GLOBEC CRUISE HX253 REPORT

4 – 11 December 2001

Funding Source: NSF-NOAA (NA-67-RJ-0147)

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Scientific Personnel:

Amy Childers	Nutrients/Productivity, Grad Student, IMS-UAF
Sarah Thornton	Nutrients/Chlorophyll, IMS-UAF
Melanie Rohr	Nutrients/Chlorophyll, Technician, IMS
Alexei Pinchuk	Zooplankton, Technician, IMS-UAF
Michael Foy	Microplankton, Technician, UW
Thomas Kline	Zooplankton C-N stable isotopes, Pr. Wm. Sd. Sci Cen.
Brian Rowe	Marine Technician, IMS-UAF,

Scientific Purpose:

The purpose of the NE Pacific GLOBEC Program is to develop a mechanistic understanding of the response of this marine ecosystem to climate variability. Toward this end, the GLOBEC cruises on the Gulf of Alaska shelf will determine the physical-chemical structure, primary production, the distribution and abundance of zooplankton, YOY salmon, other planktivorous fishes, and marine birds and mammals. Moreover, sampling is being conducted to describe the seasonal and interannual variability in abundance, biomass and size-structure of the microzooplankton (phyto- and zooplankton < 200 ? m). Sampling is also being undertaken to characterize the isotopic composition the zooplankton community. This will permit delineating coastal versus offshore (oceanic) organic carbon sources in the Gulf of Alaska food chain. These interdisciplinary cruises will occur over a seven-year period and throughout the year so that seasonal and interannual comparisons of the oceanography of this shelf can be made. Where possible these data will be compared with historical data sets, whereas other data sets will be a product of the first systematic sampling effort from this shelf.

The December 2001 focused on the distribution of physical properties, nutrients, and chlorophyll and zooplankton populations over the shelf along the Seward Line, within western Prince William Sound, and on the shelf south of Hinchinbrrok Entrance. The purpose is to charactersize the Gulf of Alaska shelf and prince William Sound in early winter when the shelf is undergoing its transition from fall to winter conditions. Cruise HX253 represents the fourth consecutive December that the shelf has been sampled.

Cruise Objectives:

1. determine thermohaline, velocity, and nutrient structure of the Gulf of Alaska shelf (Weingartner, Childers, Thornton).
2. determine primary productivity and chlorophyll abundance (Stockwell and Rohr)
3. determine abundance, distribution, and community composition of microzooplankton (Foy)

4. determine zooplankton stable isotope composition (Kline)
5. collect live diapausing zooplankton for lab studies (Pinchuk)

GENERAL COMMENTS:
We were unable to complete the planned sampling due to the threat of vessel icing throughout the cruise. Consequently we spent most of our time in Prince William Sound surveying areas that are not part of the regular GLOBEC LTOP grid. These data will be useful in understanding the surface and deep circulation of the sound when compared with historical data from this region.

Tasks completed:
1. We occupied the standard hydrographic transects where we collected vertical CTD-fluoresence-PAR profiles. These transects included: the Seward (**Table 1**), C. Fairfield (**Table 2**), W. PWS (**Table 3**), and Hinchinbrook Entrance (**Table 4**) Lines. We collected ADCP, sea surface salinity (SSS), temperature (SST) and fluorescence (SSF) using seachest sensors,
2. We collect discrete bottle samples at these stations for nutrients and chlorophyll pigments. Chlorophyll Size Fractionation was done at the whole numbered Seward Line stations and at every other C. Fairfield Line station.
3. We measured Primary Productivity at Stations GAK 1, 4, and KIP2. Nutrient amendment studies were done at stations XXXXX
4. 1 CalVet Net casts was collected along the whole-numbered Seward Line stations at PWS2, KIP2, MS2, and HB1 in prince William Sound.
5. Pinchuk and Kline conducted deep (~600 m) MOCNESS tows at GAK 11 and at PWS 2 to collect diapausing zooplankton (Neocalanus).

***Cruise Log*:**

12/3		Science party arrives in Seward and sets up equipment.
12/4	0830	Precruise meeting
	900	Depart from dock for RES 2.5
	TABLE 1 is the cruise event log showing all sampling activities	
12/11	0900	Return to SMC; science party departs.

PHYSICAL OCEANOGRAPHY (*T. Weingartner*)

Our sampling was collected under strong cooling conditions. A strong high pressure system was centered over interior Alaska which forced cold (5 – 10C below freezing) air over the gulf. Wind speeds were often high (>20 knots) especially at the mouths of fjords. These conditions are ideal for promoting strong cooling and potentially dangerous because they are ideal for icing vessels.
We collected CTD and ADCP data along the stations listed in the eventlog and shown in the figure. We also collected continuous sea surface temperature, salinity, fluorescence, and meteorological data while underway and between all waypoints. The shelf was weakly to moderately stratified with the strongest stratification occurring seaward of the shelfbreak front (seaward of GAK 8). Rapid cooling was occurring on the inner shelf. For example temperatures in the upper 150 m at GAK2 decreased by about 0.2C over a 4-day period. This suggests a heat loss of >300 $W\text{-}m^{-2}$. My preliminary feeling is that winter is occurring earlier in 2001 than in prior years that we have sampled. It will be interesting to see if this results in cooler than normal spring (April-May) water temperatures.

We conducted additional sampling in Pr. William Sound because of the inclement weather. We concentrated on sampling around the sound in an effort to understand differences in freshwater distribution within the sound. The western sound is substantially fresher than the central sound and

offshore Hinchibrook Entrance (the presumed source waters for the sound). Some of this freshening is due to local addition within the sound. However, some of it might reflect influx from the gulf during the summer months which is only slowly being replaced by saltier winter shelf water.

NUTRIENT AND CHLOROPHYLL (*A. Childers ad Dean Stockwell*)
Preliminary results suggest that relatively high nutrient concentrations are in the surface layer and nutrient amendment studies indicate that no nutrients are limiting. Over chlorophyll concentrations are low although there are noticeably higher fluorescence values in the upper 50 m of the water column than at deeper depths.

ZOOPLANKTON (STABLE ISOTOPES; *T. Kline*)
At the MOCNESS stations, samples were saved for C and N stable isotope analysis from nets #1 and 2. Zooplankton were saved as individuals in separate vials after identification to species level and frozen. They will be freeze-dried in the laboratory prior to isotopic analysis.

PWS2 Deep MOCNESS 4-5 Dec. 2001

Net#	**Depth range**		**Type**	**Investigators**
	Nominal	**Actual**		
1.	0-400	0-480	Open drogue	Kline
2.	400-600	480-600	Closed drogue	Kline
3.	600-400	600-500	Closed/100micron	Pinchuk/Hopcroft
4.	400-300	500-400	Closed/100micron	Pinchuk/Hopcroft
5.	300-200	400-300	Closed	Pinchuk/Hopcroft
6.	200-150	300-200	Closed	Pinchuk/Hopcroft
7.	150-100	200-150	Closed	Pinchuk/Hopcroft
8.	100-50	150-100	Closed	Pinchuk/Hopcroft
9.	50-0	100-0	Closed	Pinchuk/Hopcroft

PWS2 repeat Deep MOCNESS 8 Dec. 2001

Net#	**Depth range**		**Type**	**Investigators**
	Nominal	**Actual**		
1	0-400	0-420	Open drogue	Kline
2	400-600	420-600	Closed drogue	Kline
3	600-400	600-500	Closed/100micron	Pinchuk/Hopcroft
4	400-300	500-400	Closed/100micron	Pinchuk/Hopcroft
5	300-200	400-300	Closed	Pinchuk/Hopcroft
6	200-150	300-200	Closed	Pinchuk/Hopcroft
7	150-100	200-150	Closed	Pinchuk/Hopcroft
8	100-50	150-100	Closed	Pinchuk/Hopcroft
9	50-0	100-0	Closed	Pinchuk/Hopcroft

GAK11 Deep MOCNESS 10 Dec. 2001

Net#	**Depth range**		**Type**	**Investigators**
	Nominal	**Actual**		
1	0-400	0-400	Open drogue	Kline
2	400-600	400-600	Closed drogue	Kline
3	600-400	600-500	Closed/100micron	Pinchuk/Hopcroft

4	400-300	500-400	Closed/100micron	Pinchuk/Hopcroft
5	300-200	400-300	Closed	Pinchuk/Hopcroft
6	200-150	300-200	Closed	Pinchuk/Hopcroft
7	200-100	200-100	Closed	Pinchuk/Hopcroft
8	100-50	100-50	Closed	Pinchuk/Hopcroft
9	50-0	50-0	Closed	Pinchuk/Hopcroft

MICROZOOPLANKTON (*M. Foy*)
Samples were taken to determine microzooplankton abundance and biomass, either as discrete vertical samples or as integrated samples. Vertical samples consisted of sampling from depths 0m, 10 or 20m, 30m, 50m, & 100m and were taken at GAK 2,4,6,8,10 and PWS2. Integrated samples were taken by combining water for an upper layer sample (0m, 10m, 20m, 30m, 40m & 50m) and a lower layer sample (75m & 100m) and taken at GAK 1,3,5,7,9,11,12, CF 3,9, HE 2,7,10, and KIP 2. Above samples were filtered and prepared for epifluorescent microscopy as well as preserved in acid Lugols. In addition, samples were fixed for flow cytometry.

See Event Log for sampling details.

Table 1. CTD Station Locations along Seward Line.

Station Name	Latitude (° ' N)	Longitude (° ')	Approximate Bottom Depth (m)
RES 2.5	60 0.0	149 20.3	290
GAK 1	59 50.7	149 28.0	265
GAK 1i*	59 46.0	149 23.8	250
GAK 2	59 41.5	149 19.6	220
GAK 2i*	59 37.6	149 15.5	220
GAK 3	59 33.2	149 11.3	220
GAK3i*	59 28.9	149 7.1	210
GAK 4	59 24.5	149 2.9	200
GAK 4i*	59 20.1	148 58.7	200
GAK 5	59 15.7	148 54.5	175
GAK 5i*	59 11.4	148 50.3	150
GAK 6	59 7.0	148 46.2	145
GAK 6i**	59 2.7	148 42.0	192
GAK 7**	58 58.3	148 37.8	245
GAK 7i**	58 52.9	148 33.6	298
GAK 8**	58 47.5	148 29.4	290
Gak 8i**	58 44.6	148 25.2	294
GAK 9	58 40.8	148 21.0	275
GAK9i**	58 36.7	148 16.7	650
GAK 10	58 32.5	148 12.7	1400
GAK 11	58 23.3	148 4.3	1410
GAK 12	58 14.6	147 56.0	2190
GAK 13	58 5.9	147 47.6	2090

*useful in defining Alaska Coastal Current front

**useful in defining the shelfbreak front

Table 2. CTD Station Locations Along Cape Fairfield Line

Station Name	Latitude (° ' N)	Longitude (° ')	Approximate Bottom Depth (m)
CF1	59 55.0	148 52.0	50
CF2	59 53.0	148 52.0	120
CF3	59 51.0	148 52.0	170
CF4	59 49.0	148 52.0	180
CF5	59 47.0	148 52.0	180
CF6	59 45.0	148 52.0	185
CF7	59 43.0	148 52.0	180
CF8	59 41.0	148 52.0	180
CF9	59 39.0	148 52.0	175
CF9	59 39.0	148 52.0	175
CF10	59 37.0	148 52.0	175
CF11	59 35.0	148 52.0	160
CF12	59 33.0	148 52.0	145
CF13	59 31.0	148 52.0	145
CF14	59 29.0	148 52.0	145
CF15	59 27.0	148 52.0	145

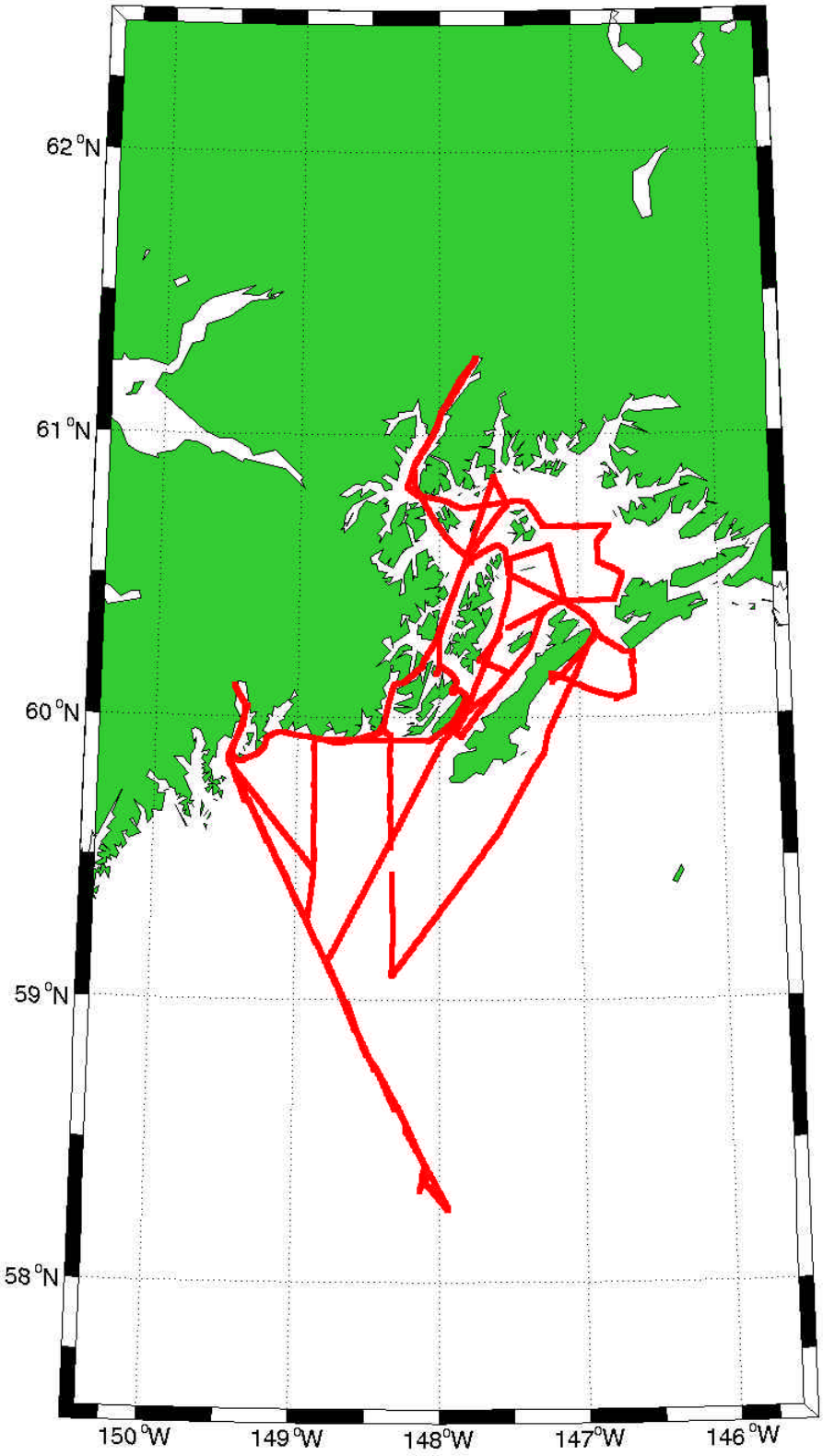
Table 3. CTD Station Locations In Western PWS (Northern PWS; Knight Island Passage; KIP, Hogan Bay; HB; and Montague Strait; MS). [ANC = weather station)

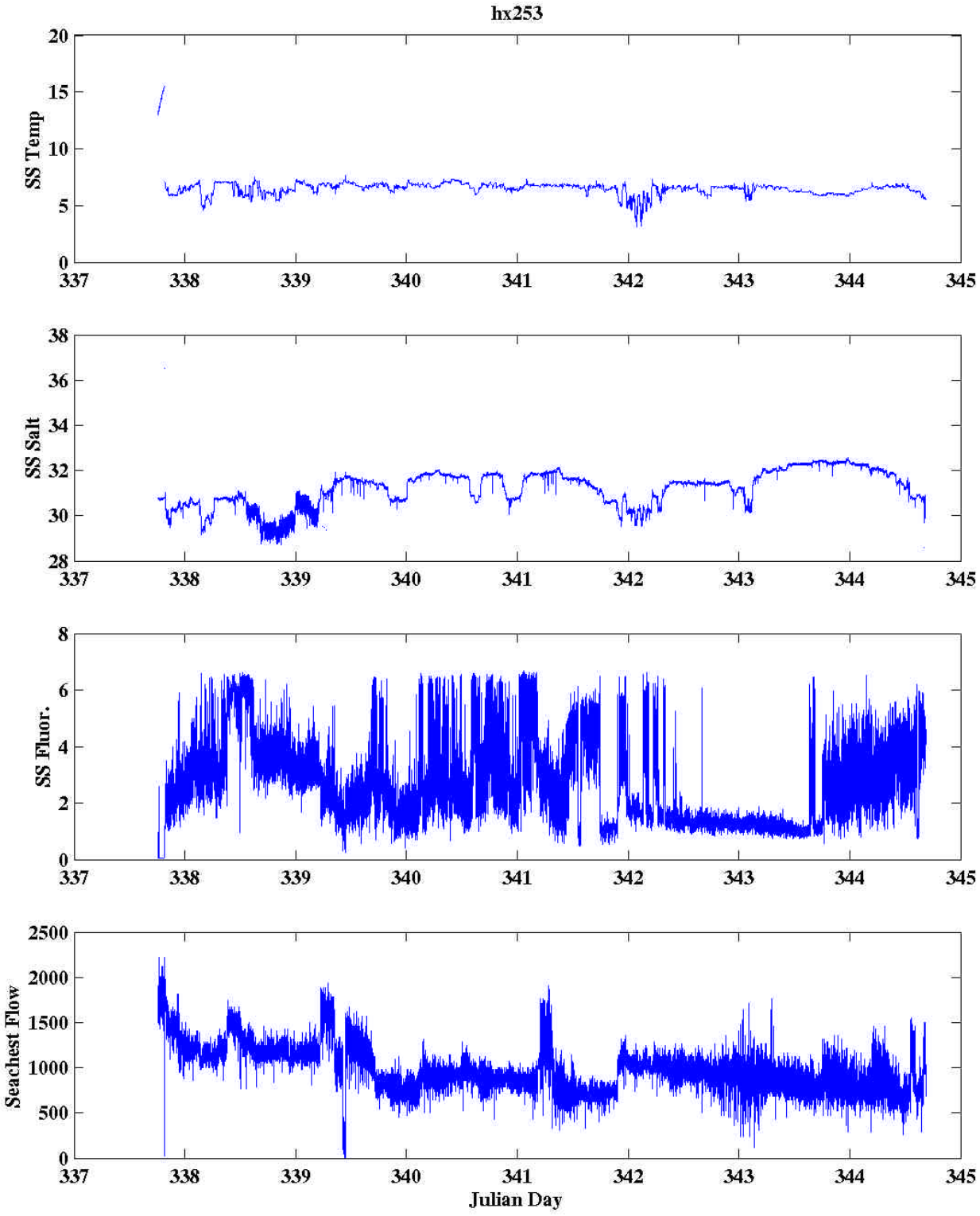
Station Name	Latitude (° N)	Longitude (° W)	Approximate Bottom Depth (m)	
HB1	60.1929	147.7001	246	
HB2	60.1792	147.6410	173	zooplankton
HB3	60.1634	147.5756	84	
HB4	60.1482	147.5024	95	
MS1	59.9587	147.9138	179	
MS2	59.9442	147.8783	201	zooplankton
MS3	59.9332	147.8550	168	
MS4	59.9219	147.8268	118	
KIP2	60.2783	147.9866	588	zooplankton
KIP1	60.2811	148.0132	540	Anc.
PWS10	60.385	146.925	293	Anc.
PWS9	60.477	147.070	222	Anc.
PWS8	60.557	147.126	228	Anc.
PWS7	60.629	147.149	292	Anc.
PWS6	60.722	147.145	390	Anc.
PWS5	60.822	147.398	476	Anc.
PWS4	60.737	147.658	657	Anc.
PWS3	60.655	147.809	753	zooplankton
PWS2	60.534	147.802	742	Anc.
PWS1	60.379	147.936	333	zooplankton

Table 4. CTD Stations Bracketing Hinchinbrook Entrance.

Station Name	Latitude (° ' N)	Longitude (° ')	Approximate Bottom Depth (m)
HE1	60 13.8	146 36.5	
HE2	60 10.8	146 36.5	zooplankton
HE3	60 7.8	146 36.5	
HE4	60 4.8	146 36.5	
HE5	60 1.8	146 36.5	zooplankton
HE6	60 3.0	146 44.8	
HE7	60 4.3	146 51.3	
HE8	60 5.6	146 57.7	
HE9	60 6.6	147 3.0	zooplankton
HE10	60 7.8	147 8.0	zooplankton
HE11	60 8.6	147 11.5	

hx253 Cruise Track




hx253
SS Temp
SS Salt
SS Fluor.
Seachest Flow
Julian Day
337
338
339
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341
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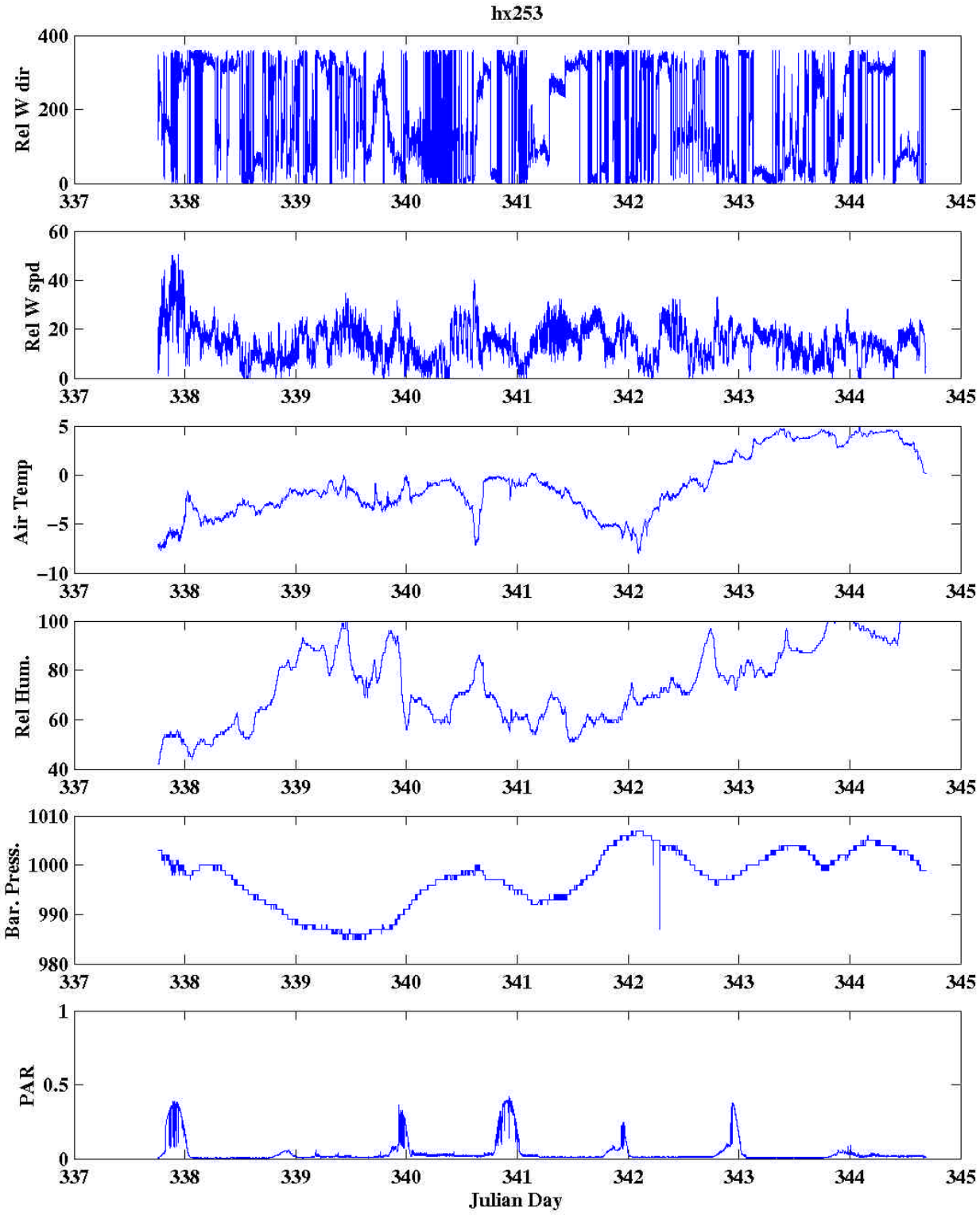
344
345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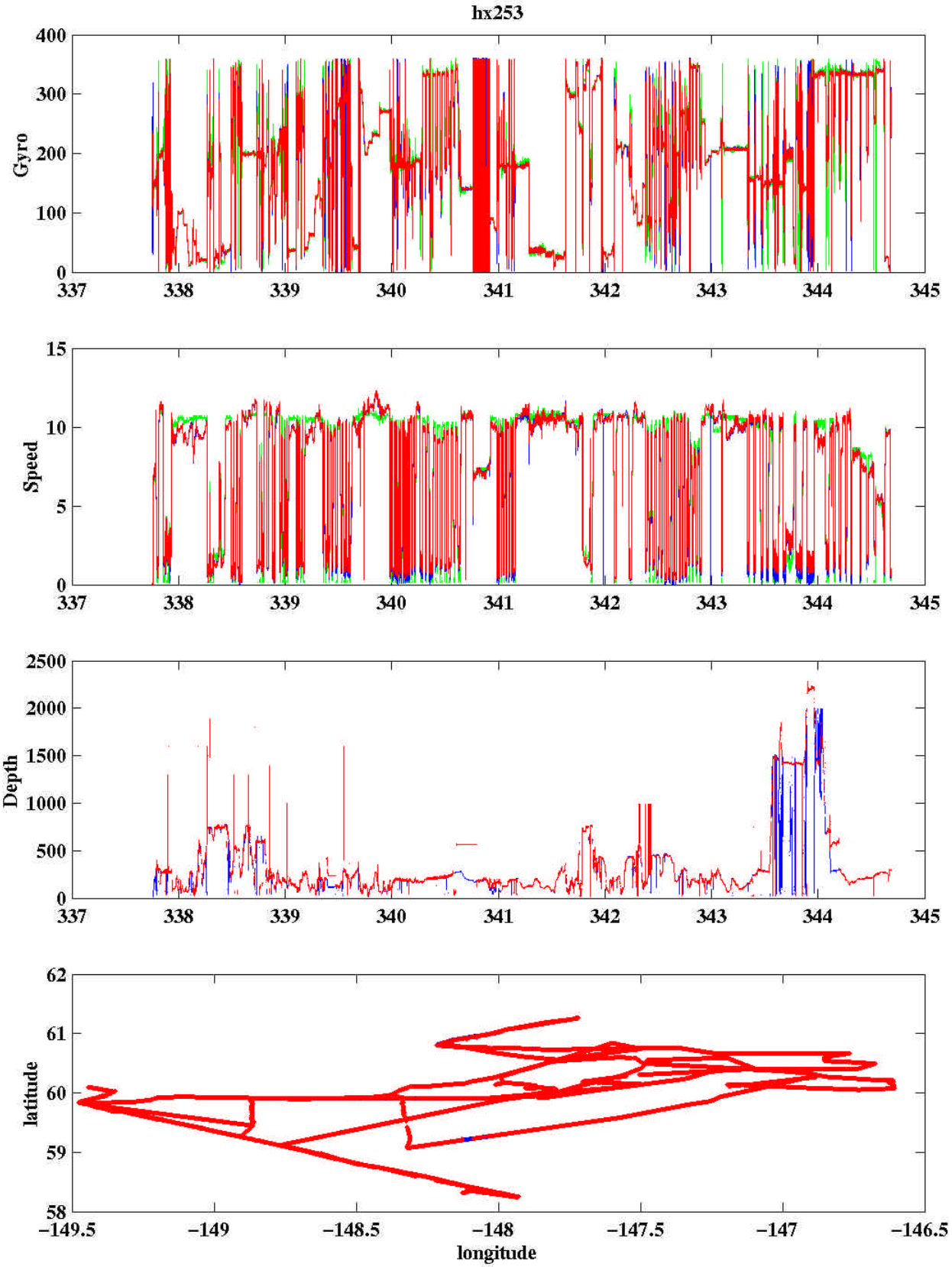
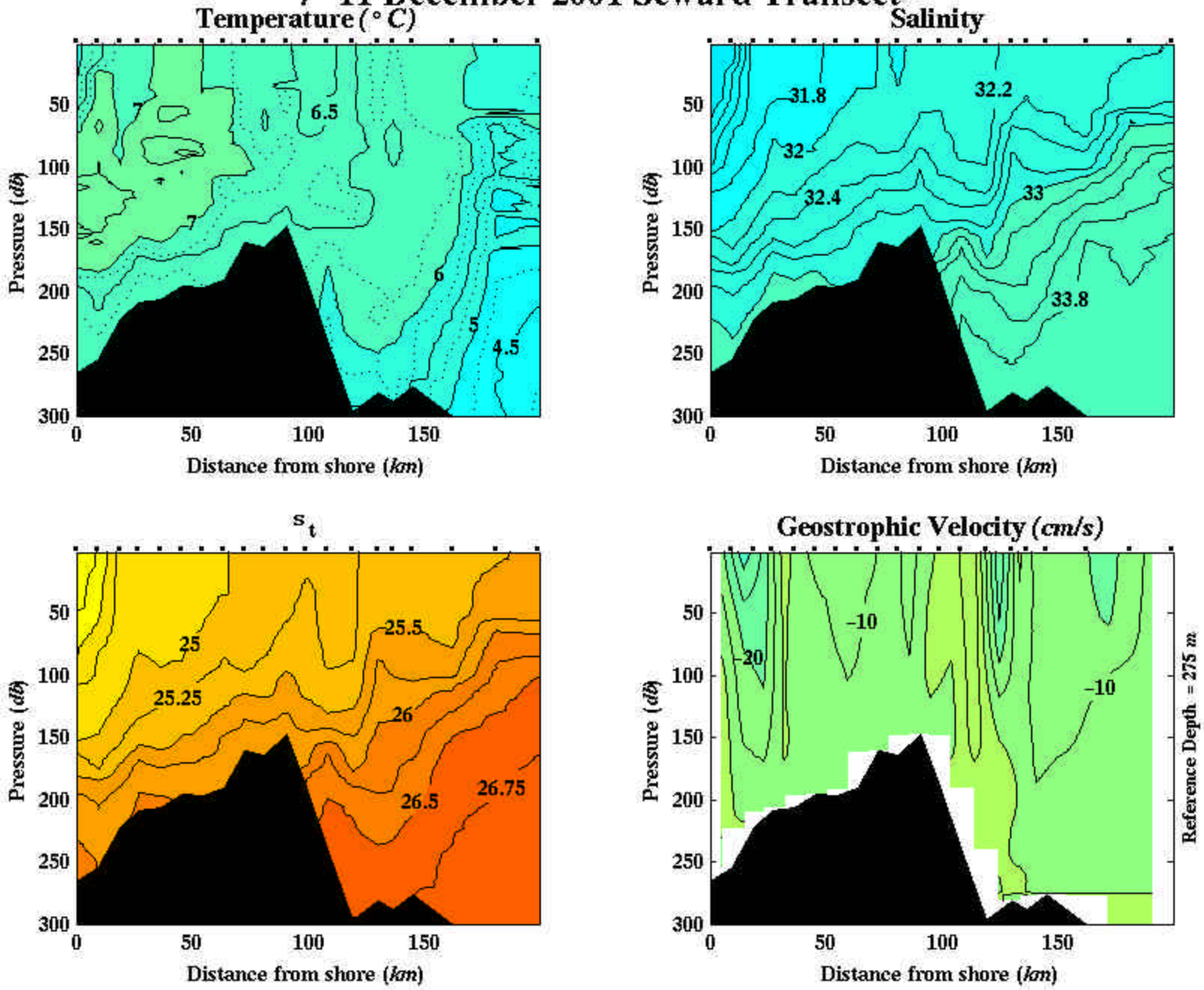
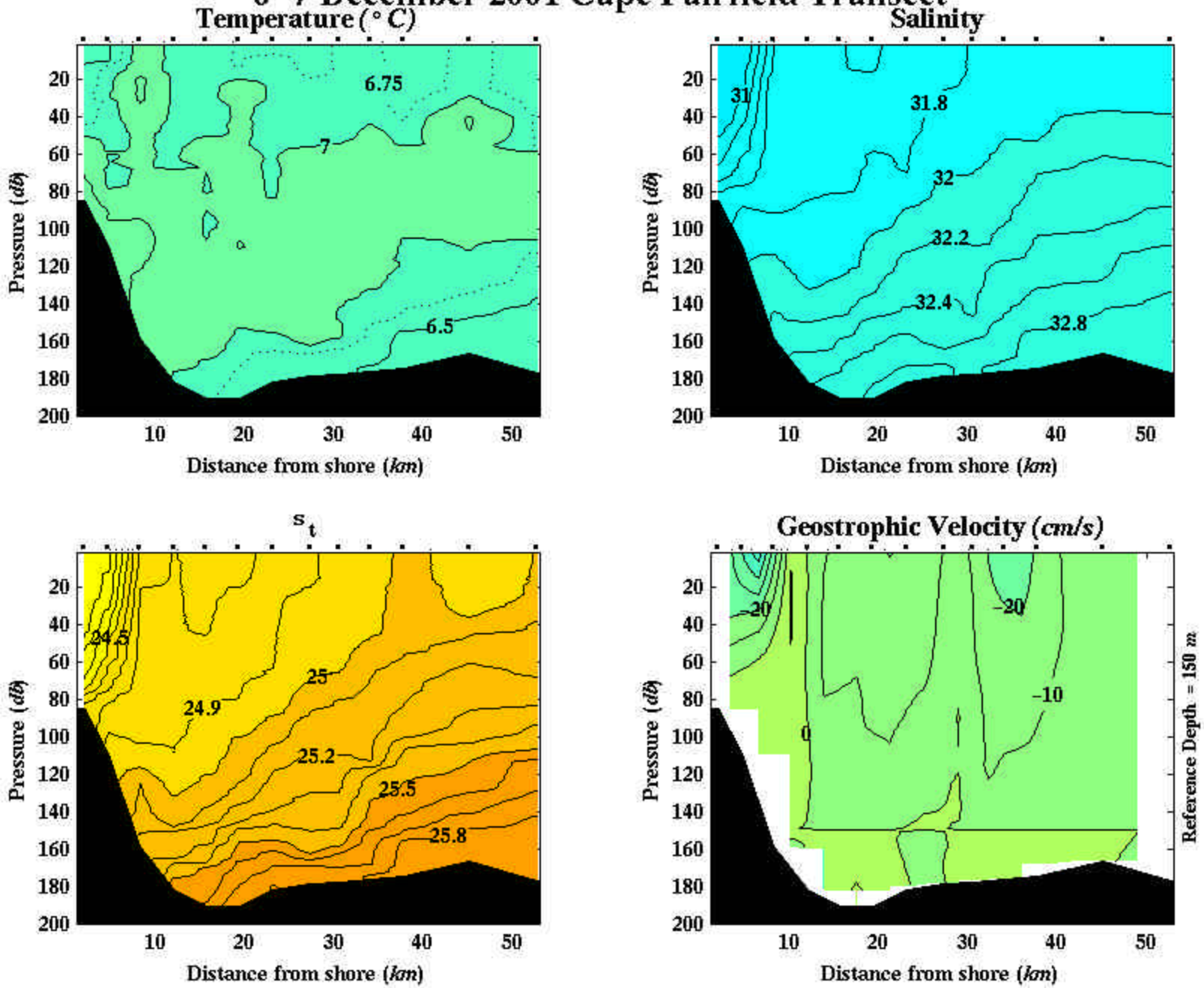
Rel W dir
Rel W spd
Air Temp
Rel Hum.
Bar. Press.
PAR
Julian Day


hx253
Gyro
Speed
Depth
latitude
longitude

7–11 December 2001 Seward Transect




6–7 December 2001 Cape Fairfield Transect
Temperature (° C)
Salinity
s_t
Geostrophic Velocity (cm/s)
Pressure (db)
Distance from shore (km)
Reference Depth = 150 m
6.75
7
6.5
31
31.8
32
32.2
32.4
32.8
24.5
24.9
25
25.2
25.5
25.8
-20
-10
0

EVENT LOG:

Unless otherwise noted, CTDs were taken for T. Weingartner and T. Royer.									
Water samples taken for T. Whitledge and D. Stockwell Nutrient and Chlorophyll analysis.									
CalVet samples were taken for K. Coyle and R. Hopcroft.									
MOCNESS samples were taken for K. Coyle.									
Ring Net samples were taken for R. Hopcroft and K. Coyle.									
Event #	**Description**	**Station**	**Date**	**GMT**	**Latitude**	**Longitude**	**Depth**	**Comments**	**Scientist**
HX25333801.001	CTD1 Start	res2.5	12/ 4/01	19:09	60.02223	149.3553	295		Weingartner
HX25333801.002	CTD1 End	res2.5	12/ 4/01	19:23	60.01902	149.3502	295		Weingartner
HX25333801.003	CTD2 Start	gak1	12/ 4/01	20:44	59.84217	149.4662	271		Weingartner
HX25333801.004	CTD2 End	gak1	12/ 4/01	21:02	59.8365	149.4628	271		Weingartner
HX25333801.005	CalVET Net Tow Start	gak1	12/ 4/01	21:21	59.84572	149.4686	271		Pinchuk
HX25333801.006	CalVET Net Tow End	gak1	12/ 4/01	21:25	59.84378	149.4685	271		Pinchuk
HX25333801.007	CTD3 Start	gak1	12/ 4/01	21:33	59.84537	149.4659	271	Prod Cast	Stockwell
HX25333801.008	CTD3 End	gak1	12/ 4/01	21:44	59.84177	149.4624	271		Stockwell
HX25333801.009	CTD4 Start	gak1	12/ 4/01	22:11	59.8517	149.4584	271	redo as one bottle failed	Stockwell
HX25333801.010	CTD4 End	gak1	12/ 4/01	22:12	59.85128	149.4585	271		Stockwell
HX25333801.011	CTD5 Start	pws-2	12/ 4/01	6:32	60.53427	147.805	740	Neocalanus	Hopcroft
HX25333801.012	CTD5 End	pws-2	12/ 4/01	6:56	60.529	147.8033	740		Hopcroft
HX25333801.013	CTD6 Start	pws-2	12/ 4/01	7:07	60.53493	147.8048	740		Weingartner
HX25333801.014	CTD6 End	pws-2	12/ 4/01	7:45	60.52655	147.8012	740		Weingartner
HX25333901.001	MOCNESS Start	pws-2	12/ 5/01	8:03	60.52995	147.8002	740		Pinchuk
HX25333901.002	MOCNESS End	pws-2	12/ 5/01	8:59	60.54918	147.7818	740		Pinchuk
HX25333901.003	MOCNESS Start	pws-2	12/ 5/01	9:48	60.54417	147.7898	740		Pinchuk
HX25333901.004	MOCNESS End	pws-2	12/ 5/01	10:04	60.54422	147.7897	740		Pinchuk
HX25333901.005	CTD7 Start	ni1	12/ 5/01	11:55	60.77386	147.5301	238		Weingartner
HX25333901.006	CTD7 End	ni1	12/ 5/01	12:02	60.77386	147.5301	238		Weingartner
HX25333901.007	CTD8 Start	ni2	12/ 5/01	12:34	60.77385	147.5302	327		Weingartner
HX25333901.008	CTD8 End	ni2	12/ 5/01	12:57	60.77552	147.5341	327		Weingartner
HX25333901.009	CTD9 Start	ni3	12/ 5/01	13:15	60.80902	147.568	510		Weingartner
HX25333901.010	CTD9 End	ni3	12/ 5/01	13:35	60.81045	147.5762	510		Weingartner
HX25333901.011	CTD10 Start	ni4	12/ 5/01	13:56	60.84065	147.5961	244		Weingartner
HX25333901.012	CTD10 End	ni4	12/ 5/01	14:11	60.84018	147.5969	244		Weingartner
HX25333901.013	CTD11 Start	kip2	12/ 5/01	17:36	60.27753	147.9852	600		Weingartner
HX25333901.014	CTD11 End	kip2	12/ 5/01	18:06	60.26843	147.9908	600		Weingartner
HX25333901.015	CalVET Net Tow Start	kip2	12/ 5/01	18:42	60.27711	147.986	600		Pinchuk
HX25333901.016	CalVET Net Tow End	kip2	12/ 5/01	18:46	60.27618	147.987	600		Pinchuk
HX25333901.017	CTD12 Start	kip2	12/ 5/01	18:51	60.27788	147.9874	600	prod cast	Stockwell
HX25333901.018	CTD12 End	kip2	12/ 5/01	18:57	60.27612	147.9882	600		Stockwell

HX25333901.019	Ring Net Start	kip2	12/ 5/01	19:04	60.27533	147.9883	600		Pinchuk
HX25333901.020	CTD13 start	FI1	12/ 5/01	19:56	60.0125	148.0074	240		Weingartner
HX25333901.021	CTD13 End	FI1	12/ 5/01	21:09	60.0125	148.008	240		Weingartner
HX25333901.022	CTD14 Start	EI1	12/ 5/01	21:15	60.08398	147.9032	234		Weingartner
HX25333901.023	CTD14 End	EI1	12/ 5/01	21:22	60.08252	147.9017	234		Weingartner
HX25333901.024	CTD15 Start	EI2	12/ 5/01	21:32	60.07518	147.8896	132		Weingartner
HX25333901.025	CTD15 End	EI2	12/ 5/01	21:41	60.0745	147.89	132		Weingartner
HX25333901.026	CTD16 Start	MS1	12/ 5/01	22:51	59.95378	147.9283	167		Weingartner
HX25333901.027	CTD16 End	MS1	12/ 5/01	23:03	59.95125	147.9342	167		Weingartner
HX25333901.028	CTD17 End	MS2	12/ 5/01	23:23	59.9436	147.8973	194		Weingartner
HX25333901.029	CTD17 End	MS2	12/ 5/01	23:38	59.93892	147.9068	194		Weingartner
HX25333901.030	CalVET Net Tow Start	MS2	12/ 5/01	23:40	59.9379	147.9088	194		Pinchuk
HX25333901.031	CalVET Net Tow End	MS2	12/ 5/01	23:46	59.93665	147.9133	194		Pinchuk
HX25333901.032	CTD18 Start	MS3	12/ 5/01	0:02	59.93228	147.8577	195		Weingartner
HX25333901.033	CTD18 End	MS3	12/ 5/01	0:14	59.93065	147.8622	171		Weingartner
HX25333901.034	CTD19 Start	MS4	12/ 5/01	0:27	59.92053	147.8286	113		Weingartner
HX25333901.035	CTD19 End	MS4	12/ 5/01	0:36	59.91877	147.8305	113		Weingartner
HX25333901.036	CTD20 Start	HB4	12/ 5/01	2:29	60.14852	147.4996	111		Weingartner
HX25333901.037	CTD20 End	HB4	12/ 5/01	2:36	60.14682	147.5	111		Weingartner
HX25333901.038	CTD21 Start	HB3	12/ 5/01	2:57	60.16305	147.5734	10+H830		Weingartner
HX25333901.039	CTD21 End	HB3	12/ 5/01	3:06	60.162	147.5708	100		Weingartner
HX25333901.040	CTD22 Start	HB2	12/ 5/01	3:23	60.17888	147.6417	175		Weingartner
HX25333901.041	CTD22 End	HB2	12/ 5/01	3:35	60.1746	147.645	175		Weingartner
HX25333901.042	CalVET Net Tow Start	HB2	12/ 5/01	3:41	60.17825	147.6404	175		Pinchuk
HX25333901.043	CalVET Net Tow End	HB2	12/ 5/01	3:48	60.17558	147.6452	175		Pinchuk
HX25333901.044	CTD23 Start	HB1	12/ 5/01	4:01	60.19238	147.6999	250		Weingartner
HX25333901.045	CTD23 End	HB1	12/ 5/01	4:17	60.18918	147.7057	250		Weingartner
HX25334001.001	CTD24 Start	HE1	12/ 6/01	8:38	60.21843	146.6142	75		Weingartner
HX25334001.002	CTD24 End	HE1	12/ 6/01	8:42	60.218	146.6175	75		Weingartner
HX25334001.003	CTD25 Start	he2	12/ 6/01	9:01	60.18073	146.609	194		Weingartner
HX25334001.004	CTD25 End	he2	12/ 6/01	9:15	60.18063	146.6194	194		Weingartner
HX25334001.005	CTD26 Start	he3	12/ 6/01	9:49	60.13115	146.6091	115		Weingartner
HX25334001.006	CTD26 End	he3	12/ 6/01	9:59	60.13215	146.6139	115		Weingartner
HX25334001.007	CTD27 Start	he4	12/ 6/01	10:32	60.08105	146.609	115		Weingartner
HX25334001.008	CTD28 Start	he6.5	12/ 6/01	11:24	60.05257	146.735	123		Weingartner
HX25334001.009	CTD28 End	he6.5	12/ 6/01	11:34	60.05587	146.7363	123		Weingartner
HX25334001.010	CTD29 Start	he8	12/ 6/01	12:32	60.093	146.9611	149		Weingartner
HX25334001.011	CTD29 End	he8	12/ 6/01	12:44	60.09595	146.9609	149		Weingartner
HX25334001.012	CTD30 Start	he9	12/ 6/01	13:09	60.11132	147.0504	280		Weingartner
HX25334001.013	CTD30 End	he9	12/ 6/01	13:27	60.11469	147.0526	280		Weingartner
HX25334001.014	CTD31 Start	he10	12/ 6/01	13:57	60.13158	147.1355	217		Weingartner
HX25334001.015	CTD31 End	he10	12/ 6/01	14:12	60.13427	147.1401	217		Weingartner
HX25334001.016	CTD32 Start	he11	12/ 6/01	14:30	60.14317	147.1915	178		Weingartner
HX25334001.017	CTD32 End	he11	12/ 6/01	14:41	60.14402	147.1941	178		Weingartner

HX25334001.018	CTD33 Start	cf1	12/ 6/01	23:33	59.90855	148.8693	86		Weingartner
HX25334001.019	CTD33 End	cf1	12/ 6/01	23:39	59.90847	148.871	86		Weingartner
HX25334001.020	CTD34 Start	cf2	12/ 6/01	23:54	59.88162	148.8741	116		Weingartner
HX25334001.021	CTD34 End	cf2	12/ 6/01	23:58	59.88162	148.8741	116		Weingartner
HX25334001.022	ctd35 start	cf3	12/ 7/01	0:15	59.8498	148.8665	167		Weingartner
HX25334001.023	CTD35 End	cf3	12/ 6/01	0:27	59.85095	148.8657	167		Weingartner
HX25334001.024	CTD36 Start	cf4	12/ 6/01	0:46	59.81625	148.8668	185		Weingartner
HX25334001.025	CTD36 End	cf4	12/ 6/01	0:56	59.8158	148.8642	185		Weingartner
HX25334001.026	CTD37 Start	cf5	12/ 6/01	1:12	59.78322	148.8669	194		Weingartner
HX25334001.027	CTD37 End	cf5	12/ 6/01	1:23	59.78338	148.8675	194		Weingartner
HX25334001.028	CTD38 Start	cf6	12/ 6/01	1:42	59.74955	148.8672	191		Weingartner
HX25334001.029	CTD38 End	cf6	12/ 6/01	1:51	59.74933	148.8692	191		Weingartner
HX25334001.030	CTD39 Start	cf7	12/ 6/01	2:06	59.71615	148.8673	182		Weingartner
HX25334001.031	CTD39 End	cf7	12/ 6/01	2:17	59.71535	148.8677	182		Weingartner
HX25334001.032	CTD40 Start	cf8	12/ 6/01	2:36	59.67847	148.8663	181		Weingartner
HX25334001.033	CTD40 End	cf8	12/ 6/01	2:45	59.67767	148.8672	181		Weingartner
HX25334001.034	CTD41 Start	cf9	12/ 6/01	2:59	59.64962	148.8658	178		Weingartner
HX25334001.035	CTD41 End	cf9	12/ 6/01	3:09	59.64919	148.8653	178		Weingartner
HX25334001.036	CTD42 Start	cf10	12/ 6/01	3:27	59.6168	148.8679	176		Weingartner
HX25334001.037	CTD42 End	cf10	12/ 6/01	3:36	59.61637	148.8666	176		Weingartner
HX25334001.038	CTD43 Start	cf11	12/ 6/01	3:51	59.58323	148.8682	177		Weingartner
HX25334001.039	CTD43 End	cf11	12/ 6/01	4:02	59.58227	148.8676	177		Weingartner
HX25334001.040	CTD44 Start	cf13	12/ 6/01	4:28	59.51668	148.8652	173		Weingartner
HX25334001.041	CTD44 End	cf13	12/ 6/01	4:41	59.51505	148.8599	173		Weingartner
HX25334001.042	CTD45 Start	cf15	12/ 6/01	5:09	59.44943	148.8653	181		Weingartner
HX25334001.043	CTD45 End	cf15	12/ 6/01	5:21	59.44672	148.8624	181		Weingartner
HX25334001.044	CTD46 Start	gak5	12/ 6/01	6:28	59.26162	148.9062	168		Weingartner
HX25334001.045	CTD46 End	gak5	12/ 6/01	6:39	59.25908	148.9035	168		Weingartner
HX25334001.046	CTD47 Start	gak4i	12/ 6/01	7:33	59.33382	148.9796	196		Weingartner
HX25334101.001	CTD47 End	gak4i	12/ 6/01	7:45	59.33188	148.9792	196		Weingartner
HX25334101.002	CTD48 Start	gak4	12/ 7/01	8:21	59.40687	149.0493	198		Weingartner
HX25334101.003	CTD48 End	gak4	12/ 7/01	8:31	59.40457	149.0486	198		Weingartner
HX25334101.004	CTD49 Start	gak4	12/ 7/01	8:32	59.40452	149.0487	198		Weingartner
HX25334101.005	CTD49 End	gak4	12/ 7/01	8:37	59.40458	149.0488	198		Weingartner
HX25334101.006	CalVET Net Tow Start	gak4	12/ 7/01	8:42	59.4076	149.0484	198		Pinchuk
HX25334101.007	CTD50 Start	gak4	12/ 7/01	8:53	59.40619	149.0459	198		Weingartner
HX25334101.008	CTD50 End	gak4	12/ 7/01	9:08	59.40507	149.0403	198		Weingartner
HX25334101.009	Ring Net End	gak4	12/ 7/01	9:12	59.40437	149.039	198		Pinchuk
HX25334101.010	CTD51 Start	gak3i	12/ 7/01	9:56	59.4804	149.119	202		Weingartner
HX25334101.011	CTD51 End	gak3i	12/ 7/01	10:11	59.47552	149.1148	202		Weingartner
HX25334101.012	CTD52 Start	gak3	12/ 7/01	10:54	59.55242	149.1888	212		Weingartner
HX25334101.013	CTD52 End	gak3	12/ 7/01	11:10	59.54752	149.182	212		Weingartner
HX25334101.014	CalVET Net Tow Start	gak3	12/ 7/01	11:14	59.54659	149.1809	212		Pinchuk
HX25334101.015	CalVET Net Tow End	gak3	12/ 7/01	11:27	59.55593	149.1919	212		Pinchuk
HX25334101.016	CTD53 Start	gak2i	12/ 7/01	11:59	59.62577	149.2601	214		Weingartner

HX25334101.017	CTD53 End	gak2i	12/ 7/01	12:14	59.62153	149.2598	214		Weingartner
HX25334101.018	CTD54 Start	gak2	12/ 7/01	12:51	59.69107	149.3285	230		Weingartner
HX25334101.019	CTD54 End	gak2	12/ 7/01	13:09	59.68647	149.3326	230		Weingartner
HX25334101.020	CalVET Net Tow Start	gak2	12/ 7/01	13:12	59.68588	149.3326	230		Pinchuk
HX25334101.021	CalVET Net Tow End	gak2	12/ 7/01	13:24	59.69868	149.3431	230		Pinchuk
HX25334101.022	CTD55 Start	gak1i	12/ 7/01	13:56	59.76593	149.4007	259		Weingartner
HX25334101.023	CTD55 End	gak1i	12/ 7/01	14:14	59.76012	149.4103	259		Weingartner
HX25334101.024	CTD56 Start	gak1	12/ 7/01	14:57	59.8435	149.4678	273		Weingartner
HX25334101.025	CTD56 End	gak1	12/ 7/01	15:16	59.83733	149.4699	273		Weingartner
HX25334101.026	CalVET Net Tow Start	gak1	12/ 7/01	15:21	59.83492	149.4724	273		Pinchuk
HX25334101.027	CalVET Net Tow End	gak1	12/ 7/01	15:28	59.83062	149.4717	273		Pinchuk
HX25334101.028	CTD57 Start	PWSW A	12/ 7/01	23:40	59.94162	148.3793	162		Weingartner
HX25334101.029	CTD57 End	PWSW A	12/ 7/01	23:51	59.94077	148.3801	162		Weingartner
HX25334201.001	CTD58 Start	PWSW 1	12/ 8/01	0:08	59.9242	148.3337	95		Weingartner
HX25334201.002	CTD58 End	PWSW 1	12/ 8/01	0:16	59.92382	148.3346	95		Weingartner
HX25334201.003	CTD59 Start	PWSW 2	12/ 8/01	0:41	59.8738	148.3354	80		Weingartner
HX25334201.004	CTD59 End	PWSW 2	12/ 8/01	0:47	59.87322	148.3374	80		Weingartner
HX25334201.005	CTD60 Start	PWSW 3	12/ 8/01	1:13	59.83	148.334	124		Weingartner
HX25334201.006	CTD60 End	PWSW 3	12/ 8/01	1:23	59.83	148.3341	124		Weingartner
HX25334201.007	CTD61 Start	PWSW 4	12/ 8/01	1:45	59.77447	148.334	124		Weingartner
HX25334201.008	CTD61 End	PWSW 4	12/ 8/01	1:53	59.77488	148.3329	124		Weingartner
HX25334201.009	CTD62 Start	PWSW 5	12/ 8/01	2:25	59.708	148.3344	172		Weingartner
HX25334201.010	CTD62 End	PWSW 5	12/ 8/01	2:35	59.7099	148.3358	172		Weingartner
HX25334201.011	CTD63 Start	PWSW 5i	12/ 8/01	2:57	59.66708	148.3326	190		Weingartner
HX25334201.012	CTD63 End	pwsw5i	12/ 8/01	3:08	59.66845	148.3325	190		Weingartner
HX25334201.013	CTD64 Start	pwsw6	12/ 8/01	3:30	59.62462	148.3339	197		Weingartner
HX25334201.014	CTD64 End	pwsw6	12/ 8/01	3:42	59.62525	148.3313	197		Weingartner
HX25334201.015	MOCNESS Start	pws2	12/ 8/01	19:33	60.54288	147.7773	704		Pinchuk
HX25334201.016	MOCNESS End	pws2	12/ 8/01	20:34	60.56538	147.7883	704		Pinchuk
HX25334201.017	CTD65 Start	pws2	12/ 8/01	20:43	60.55967	147.7885	704	for zooplankton	Pinchuk
HX25334201.018	CTD65 End	pws2	12/ 8/01	21:07	60.55568	147.7788	704		Pinchuk
HX25334201.019	CTD66 Start	hg1	12/ 9/01	2:07	61.26022	147.7189	175	harvard glacier	Weingartner
HX25334201.020	CTD66 End	hg1	12/ 9/01	2:23	61.26042	147.7221	175		Weingartner

HX25334301.001	CTD67 Start	pw1	12/ 8/01	5:32	60.80423	148.219	430	Port Wells	Weingartner
HX25334301.002	CTD67 End	pw1	12/ 8/01	5:59	60.80207	148.2177	430		Weingartner
HX25334301.003	CTD68 Start	nk1	12/ 9/01	9:12	60.66548	147.2358	155		Weingartner
HX25334301.004	CTD68 End	nk1	12/ 9/01	9:24	60.6639	147.241	155		Weingartner
HX25334301.005	CTD69 Start	nk2	12/ 9/01	9:54	60.66525	147.1208	245		Weingartner
HX25334301.006	CTD69 End	nk2	12/ 9/01	10:10	60.66173	147.1305	245		Weingartner
HX25334301.007	CTD70 Start	nk3	12/ 9/01	10:44	60.66535	147.0027	450		Weingartner
HX25334301.008	CTD70 End	nk3	12/ 9/01	11:07	60.66018	147.013	450		Weingartner
HX25334301.009	CTD71 Start	nk4	12/ 9/01	11:40	60.66595	146.8807	450		Weingartner
HX25334301.010	CTD71 End	nk4	12/ 9/01	12:04	60.66273	146.8861	450		Weingartner
HX25334301.011	CTD72 Start	nk5	12/ 9/01	12:35	60.66587	146.763	235		Weingartner
HX25334301.012	CTD72 End	nk5	12/ 9/01	12:51	60.66435	146.7665	235		Weingartner
HX25334301.013	CTD73 Start	kj1	12/ 9/01	13:24	60.60645	146.853	460		Weingartner
HX25334301.014	CTD73 End	kj1	12/ 9/01	13:48	60.60707	146.8529	460		Weingartner
HX25334301.015	CTD74 Start	kj2	12/ 9/01	14:24	60.53723	146.8527	442		Weingartner
HX25334301.016	CTD74 End	kj2	12/ 9/01	14:44	60.5374	146.8496	442		Weingartner
HX25334301.017	CTD75 Start	kj3	12/ 9/01	15:08	60.5182	146.7642	376		Weingartner
HX25334301.018	CTD75 End	kj3	12/ 9/01	15:27	60.51871	146.7623	376		Weingartner
HX25334301.019	CTD76 Start	kj4	12/ 9/01	15:51	60.49368	146.6745	185		Weingartner
HX25334301.020	CTD76 End	kj4	12/ 9/01	16:03	60.49348	146.6738	185		Weingartner
HX25334301.021	CTD77 Start	mh4	12/ 9/01	16:42	60.40273	146.735	222		Weingartner
HX25334301.022	CTD77 End	mh4	12/ 9/01	16:55	60.40318	146.7341	222		Weingartner
HX25334301.023	CTD78 Start	mh3	12/ 9/01	17:23	60.40211	146.8542	292		Weingartner
HX25334301.024	CTD78 End	mh3	12/ 9/01	17:40	60.4001	146.8551	292		Weingartner
HX25334301.025	CTD79 Start	mh2	12/ 9/01	18:05	60.40213	146.9728	305		Weingartner
HX25334301.026	CTD79 End	mh2	12/ 9/01	18:22	60.39963	146.9735	305		Weingartner
HX25334301.027	CTD80 Start	mh1	12/ 9/01	18:51	60.40117	147.0918	142		Weingartner
HX25334301.028	CTD80 End	mh1	12/ 9/01	19:02	60.39742	147.0936	142		Weingartner
HX25334301.029	CTD81 Start	mn1	12/ 9/01	19:40	60.46643	147.1278	191		Weingartner
HX25334301.030	CTD81 End	mn1	12/ 9/01	19:54	60.4613	147.1277	191		Weingartner
HX25334301.031	CTD82 Start	mn2	12/ 9/01	20:33	60.53143	147.1646	183		Weingartner
HX25334301.032	CTD82 End	mn2	12/ 9/01	20:45	60.52787	147.1646	183		Weingartner
HX25334301.033	CTD83 Start	mn3	12/ 9/01	21:24	60.59737	147.1996	224		Weingartner
HX25334301.034	CTD83 end	mn3	12/ 9/01	21:40	60.5931	147.1999	250		Weingartner
HX25334301.035	CTD84 Start	ms2	12/ 9/01	2:16	59.94178	147.8957	192	nutrient replicates	Childers
HX25334301.036	CTD84 End	ms2	12/ 9/01	2:26	59.94063	147.9005	192		Childers
HX25334401.001	CTD85 Start	gak6	12/ 10/01	8:09	59.11617	148.7679	150		Weingartner
HX25334401.002	CTD85 End	gak6	12/ 10/01	8:19	59.11683	148.7646	150		Weingartner
HX25334401.003	CalVET Net Tow Start	gak6	12/ 10/01	8:22	59.11788	148.7616	150		Pinchuk
HX25334401.004	CalVET Net Tow End	gak6	12/ 10/01	8:28	59.11788	148.7616	150		Pinchuk
HX25334401.005	CTD86 Start	gak7	12/ 10/01	9:29	58.97205	148.6275	244		Weingartner
HX25334401.006	CTD86 End	gak7	12/ 10/01	9:43	58.97293	148.6239	244		Weingartner
HX25334401.007	CalVET Net Tow Start	gak7	12/ 10/01	9:46	58.97297	148.6228	244		Pinchuk
HX25334401.008	CalVET Net Tow End	gak7	12/ 10/01	9:53	58.97192	148.6206	244		Pinchuk

HX25334401.009	CTD87 Start	gak8	12/ 10/01	11:06	58.79083	148.4881	289		Weingartner
HX25334401.010	CTD87 End	gak8	12/ 10/01	11:22	58.79072	148.4838	289		Weingartner
HX25334401.011	CalVET Net Tow Start	gak8	12/ 10/01	11:25	58.79045	148.4838	289		Pinchuk
HX25334401.012	CalVET Net Tow End	gak8	12/ 10/01	11:38	58.78178	148.4702	289		Pinchuk
HX25334401.013	CTD88 Start	gak9	12/ 10/01	12:22	58.67855	148.3477	270		Weingartner
HX25334401.014	CTD88 End	gak9	12/ 10/01	12:37	58.67635	148.3465	270		Weingartner
HX25334401.015	CTD89 Start	gak10	12/ 10/01	13:51	58.53992	148.2106	1461		Weingartner
HX25334401.016	CTD89 End	gak10	12/ 10/01	14:58	58.53205	148.2197	1461		Weingartner
HX25334401.017	CalVET Net Tow Start	gak10	12/ 10/01	15:17	58.5157	148.2074	1461		Pinchuk
HX25334401.018	CalVET Net Tow End	gak10	12/ 10/01	15:17	58.51503	148.2065	1461		Pinchuk
HX25334401.019	CTD90 Start	gak11	12/ 10/01	16:10	58.38807	148.0711	1430	water for zoops	Pinchuk
HX25334401.020	CTD90 End	gak11	12/ 10/01	16:36	58.38533	148.0723	1430		Pinchuk
HX25334401.021	MOCNESS Start	gak11	12/ 10/01	16:46	58.385	148.072	1430		Pinchuk
HX25334401.022	MOCNESS End	gak11	12/ 10/01	18:21	58.31732	148.122	1408		Pinchuk
HX25334401.023	CalVET Net Tow Start	gak11	12/ 10/01	19:08	58.38732	148.0771	1427		Pinchuk
HX25334401.024	CalVET Net Tow End	gak11	12/ 10/01	19:13	58.3869	148.0788	1427		Pinchuk
HX25334401.025	CTD91 Start	gak11	12/ 10/01	19:15	58.38662	148.0797	1421		Weingartner
HX25334401.026	CTD91 End	gak11	12/ 10/01	20:20	58.38308	148.0964	1421		Weingartner
HX25334401.027	CTD92 Start	gak12	12/ 10/01	21:33	58.24367	147.9315	2166		Weingartner
HX25334401.028	CTD92 End	gak12	12/ 10/01	22:44	58.24712	147.9303	2166		Weingartner
HX25334401.029	CalVET Net Tow Start	gak12	12/ 10/01	22:45	58.24714	147.9302	2166		Pinchuk
HX25334401.030	CalVET Net Tow End	gak12	12/ 10/01	22:55	58.24905	147.9277	2166		Pinchuk
HX25334401.031	CTD93 Start	gak9i	12/ 10/01	1:44	58.61103	148.279	680		Weingartner
HX25334401.032	CTD93 End	gak9i	12/ 10/01	2:17	58.60238	148.2879	680		Weingartner
HX25334401.033	Ring Net Start	gak9i	12/ 10/01	2:18	58.6022	148.2883	710		Pinchuk
HX25334401.034	Ring Net End	gak9i	12/ 10/01	2:26	58.6022	148.29	710		Pinchuk
HX25334401.035	CTD94 Start	gak8i	12/ 10/01	3:30	58.74295	148.4227	290		Weingartner
HX25334401.036	CTD94 End	gak8i	12/ 10/01	3:49	58.74287	148.4336	290		Weingartner
HX25334401.037	CTD95 Start	gak7i	12/ 10/01	4:48	58.88123	148.5627	300		Weingartner
HX25334401.038	CTD95 End	gak7i	12/ 10/01	5:03	58.88132	148.5659	300		Weingartner
HX25334401.039	CTD96 Start	gak6i	12/ 10/01	6:14	59.0445	148.7023	195		Weingartner
HX25334401.040	CTD96 End	gak6i	12/ 10/01	6:24	59.04548	148.703	195		Weingartner
HX25334401.041	CTD97 Start	gak5i	12/ 10/01	7:26	59.18928	148.8401	169		Weingartner
HX25334401.042	CTD97 End	gak5i	12/ 10/01	7:36	59.18972	148.8405	169		Weingartner
HX25334501.001	CTD98 Start	gak4	12/ 11/01	9:29	59.40827	149.0493	200		Weingartner
HX25334501.002	CTD98 end	gak4	12/ 11/01	9:33	59.408	149.0493	200		Weingartner
HX25334501.003	CTD99 Start	gak3	12/ 11/01	11:00	59.55225	149.1892	212		Weingartner
HX25334501.004	CTD99 End	gak3	12/ 11/01	11:06	59.54984	149.1914	212		Weingartner
HX25334501.005	CTD100 Start	gak2	12/ 11/01	12:34	59.69132	149.33	225		Weingartner
HX25334501.006	CTD100 End	gak2	12/ 11/01	12:51	59.68895	149.3515	230		Weingartner

HX25334501.007	CTD101 Start	gak1	12/ 11/01	14:46	59.84465	149.4671	270		Weingartner
HX25334501.008	CTD101 End	gak1	12/ 11/01	15:04	59.84435	149.4751	270		Weingartner
HX25334501.009	CTD102 Start	res2.5	12/ 11/01	16:21	60.0248	149.3615	295		Weingartner
HX25334501.010	CTD102 End	res2.5	12/11/01	16:35	60.02482	149.3627	295		Weingartner