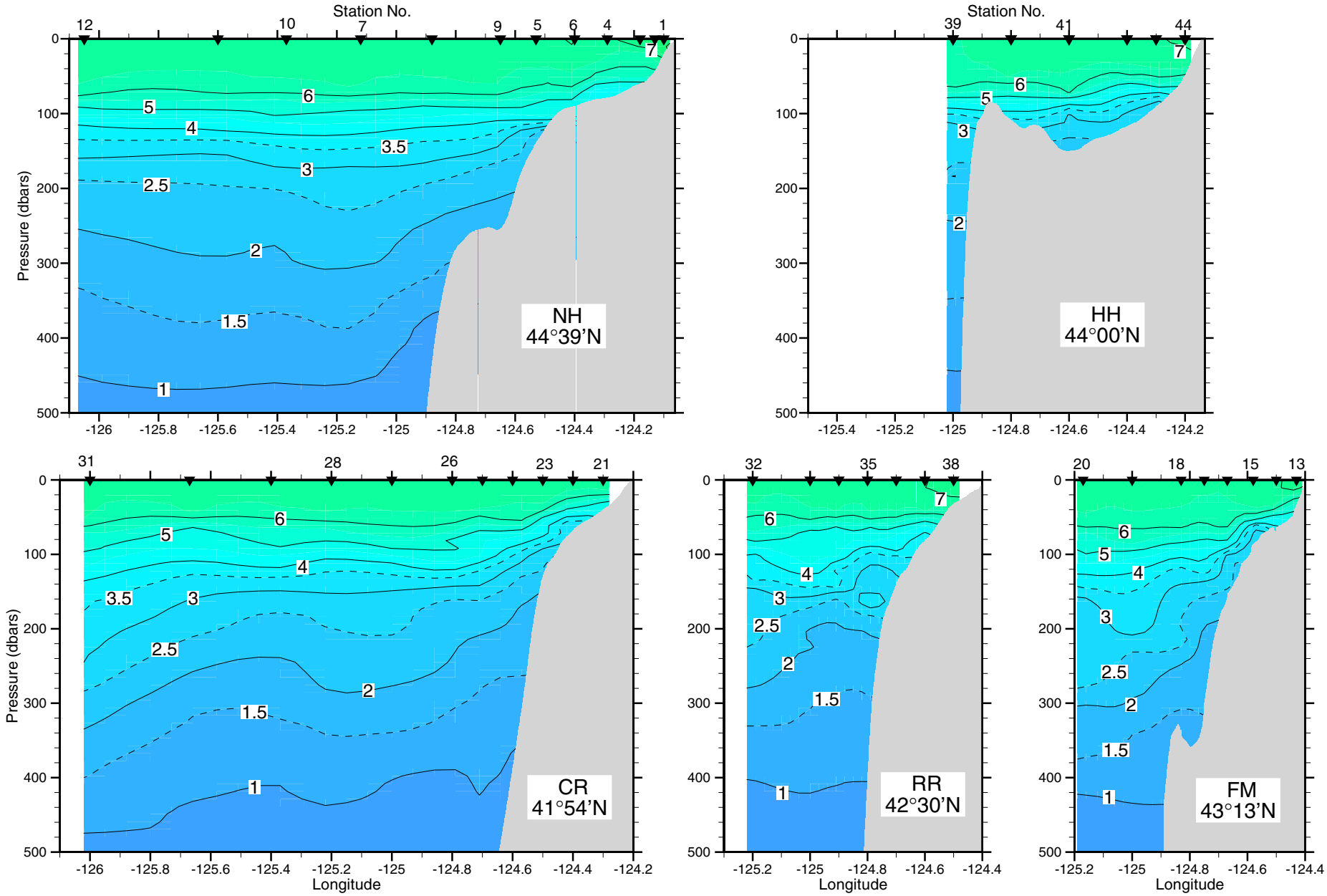
Fluorescence Voltage, 1-6 April 2003



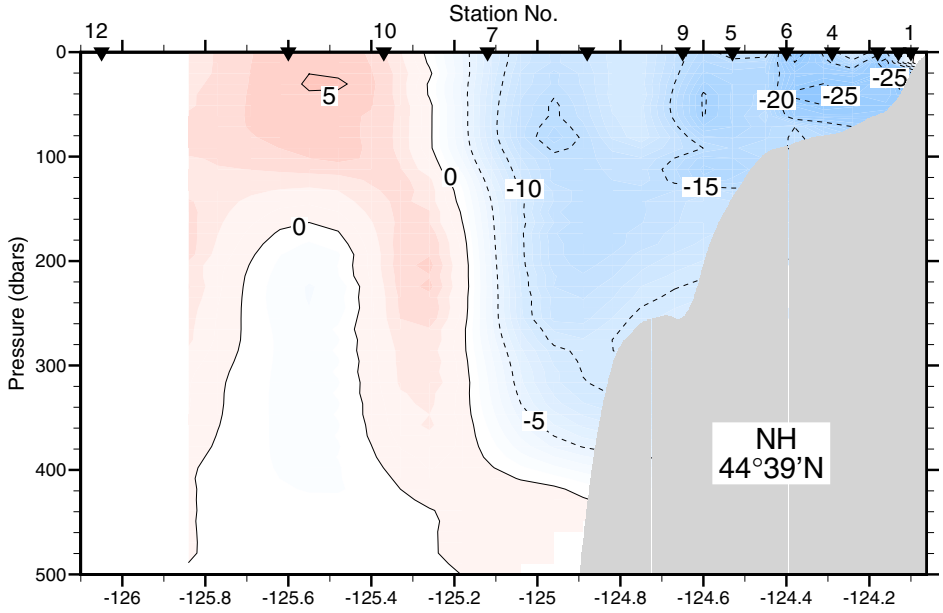
% Light Transmission, 1-6 April 2003

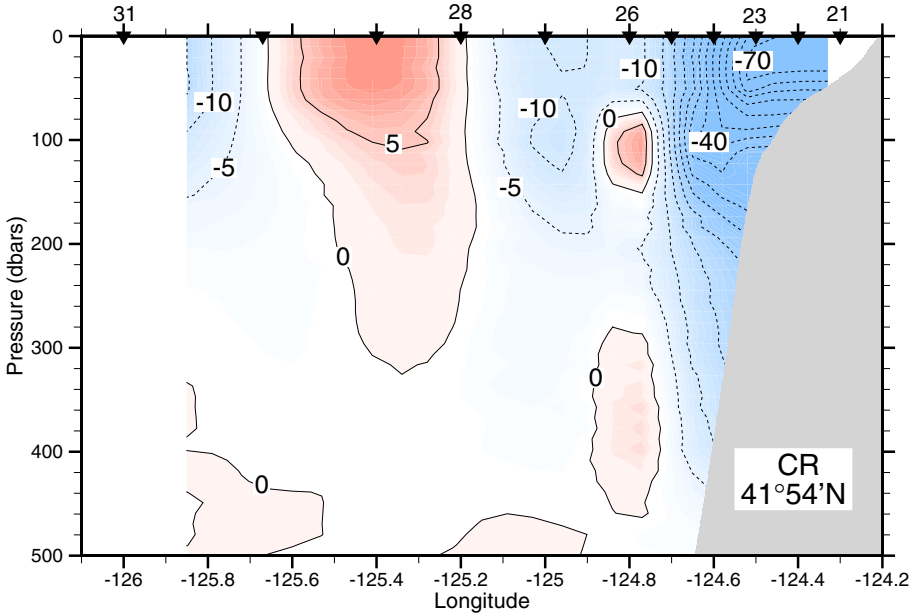


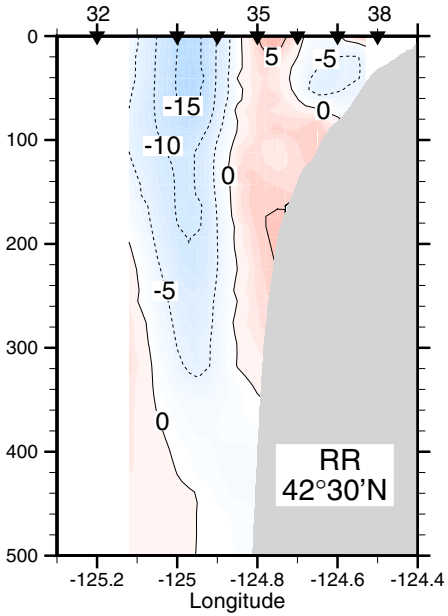
Oxygen, 1-6 April 2003

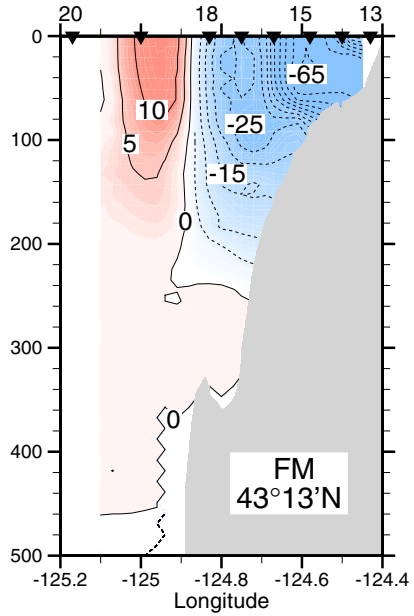


Geostrophic Velocity 0/500, 1-6 April 2003





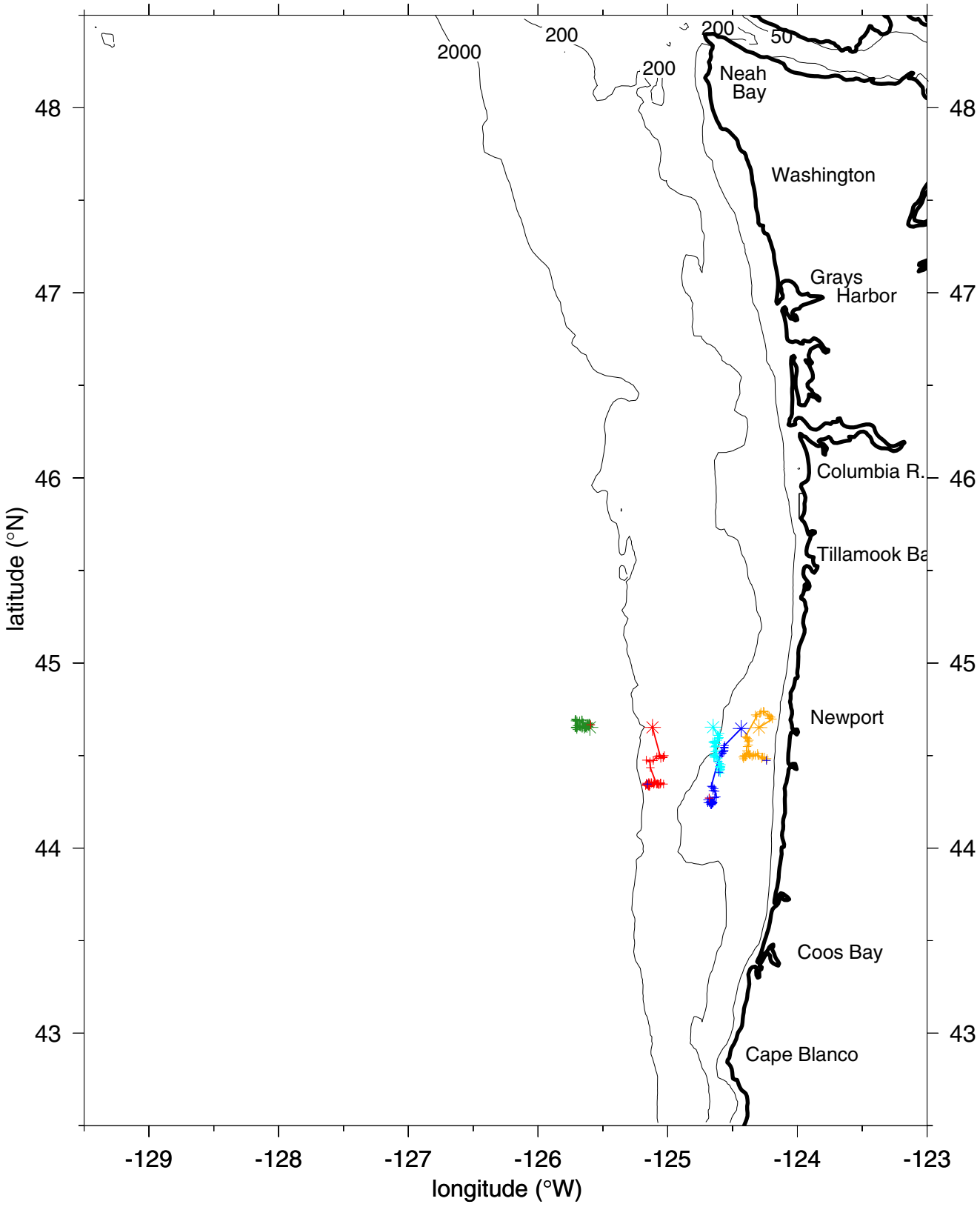




Drifter data from Apr 2-3 2003 to Apr 8 2003

(dates on land indicate last transmission from failed drifters)

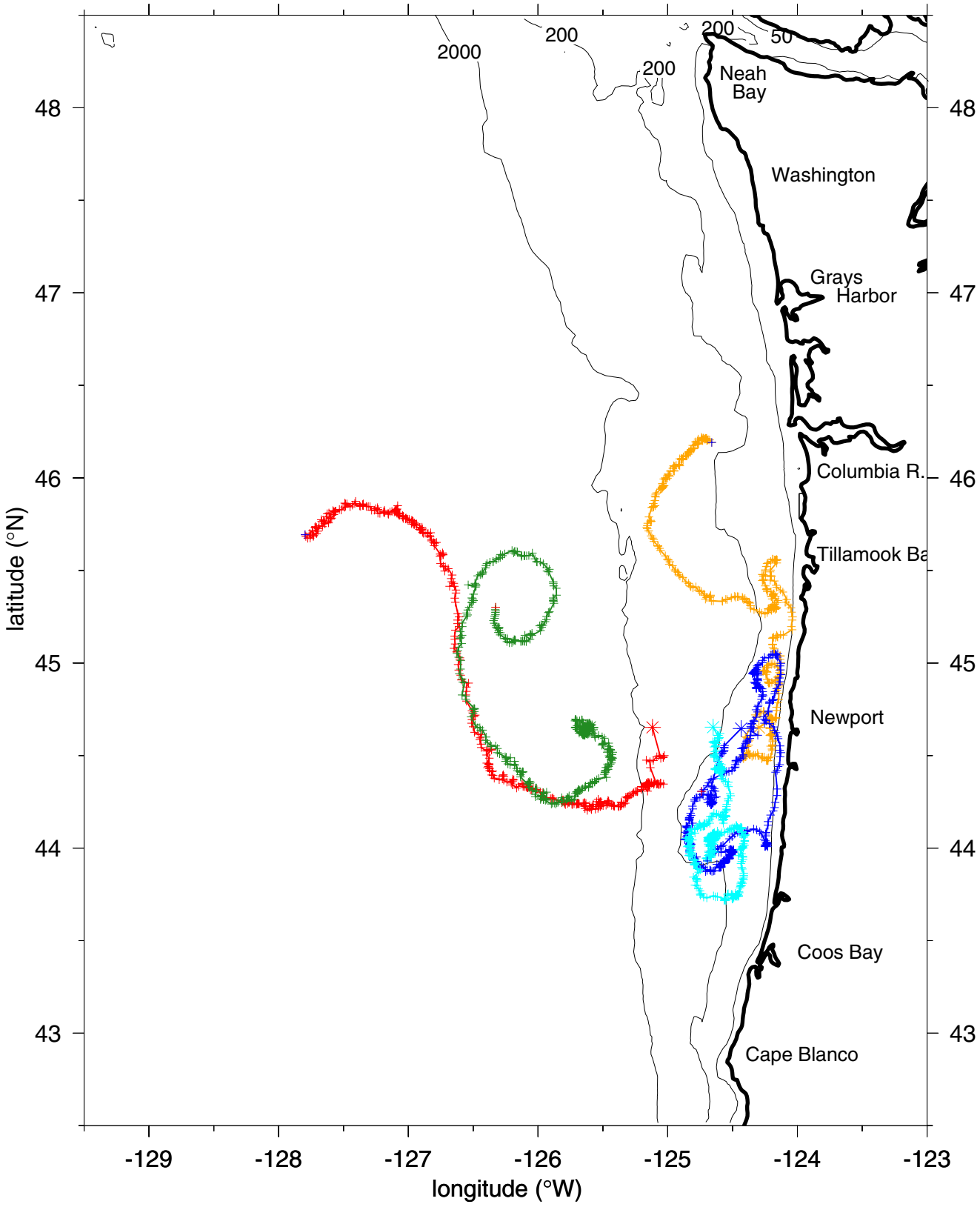
(Courtesy of Jack Barth, Oregon State University)



Drifter data from Apr 2-3 2003 to May 11 2003

(dates on land indicate last transmission from failed drifters)

(Courtesy of Jack Barth, Oregon State University)



Microzooplankton Sampling

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

April, 2003 GLOBEC CRUISE W0304A:

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

Table 5: Actual sample depths for collection of microzooplankton samples for bacterial counts (Flow Cytometry), dinoflagellate counts (Epifluorescence Microscopy), and ciliate counts (Inverted Scope Microscopy) during W0304A.

Station	Sample Collection Depths (m)
NH-01	2, 16, 21
NH-03	2, 20, 42
NH-05	2, 10, 15, 20, 30, 53
NH-10	5, 22
NH-15	2, 10, 20, 30, 40, 51, 60, 70
NH-25	2, 10, 20, 30, 40, 50
NH-35	1, 10, 21, 30, 40, 50, 70,
NH-45	2, 10, 20, 30, 40, 50, 70
NH-65	10, 21, 30, 40, 50, 70, 100
NH-85	3, 10, 20, 30, 38, 52, 70
FM-1	5, 26
FM-3	5,25,50
FM-4	1, 10, 20, 30,40, 60
FM-5	1, 10, 20, 30, 40, 50, 70
FM-7	2, 10, 20, 30, 40, 70
FM-8	2, 10, 20, 30, 40, 50, 70
FM-9	2, 10, 20, 30, 40, 51, 71
CR-1	2, 15, 35
CR-2	1, 20, 48
CR-3	1, 10, 20, 30, 40, 60
CR-4	2, 12, 20, 30, 40, 50, 70
CR-5	1, 10, 20, 30, 40, 50, 70
CR-7	2, 10, 20, 30, 40, 50, 70
CR-9a	2, 10, 20, 30, 40, 51, 70

Table 5 cont.

RR-1	2, 31
RR-2	1, 20, 48
RR-3	1, 10, 26, 41, 60
RR-4	1, 10, 15, 20, 30, 40, 50
RR-6	2, 10, 20, 30, 40, 50, 70, 100
RR-7	2, 10, 20, 30, 40, 51, 71

HH-1	5, 20, 40
HH-1.5	5, 25, 60
HH-2	5, 20, 30, 50
HH-3	2, 10, 25, 39, 60
HH-4	5, 20, 40, 60, 70
HH-5	2, 9, 20, 30, 40, 50, 70, 100