



HOKKAIDO UNIVERSITY

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THE “USHIO MARU”

CRUISE 179
CRUISE 180
CRUISE 181

IN OCTOBER 2009

1. Cruise Itinerary

Cruise 179

Departure from Hakodate	Oct.	1	, 2009
Start hydrographic research (US09411)		2	
Arrival at Rausu		2	
Departure from Rausu		3	
Photography of the R.O.V.		3	
Arrival at and departure from Rausu		4	
Finish hydrographic research (US09436)		5	
Arrival at Rausu		5	
Departure from Rausu		6	
Return to Rausu		8	
Total coverage 990.5 miles			

Cruise 180

Departure from Hakodate	Oct.	14	, 2009
Start hydrographic research (US09437)		14	
Arrival at Usujiri		14	
Departure from Usujiri		15	
Retrieval sediment trap system		15	
Start trawl net research		15	
Set sediment trap system		16	
Finish hydrographic research (US09450) and trawl net research		16	
Arrival at and departure from Usujiri		16	
Return to Hakodate		17	
Total coverage 215.9 miles			

Cruise 181

Departure from Hakodate	Oct.	22	, 2009
Hydrographic research (US09451-US09453)		23	
Practical training in tuna long line		23	
Return to Hakodate		24	
Total coverage 222.0 miles			

2. Vessel Personnel

Captain:		Professor	Toshimi Meguro
Crew :	Chief Officer	Assistant Professor	Osamu Kimura
	Second Officer	Assistant Professor	Naoto Kobayashi
	And 13 men		

Cruise 179

Research Staff:	Assistant Professor	(Field Science Center for Northern Biosphere)	
			Jun Yamamoto
	Research Associate	(Graduate School of Information Science and Technology)	
			Toshihiro Iwamori
Graduate Students:	Chair of Marine Bioresource Science:		2 persons
	Graduate School of Environmental Science:		2 persons
Under Graduate Students:	Department of Marine Biology:		4 persons

Cruise 180

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	
			Tetsuya Takatsu
	Assistant Professor	(Laboratory of Marine Environmental Science)	
			Hiroji Onishi
Guest Scientist (Domestic):		(Ehime University)	
			Michinobu Kuwae
Graduate Students:	Chair of Marine Bioresource Science:		6 persons
	Chair of Marine Environmental Science:		2 persons
Under Graduate Students:	Department of Marine Biological Science:		1 person
	Department of Applied Marine Science:		3 persons

Cruise 181

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource and Environment Sensing)	
			Susumu Shimizu
Graduate Students:	Chair of Marine Bioresource and Environment Sensing:		2 persons
Under Graduate Students:	Department of Applied Marine Science:		1 person
	Department of Marine Biological Science:		1 person

3. Data on Temperature, Salinity, and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the “Ushio Maru”.

Temperature and salinity were measured by CTD (Seabird SBE9Plus and SBE-19).

Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

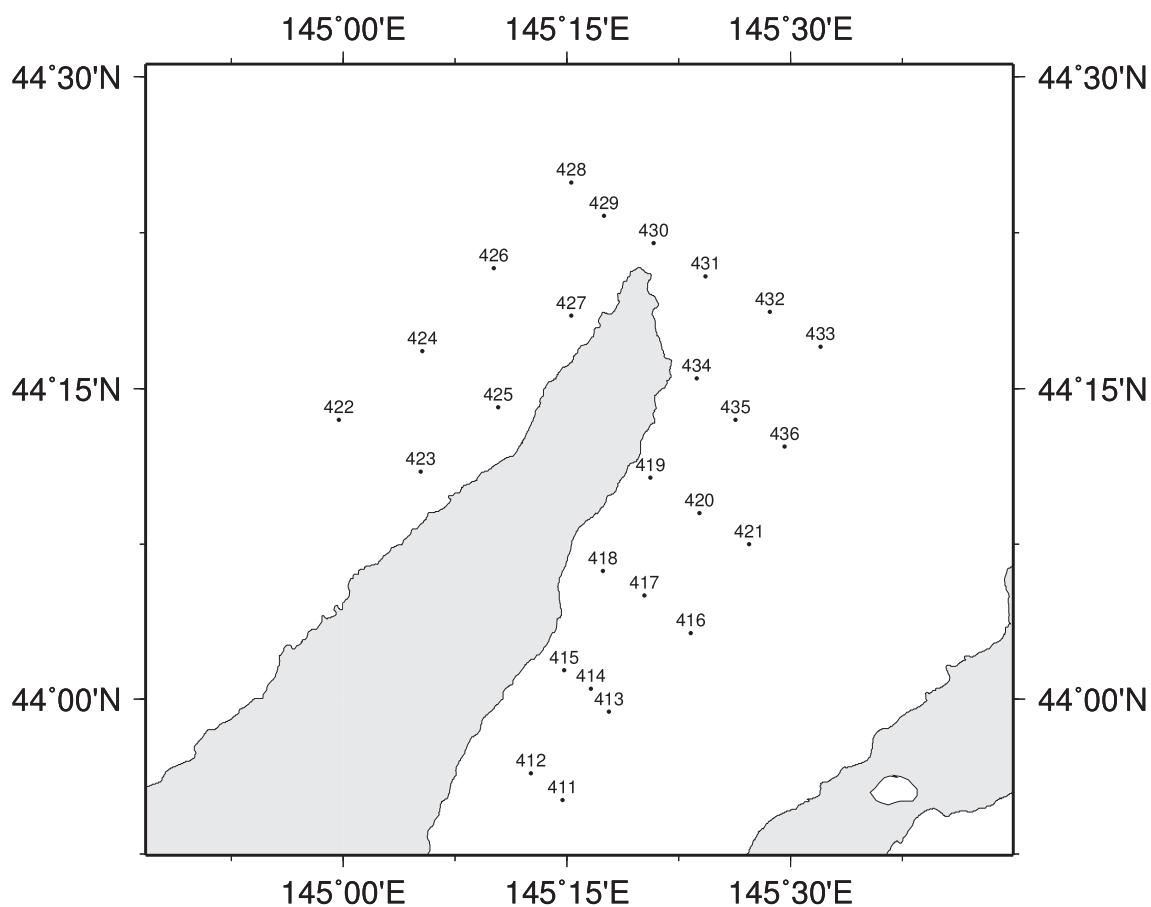


Figure 1: Oceanographic stations (Cruise 179)

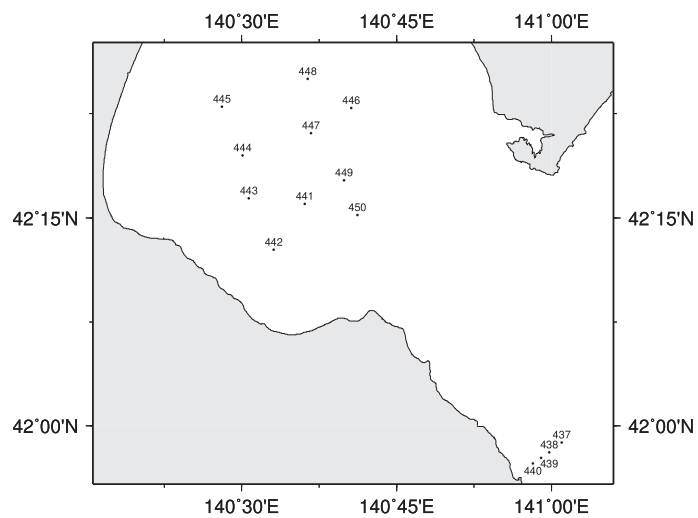


Figure 2: Oceanographic stations (Cruise 180)

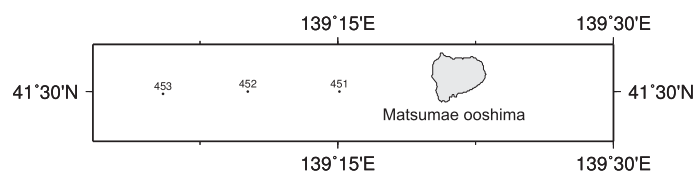


Figure 3: Oceanographic stations (Cruise 181)

Table 1: List of oceanographic stations

Cruise 179

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09411	43-55.1	145-14.7	10/2	1357-1401	79	SSE-3	South-2	SSE-5	16.7	16.5	o 1012.1
US09412	43-56.4	145-12.6	10/2	1422-1426	83	SSE-4	South-2	SSE-6	16.9	16.5	o 1011.6
US09413	43-59.4	145-17.8	10/3	0730-0738	258	SSW-2	SSE-1	SSW-3	16.9	16.4	bc 998.0
US09414	44-00.5	145-16.6	10/3	0805-0819	424	SSW-1	SSE-1	SSW-2	17.0	16.3	c 998.0
US09415	44-01.4	145-14.8	10/3	0833-0847	470	Calm	SSE-1	Calm	17.0	16.2	c 998.2
US09416	44-03.2	145-23.3	10/3	0941-0959	504	SSW-1	SSE-1	SSW-3	16.9	16.6	c 998.9
US09417	44-05.0	145-20.2	10/3	1019-1037	878	SW -1	SSE-1	SW -2	16.6	16.6	o 998.6
US09418	44-06.2	145-17.4	10/3	1107-1125	530	Calm	SSE-1	Calm	17.0	16.6	f 998.4
US09419	44-10.7	145-20.6	10/3	1425-1428	91	NE -1	SSE-1	NE -3	17.3	17.1	c 999.0
US09420	44-09.0	145-23.9	10/3	1456-1515	1420	North-1	SSE-1	North-3	10.5	16.7	c 999.5
US09421	44-07.5	145-27.2	10/3	1536-1552	1225	NNE-2	SSE-1	NNE-4	16.5	16.7	r 1000.0
US09422	44-13.5	144-59.7	10/4	1204-1220	680	SSW-1	West-1	SSW-3	17.5	14.5	bc 1009.2
US09423	44-11.0	145-05.2	10/4	1300-1311	350	West-1	West-1	West-2	19.1	16.1	bc 1009.1
US09424	44-16.8	145-05.3	10/4	1347-1403	842	NW -1	West-1	NW -2	17.2	14.9	bc 1009.1
US09425	44-14.1	145-10.4	10/4	1444-1451	211	Calm	West-1	Calm	17.4	14.7	bc 1009.1
US09426	44-20.8	145-10.1	10/4	1531-1548	1048	Calm	West-1	Calm	18.1	14.5	bc 1009.4
US09427	44-18.5	145-15.3	10/4	1630-1642	375	Calm	West-1	Calm	16.5	14.6	bc 1009.2
US09428	44-24.9	145-15.3	10/5	0550-0600	1330	SW -3	West-1	SW -5	13.7	13.7	bc 1011.8
US09429	44-23.3	145-17.5	10/5	0634-0645	825	SW -3	West-1	SW -5	13.5	13.9	bc 1012.6
US09430	44-22.0	145-20.8	10/5	0704-0708	108	SW -3	West-1	SW -5	14.5	15.4	bc 1012.8
US09431	44-20.4	145-24.3	10/5	0742-0800	880	SW -3	NW -1	SW -5	14.8	15.4	bc 1012.8
US09432	44-18.7	145-28.6	10/5	0821-0838	1540	SSW-2	NW -1	WSW-4	15.8	15.3	bc 1013.6
US09433	44-17.0	145-32.0	10/5	0908-0925	2021	SW -1	NW -1	SW -3	16.3	15.2	bc 1013.6
US09434	44-15.5	145-23.7	10/5	1007-1012	105	South-2	South-1	South-4	16.9	15.6	bc 1013.5
US09435	44-13.5	145-26.3	10/5	1040-1058	1562	SW -2	South-1	SW -4	16.7	15.4	bc 1013.5
US09436	44-12.2	145-29.6	10/5	1125-1145	2011	South-2	South-1	South-4	16.1	15.3	bc 1013.8

Cruise 180

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09437	41-58.8	141-01.0	10/14	1320-1324	96	West-1	NW -1	West-3	15.8	14.1	c 1010.8
US09438	41-58.1	140-59.8	10/14	1333-1337	87	West-2	NW -1	West-4	15.0	14.2	c 1010.7
US09439	41-57.7	140-59.0	10/14	1342-1346	84	West-1	NW -1	West-2	15.2	14.4	c 1010.7
US09440	41-57.3	140-58.2	10/14	1352-1355	78	West-2	NW -1	West-4	15.6	14.8	c 1010.7
US09441	42-16.0	140-36.1	10/15	0835-0842	91	WSW-1	East-1	WSW-2	16.1	15.2	bc 1013.6
US09442	42-12.7	140-33.1	10/15	1045-1050	83	West-1	East-1	West-3	17.0	15.4	bc 1013.4
US09443	42-16.4	140-30.7	10/15	1207-1213	90	West-3	West-1	West-5	17.7	15.2	bc 1012.8
US09444	42-19.5	140-30.1	10/15	1517-1525	92	West-3	West-1	West-5	16.7	15.2	bc 1012.6
US09445	42-23.0	140-28.1	10/15	1649-1655	89	West-3	West-1	West-5	16.1	15.2	bc 1013.0
US09446	42-22.9	140-40.6	10/16	0427-0432	71	NE -1	ESE-1	NE -2	11.9	15.1	bc 1016.0
US09447	42-21.1	140-36.7	10/16	0523-0527	87	NE -1	ESE-1	NE -3	11.7	15.2	bc 1016.0
US09448	42-25.0	140-36.4	10/16	0835-0841	87	South-1	ESE-1	South-1	13.6	15.2	bc 1015.8
US09449	42-17.7	140-39.9	10/16	1020-1025	79	ESE-2	ESE-1	ESE-4	14.6	15.2	bc 1015.1
US09450	42-15.2	140-41.2	10/16	1101-1106	83	East-3	ESE-1	East-5	15.0	15.1	bc 1014.6

Cruise 181

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09451	41-30.0	139-15.1	10/23	1015-1025	1132	WSW-3	West-1	WSW-5	14.2	16.1	r 1020.7
US09452	41-30.0	139-10.1	10/23	1050-1100	1183	SW -3	West-1	SW -5	13.9	15.3	o 1020.6
US09453	41-29.9	139-05.5	10/23	1126-1135	1140	SW -3	West-1	SW -5	13.9	16.0	o 1020.0

(*):Fixed position by Global Positioning System

Table 2: Oceanographic data

STATION US09411				STATION US09412				STATION US09413			
LATITUDE 43-55.1 N				LATITUDE 43-56.4 N				LATITUDE 43-59.4 N			
LONGITUDE 145-14.7 E				LONGITUDE 145-12.6 E				LONGITUDE 145-17.8 E			
DEPTH (m) 79				DEPTH (m) 83				DEPTH (m) 258			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.732	33.372	24.328	5	16.737	33.371	24.326	5	16.691	33.250	24.244
10	16.730	33.374	24.330	10	16.738	33.372	24.326	10	16.672	33.267	24.261
20	16.730	33.376	24.331	20	16.720	33.378	24.335	20	16.682	33.327	24.305
30	16.411	33.362	24.548	30	16.054	33.623	24.676	30	16.260	33.575	24.592
40	15.195	33.708	24.933	40	15.288	33.710	24.914	40	14.640	33.741	25.079
50	14.298	33.763	25.169	50	14.227	33.768	25.188	50	13.889	33.777	25.265
75	10.826	33.806	25.877	75	11.374	33.814	25.784	75	11.080	33.783	25.814
								100	8.869	33.740	26.152
								125	7.865	33.748	26.311
								150	6.980	33.733	26.423
								175	4.632	33.503	26.529
								200	3.057	33.449	26.642
STATION US09414				STATION US09415				STATION US09416			
LATITUDE 44-00.5 N				LATITUDE 44-01.4 N				LATITUDE 44-03.2 N			
LONGITUDE 145-16.6 E				LONGITUDE 145-14.8 E				LONGITUDE 145-23.3 E			
DEPTH (m) 424				DEPTH (m) 470				DEPTH (m) 504			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.492	33.160	24.221	5	16.381	33.244	24.310	5	16.858	33.278	24.226
10	16.474	33.184	24.243	10	16.355	33.529	24.535	10	16.701	33.330	24.303
20	16.359	33.497	24.510	20	15.571	33.700	24.844	20	16.592	33.482	24.445
30	15.432	33.697	24.873	30	15.121	33.753	24.984	30	16.553	33.569	24.521
40	14.414	33.745	25.131	40	14.076	33.785	25.232	40	16.303	33.636	24.630
50	13.387	33.797	25.383	50	13.185	33.813	25.436	50	14.403	33.758	25.143
75	10.828	33.799	25.871	75	11.309	33.843	25.819	75	11.379	33.812	25.782
100	8.868	33.737	26.149	100	10.021	33.848	26.049	100	9.258	33.808	26.143
125	8.490	33.852	26.298	125	7.545	33.708	26.325	125	6.989	33.689	26.387
150	6.942	33.741	26.435	150	6.635	33.706	26.449	150	4.901	33.513	26.508
175	4.768	33.585	26.579	175	4.950	33.587	26.561	175	4.096	33.533	26.609
200	4.403	33.595	26.627	200	2.901	33.414	26.627	200	2.442	33.384	26.643
250	2.003	33.395	26.686	250	1.601	33.364	26.690	250	1.421	33.368	26.706
300	1.240	33.379	26.726	300	1.319	33.390	26.730	300	1.198	33.394	26.741
400	1.523	33.515	26.817	400	1.454	33.493	26.804	400	1.460	33.503	26.811
STATION US09417				STATION US09418				STATION US09419			
LATITUDE 44-05.0 N				LATITUDE 44-06.2 N				LATITUDE 44-10.7 N			
LONGITUDE 145-20.2 E				LONGITUDE 145-17.4 E				LONGITUDE 145-20.6 E			
DEPTH (m) 878				DEPTH (m) 530				DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.751	33.186	24.180	5	16.463	33.321	24.351	5	16.586	33.137	24.181
10	16.695	33.192	24.199	10	16.555	33.389	24.382	10	16.434	33.473	24.474
20	16.658	33.373	24.346	20	15.857	33.674	24.760	20	15.567	33.659	24.813
30	15.843	33.663	24.755	30	14.665	33.769	25.095	30	15.133	33.715	24.953
40	14.210	33.775	25.196	40	13.853	33.806	25.295	40	14.571	33.749	25.100
50	13.152	33.766	25.407	50	12.854	33.834	25.518	50	13.756	33.773	25.290
75	11.243	33.813	25.807	75	10.963	33.848	25.885	75	10.843	33.817	25.882
100	8.985	33.770	26.157	100	8.795	33.771	26.188				
125	6.820	33.724	26.438	125	7.393	33.801	26.420				
150	6.053	33.728	26.541	150	6.297	33.727	26.509				
175	4.430	33.531	26.573	175	3.212	33.444	26.624				
200	2.586	33.386	26.632	200	2.789	33.434	26.654				
250	1.462	33.356	26.693	250	1.423	33.364	26.702				
300	1.126	33.371	26.727	300	1.278	33.387	26.731				
400	1.467	33.499	26.808	400	1.502	33.516	26.819				
500	1.911	33.720	26.953								
STATION US09420				STATION US09421				STATION US09422			
LATITUDE 44-09.0 N				LATITUDE 44-07.5 N				LATITUDE 44-13.5 N			
LONGITUDE 145-23.9 E				LONGITUDE 145-27.2 E				LONGITUDE 144-59.7 E			
DEPTH (m) 1420				DEPTH (m) 1225				DEPTH (m) 680			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.747	33.296	24.266	5	16.841	33.332	24.272	5	14.250	32.955	24.555
10	16.730	33.369	24.326	10	16.741	33.388	24.338	10	14.625	33.604	24.977
20	16.608	33.585	24.520	20	16.625	33.537	24.479	20	13.516	33.736	25.310
30	16.585	33.602	24.538	30	16.603	33.582	24.519	30	13.092	33.714	25.378
40	15.444	33.720	24.888	40	16.072	33.676	24.713	40	12.672	33.799	25.527
50	14.103	33.787	25.228	50	14.507	33.749	25.114	50	12.461	33.793	25.563
75	10.880	33.823	25.880	75	11.468	33.820	25.772	75	9.499	33.828	26.120
100	8.716	33.826	26.243	100	8.895	33.826	26.216	100	6.927	33.607	26.331
125	7.009	33.768	26.447	125	6.724	33.707	26.437	125	5.143	33.629	26.572
150	5.362	33.651	26.564	150	4.884	33.541	26.532	150	3.694	33.500	26.623
175	4.127	33.599	26.659	175	3.660	33.458	26.593	175	3.140	33.475	26.656
200	3.440	33.534	26.675	200	3.780	33.557	26.661	200	-0.271	33.219	26.681
250	2.684	33.484	26.702	250	2.270	33.405	26.673	250	2.968	33.627	26.792
300	1.751	33.406	26.713	300	1.170	33.369	26.724	300	2.820	33.623	26.802
400	1.354	33.472	26.794	400	1.385	33.483	26.801	400	1.664	33.576	26.855
500	1.882	33.645	26.895								

STATION US09423 LATITUDE 44-11.0 N LONGITUDE 145-05.2 E DEPTH (m) 350				STATION US09424 LATITUDE 44-16.8 N LONGITUDE 145-05.3 E DEPTH (m) 842				STATION US09425 LATITUDE 44-14.1 N LONGITUDE 145-10.4 E DEPTH (m) 211			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.703	33.562	24.480	5	14.726	33.042	24.522	5	16.097	33.211	24.350
10	16.191	33.590	24.620	10	15.092	33.554	24.837	10	16.238	33.591	24.610
20	15.696	33.749	24.854	20	13.625	33.608	25.189	20	15.722	33.783	24.874
30	14.919	33.768	25.040	30	13.225	33.662	25.312	30	15.683	33.784	24.884
40	14.553	33.822	25.160	40	12.706	33.793	25.516	40	15.298	33.784	24.969
50	14.364	33.825	25.203	50	12.326	33.836	25.623	50	14.611	33.768	25.106
75	13.891	33.806	25.287	75	9.644	33.737	26.025	75	13.821	33.801	25.298
100	12.109	33.788	25.627	100	8.941	33.808	26.194	100	12.772	33.842	25.541
125	11.731	33.809	25.714	125	4.110	33.248	26.382	125	11.303	33.843	25.820
150	6.347	33.680	26.466	150	1.711	33.209	26.558	150	7.368	33.683	26.331
175	3.923	33.549	26.639	175	-0.175	33.172	26.639	175	4.036	33.537	26.619
200	3.015	33.486	26.675	200	2.011	33.463	26.739				
250	2.693	33.557	26.760	250	2.496	33.525	26.751				
				300	3.186	33.630	26.775				
				400	2.142	33.624	26.858				

STATION US09426 LATITUDE 44-20.8 N LONGITUDE 145-10.1 E DEPTH (m) 1048				STATION US09427 LATITUDE 44-18.5 N LONGITUDE 145-15.3 E DEPTH (m) 375				STATION US09428 LATITUDE 44-24.9 N LONGITUDE 145-15.3 E DEPTH (m) 1330			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.770	32.517	24.108	5	15.923	33.543	24.645	5	14.320	33.228	24.752
10	14.344	33.180	24.709	10	16.129	33.630	24.665	10	14.917	33.806	25.069
20	13.746	33.544	25.115	20	15.904	33.678	24.753	20	14.741	33.823	25.121
30	13.198	33.747	25.382	30	15.457	33.786	24.935	30	13.514	33.756	25.326
40	12.696	33.800	25.523	40	14.554	33.780	25.128	40	12.206	33.677	25.523
50	12.477	33.815	25.577	50	13.855	33.819	25.305	50	10.962	33.681	25.755
75	10.571	33.779	25.900	75	13.231	33.840	25.448	75	8.725	33.777	26.204
100	8.956	33.727	26.128	100	12.246	33.838	25.640	100	5.303	33.357	26.338
125	-0.263	33.020	26.520	125	10.157	33.841	26.021	125	-0.248	33.071	26.561
150	1.324	33.316	26.670	150	6.384	33.637	26.427	150	0.915	33.267	26.657
175	2.630	33.578	26.782	175	4.861	33.562	26.551	175	0.928	33.324	26.702
200	3.213	33.576	26.729	200	3.953	33.532	26.623	200	2.284	33.516	26.760
250	2.625	33.538	26.750	250	3.136	33.534	26.703	250	2.713	33.551	26.753
300	2.522	33.558	26.775	300	2.606	33.533	26.748				
400	1.359	33.531	26.840								

STATION US09429 LATITUDE 44-23.3 N LONGITUDE 145-17.5 E DEPTH (m) 825				STATION US09430 LATITUDE 44-22.0 N LONGITUDE 145-20.8 E DEPTH (m) 108				STATION US09431 LATITUDE 44-20.4 N LONGITUDE 145-24.3 E DEPTH (m) 880			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.104	33.140	24.728	5	15.634	33.575	24.734	5	15.606	33.527	24.703
10	14.837	33.792	25.076	10	15.636	33.572	24.731	10	15.610	33.524	24.700
20	14.815	33.794	25.083	20	15.702	33.596	24.735	20	15.595	33.528	24.706
30	14.398	33.821	25.192	30	15.816	33.681	24.775	30	14.542	33.659	25.037
40	13.987	33.834	25.289	40	15.214	33.785	24.989	40	14.468	33.691	25.078
50	13.449	33.823	25.391	50	14.526	33.809	25.156	50	14.033	33.718	25.190
75	10.344	33.810	25.964	75	12.617	33.823	25.556	75	11.885	33.765	25.652
100	8.224	33.760	26.266					100	10.897	33.795	25.856
125	5.779	33.600	26.474					125	9.400	33.744	26.070
150	1.375	33.235	26.602					150	6.801	33.670	26.398
175	2.838	33.514	26.713					175	5.890	33.695	26.535
200	2.763	33.528	26.731					200	3.774	33.472	26.593
250	2.618	33.542	26.755					250	2.306	33.429	26.689
								300	1.489	33.409	26.734
								400	1.350	33.474	26.796

STATION US09432 LATITUDE 44-18.7 N LONGITUDE 145-28.6 E DEPTH (m) 1540				STATION US09433 LATITUDE 44-17.0 N LONGITUDE 145-32.0 E DEPTH (m) 2021				STATION US09434 LATITUDE 44-15.5 N LONGITUDE 145-23.7 E DEPTH (m) 105			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.591	33.581	24.748	5	15.528	33.576	24.758	5	15.840	33.535	24.657
10	15.588	33.578	24.747	10	15.513	33.573	24.759	10	15.787	33.529	24.664
20	15.592	33.583	24.749	20	15.378	33.584	24.797	20	15.441	33.575	24.777
30	15.451	33.600	24.794	30	15.323	33.595	24.818	30	15.043	33.658	24.928
40	14.992	33.649	24.932	40	15.273	33.610	24.841	40	14.864	33.684	24.987
50	14.227	33.678	25.118	50	15.199	33.628	24.871	50	14.603	33.739	25.085
75	13.660	33.805	25.334	75	13.906	33.724	25.221	75	12.862	33.807	25.496
100	12.887	33.812	25.495	100	10.434	33.809	25.947				
125	9.624	33.844	26.112	125	8.353	33.789	26.270				
150	7.160	33.743	26.406	150	6.613	33.674	26.426				
175	4.287	33.481	26.549	175	4.675	33.529	26.545				
200	2.856	33.419	26.636	200	3.011	33.388	26.597				
250	1.277	33.337	26.690	250	1.705	33.382	26.697				
300	1.570	33.401	26.722	300	1.032	33.380	26.741				
400	1.444	33.500	26.810	400	1.602	33.546	26.836				

STATION US09435 LATITUDE 44-13.5 N LONGITUDE 145-26.3 E DEPTH (m) 1562				STATION US09436 LATITUDE 44-12.2 N LONGITUDE 145-29.6 E DEPTH (m) 2011				STATION US09437 LATITUDE 41-58.8 N LONGITUDE 141-01.0 E DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.473	33.405	24.638	5	15.650	33.421	24.612	5	14.417	32.964	24.527
10	15.429	33.523	24.739	10	15.673	33.515	24.679	10	14.399	32.964	24.531
20	15.392	33.533	24.755	20	15.572	33.537	24.718	20	14.305	32.973	24.557
30	15.325	33.553	24.786	30	15.420	33.522	24.741	30	13.993	33.075	24.701
40	15.277	33.608	24.838	40	15.336	33.545	24.777	40	13.127	33.364	25.101
50	15.268	33.602	24.836	50	15.281	33.569	24.807	50	12.021	33.442	25.376
75	14.560	33.698	25.063	75	14.051	33.685	25.161	75	10.383	33.485	25.704
100	10.966	33.801	25.848	100	10.338	33.806	25.962				
125	8.855	33.810	26.210	125	8.057	33.777	26.305				
150	5.998	33.633	26.473	150	5.186	33.535	26.493				
175	5.374	33.630	26.546	175	3.807	33.519	26.627				
200	4.814	33.589	26.577	200	2.808	33.459	26.671				
250	3.438	33.511	26.657	250	2.148	33.435	26.707				
300	1.795	33.396	26.702	300	2.015	33.459	26.736				
400	1.373	33.480	26.799	400	1.658	33.486	26.784				
				500	1.843	33.661	26.911				

STATION US09438 LATITUDE 41-58.1 N LONGITUDE 140-59.8 E DEPTH (m) 87				STATION US09439 LATITUDE 41-57.7 N LONGITUDE 140-59.0 E DEPTH (m) 84				STATION US09440 LATITUDE 41-57.3 N LONGITUDE 140-58.2 E DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.569	32.903	24.448	5	14.937	32.629	24.158	5	15.111	32.452	23.985
10	14.573	32.902	24.446	10	14.936	32.633	24.162	10	15.095	32.488	24.016
20	14.554	32.945	24.484	20	14.934	32.694	24.209	20	15.090	32.508	24.032
30	14.048	33.049	24.670	30	14.424	32.964	24.526	30	14.942	32.872	24.344
40	12.829	33.351	25.149	40	12.728	33.355	25.172	40	13.415	33.088	24.829
50	12.113	33.549	25.441	50	11.697	33.485	25.469	50	10.817	33.410	25.570
75	9.522	33.478	25.843	75	8.789	33.473	25.956	75	8.787	33.494	25.973

STATION US09441 LATITUDE 42-16.0 N LONGITUDE 140-36.1 E DEPTH (m) 91				STATION US09442 LATITUDE 42-12.7 N LONGITUDE 140-33.1 E DEPTH (m) 83				STATION US09443 LATITUDE 42-16.4 N LONGITUDE 140-30.7 E DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.465	32.443	23.900	5	15.356	32.405	23.895	5	15.392	32.434	23.909
10	15.467	32.445	23.901	10	15.317	32.406	23.905	10	15.334	32.433	23.921
20	15.474	32.453	23.906	20	15.303	32.439	23.932	20	15.284	32.441	23.938
30	15.279	32.735	24.165	30	14.042	32.842	24.511	30	13.877	32.859	24.558
40	13.335	33.126	24.875	40	12.207	33.148	25.112	40	12.316	33.096	25.051
50	12.066	33.272	25.235	50	11.146	33.193	25.343	50	10.315	33.043	25.371
75	8.574	33.372	25.910	75	7.803	33.367	26.020	75	8.030	33.365	25.986

STATION US09444 LATITUDE 42-19.5 N LONGITUDE 140-30.1 E DEPTH (m) 92				STATION US09445 LATITUDE 42-23.0 N LONGITUDE 140-28.1 E DEPTH (m) 89				STATION US09446 LATITUDE 42-22.9 N LONGITUDE 140-40.6 E DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.397	32.439	23.912	5	15.271	32.387	23.900	5	15.168	32.393	23.927
10	15.399	32.442	23.914	10	15.282	32.421	23.923	10	15.170	32.390	23.924
20	15.384	32.444	23.919	20	15.289	32.422	23.923	20	15.137	32.471	23.993
30	13.889	32.899	24.586	30	12.785	32.907	24.814	30	13.296	32.931	24.732
40	12.236	33.123	25.087	40	11.659	33.132	25.202	40	12.208	33.152	25.115
50	11.328	33.212	25.325	50	10.256	33.123	25.443	50	10.692	33.130	25.373
75	8.738	33.352	25.869	75	8.058	33.307	25.936				

STATION US09447 LATITUDE 42-21.1 N LONGITUDE 140-36.7 E DEPTH (m) 87				STATION US09448 LATITUDE 42-25.0 N LONGITUDE 140-36.4 E DEPTH (m) 87				STATION US09449 LATITUDE 42-17.7 N LONGITUDE 140-39.9 E DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.442	32.466	23.923	5	15.110	32.392	23.938	5	15.349	32.431	23.916
10	15.445	32.465	23.922	10	15.103	32.393	23.941	10	15.295	32.428	23.926
20	15.449	32.465	23.921	20	15.170	32.436	23.959	20	15.193	32.416	23.939
30	15.119	32.744	24.207	30	13.381	32.919	24.705	30	13.773	33.029	24.711
40	13.164	33.146	24.925	40	12.515	33.123	25.034	40	12.669	33.164	25.035
50	11.934	33.177	25.186	50	11.123	33.177	25.335	50	11.588	33.195	25.264
75	7.478	33.329	26.037	75	7.542	33.317	26.018	75	8.752	33.356	25.869
STATION US09450 LATITUDE 42-15.2 N LONGITUDE 140-41.2 E DEPTH (m) 83				STATION US09451 LATITUDE 41-30.0 N LONGITUDE 139-15.1 E DEPTH (m) 1132				STATION US09452 LATITUDE 41-30.0 N LONGITUDE 139-10.1 E DEPTH (m) 1183			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.290	32.419	23.920	5	16.094	33.514	24.584	5	15.629	33.538	24.706
10	15.262	32.421	23.928	10	15.983	33.523	24.616	10	15.623	33.539	24.709
20	15.248	32.431	23.939	20	15.946	33.531	24.630	20	15.608	33.545	24.717
30	13.798	33.011	24.692	30	14.876	33.639	24.950	30	15.593	33.550	24.724
40	12.392	33.165	25.090	40	9.153	33.986	26.300	40	8.719	33.911	26.309
50	11.372	33.239	25.338	50	7.088	34.065	26.670	50	6.395	34.044	26.747
75	8.917	33.363	25.850	75	4.704	34.082	26.981	75	4.181	34.070	27.028
				100	3.247	34.052	27.106	100	3.096	34.060	27.126
				125	2.564	34.065	27.177	125	2.349	34.068	27.197
				150	2.049	34.066	27.220	150	2.003	34.069	27.225
				175	1.710	34.069	27.248	175	1.745	34.070	27.246
				200	1.443	34.066	27.265	200	1.501	34.066	27.261
STATION US09453 LATITUDE 41-29.9 N LONGITUDE 139-05.5 E DEPTH (m) 1140											
Press.	Temp.	Salinity	Sigma-T								
5	16.296	33.453	24.491								
10	16.300	33.451	24.488								
20	16.247	33.462	24.509								
30	16.149	33.473	24.539								
40	10.015	33.919	26.105								
50	6.594	34.024	26.704								
75	4.638	34.073	26.981								
100	3.242	34.069	27.120								
125	2.433	34.067	27.190								
150	1.959	34.068	27.228								
175	1.701	34.069	27.248								
200	1.426	34.066	27.266								