



HOKKAIDO UNIVERSITY

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THE “USHIO MARU”

CRUISE 170

CRUISE 171

CRUISE 172

IN JUNE-JULY 2009

1. Cruise Itinerary

Cruise 170

Departure from Hakodate	Jun.	8	, 2009
Start trawl net research		8	
Start hydrographic research (US09182)		8	
Arrival at Aomori		8	
Departure from Aomori		9	
Arrival at Noheji		9	
Departure from Noheji		10	
Finish trawl net research		10	
Finish hydrographic research (US09204)		10	
Return to Hakodate		11	
Total coverage 199.0 miles			

Cruise 171

Departure from Hakodate	Jun.	16	, 2009
Arrival at Usujiri		16	
Departure from Usujiri		17	
Start hydrographic research (US09205) and frame trawl net sampling		17	
Arrival at Usujiri		19	
Departure from Usujiri		20	
Retrieval sediment trap system		20	
Finish hydrographic research (US09213) and frame trawl net sampling		20	
Set sediment trap system		20	
Arrival at Usujiri		20	
Departure from Usujiri		24	
Return to Hakodate		24	
Total coverage 314.8 miles			

Cruise 172

Departure from Hakodate	Jun.	29	, 2009
Arrival at and departure from Otaru		30	
Start hydrographic research (US09214)		30	
Arrival at Oniwaki	Jul.	1	
Departure from Oniwaki		2	
Arrival at Wakkanai		2	
Departure from Wakkanai		3	
Arrival at Nemuro		6	
Departure from Nemuro		7	
Finish hydrographic research (US09288)		9	
Arrival at Kushiro		9	
Departure from Kushiro		11	
Return to Hakodate		12	
Total coverage 1159.8 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 170

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Tetsuya Takatsu
Graduate Students:	Chair of Marine Bioresource Science:		2 persons
Under Graduate Students:	Department of Marine Biological Science:		5 persons

Cruise 171

Research Staff:	Associate Professor	(Laboratory of Marine Environmental Science)	Toshikuni Nakatani
	Associate Professor	(Laboratory of Marine Bioresource and Environment Sensing)	Tohru Mukai
Graduate Students:	Chair of Marine Bioresource and Environmental Sensing:		5 persons
	Chair of Marine Bioresource Science:		3 persons
Under Graduate Students:	Department of Marine Biology:		1 person
	Department of Applied Marine Science:		2 persons

Cruise 172

Research Staff:	Professor	(Laboratory of Marine Environmental Science)	Shigeru Montani
	Assistant Professor	(Laboratory of Marine Environmental Science)	Isao Kudo
Guest Scientist (Domestic):	Professor	(University of Toyama)	Zhang Jing
Graduate Students:	Graduate School of Environmental Science:		6 persons
Graduate Students (Domestic):	University of Toyama:		2 person
Under Graduate Students:	Department of Marine Biology:		2 persons
Under Graduate Students (Domestic):	University of Toyama:		2 persons

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”.

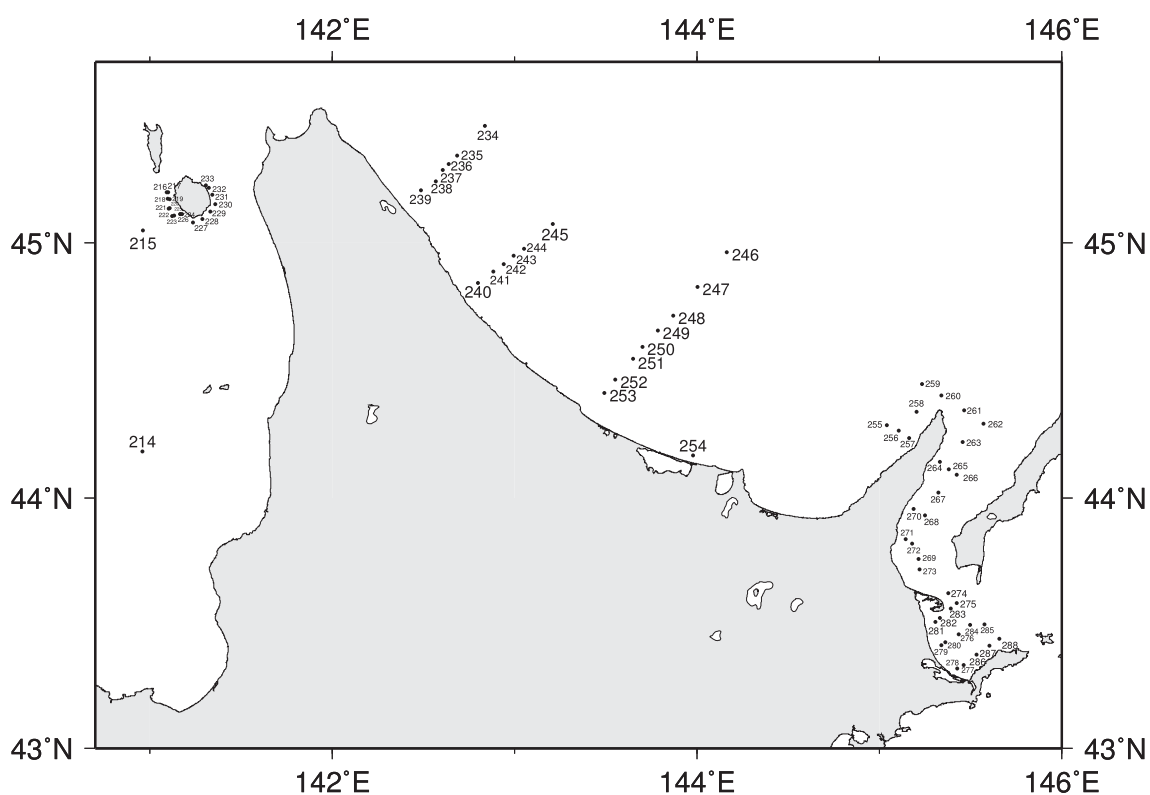


Figure 1: Oceanographic stations (Cruise 172)

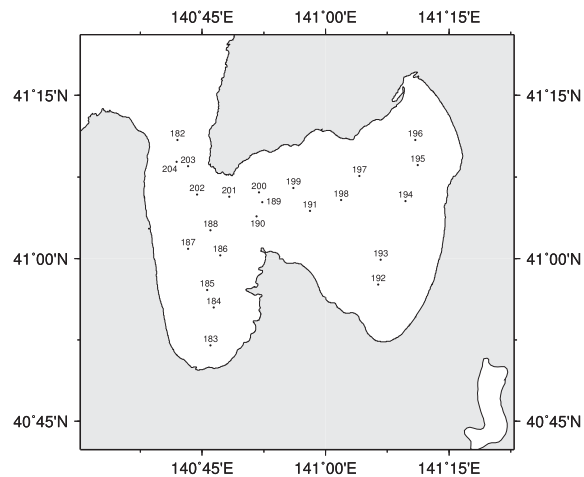


Figure 2: Oceanographic stations (Cruise 170)

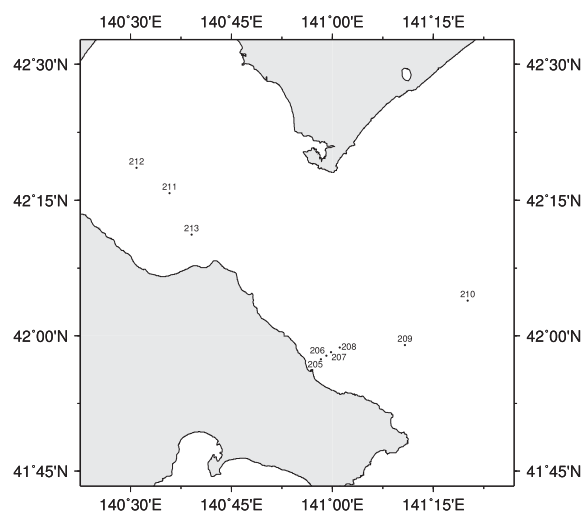


Figure 3: Oceanographic stations (Cruise 171)

Table 1: List of oceanographic stations

Cruise 170													
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)	
US09182	41-10.9	140-42.0	6/8	1254-1257	73	East-2	South-1	East-4	15.2	13.4	c	1015.2	
US09183	40-52.0	140-46.0	6/9	0632-0634	28	WSW-1	North-1	WSW-2	14.8	13.7	c	1015.6	
US09184	40-55.5	140-46.4	6/9	0722-0725	43	West-2	SW-1	West-4	15.3	13.5	o	1016.1	
US09185	40-57.1	140-45.9	6/9	0813-0816	50	West-1	SW-1	West-3	15.8	13.4	o	1015.3	
US09186	41-00.3	140-47.2	6/9	0925-0928	52	SW-1	SW-1	SW-2	15.1	13.1	c	1016.0	
US09187	41-00.9	140-43.3	6/9	1047-1050	56	NE-1	South-1	NE-1	16.1	12.9	c	1015.7	
US09188	41-02.6	140-46.0	6/9	1121-1123	52	Calm	South-1	Calm	16.7	13.0	c	1015.1	
US09189	41-05.2	140-46.3	6/9	1224-1227	53	West-1	South-1	West-3	15.9	12.9	c	1015.2	
US09190	41-03.9	140-51.6	6/9	1337-1340	51	NW-1	South-1	NW-3	15.4	12.9	c	1015.2	
US09191	41-04.4	140-58.1	6/9	1422-1425	50	West-1	West-1	West-2	16.9	12.8	c	1014.2	
US09192	40-57.6	141-06.4	6/9	1553-1556	39	West-1	NW-1	West-2	16.0	14.3	bc	1014.1	
US09193	40-59.9	141-06.7	6/10	0712-0715	44	Calm	West-1	Calm	12.6	13.4	f	1011.0	
US09194	41-05.3	141-09.7	6/10	0925-0928	40	Calm	North-1	Calm	16.3	14.5	bc	1010.2	
US09195	41-08.6	141-11.2	6/10	1014-1017	35	Calm	North-1	Calm	17.4	14.8	bc	1009.7	
US09196	41-10.9	141-10.9	6/10	1047-1050	31	Calm	SW-1	Calm	19.1	15.2	bc	1009.6	
US09197	41-07.6	141-04.1	6/10	1227-1230	39	Calm	SW-1	Calm	20.7	15.6	bc	1008.5	
US09198	41-05.4	141-01.9	6/10	1335-1338	47	SE-2	SE-1	SE-4	17.5	14.5	bc	1007.7	
US09199	41-06.5	140-56.1	6/10	1420-1423	47	SE-3	SE-1	SE-5	16.3	14.2	o	1007.6	
US09200	41-06.1	140-51.9	6/10	1446-1449	53	East-3	SE-1	East-5	15.3	12.6	o	1007.2	
US09201	41-05.7	140-48.3	6/10	1510-1514	59	East-3	SE-1	East-5	15.3	13.2	o	1007.1	
US09202	41-05.9	140-44.4	6/10	1601-1605	62	East-3	SE-1	East-5	14.9	13.6	o	1007.0	
US09203	41-08.5	140-41.3	6/10	1639-1643	82	East-1	SE-1	East-2	13.6	13.9	o	1006.2	
US09204	41-08.9	140-41.9	6/10	1655-1700	56	SE-1	SE-1	SE-3	15.6	15.0	o	1006.2	
Cruise 171													
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)	
US09205	41-57.4	140-58.3	6/17	1138-1142	79	East-1	East-1	East-3	11.1	11.6	o	1019.2	
US09206	41-57.8	140-59.1	6/17	1147-1151	85	East-1	East-1	East-3	10.9	11.6	o	1019.2	
US09207	41-58.2	140-58.8	6/17	1155-1159	89	East-1	East-1	East-3	11.2	12.1	o	1019.2	
US09208	41-58.7	141-01.1	6/17	1206-1210	96	East-1	East-1	East-3	11.1	12.3	o	1019.2	
US09209	41-59.0	141-10.8	6/17	1257-1303	168	East-1	East-1	East-3	11.6	12.3	o	1019.1	
US09210	42-03.9	141-20.1	6/17	1455-1506	325	East-1	East-1	East-3	11.5	11.3	o	1018.7	
US09211	42-15.8	140-35.8	6/20	0815-0823	92	East-4	East-2	East-6	12.0	12.3	o	1014.5	
US09212	42-18.6	140-30.9	6/20	0945-0952	93	East-3	East-2	East-5	11.9	12.5	o	1014.6	
US09213	42-11.2	140-39.1	6/20	1404-1409	87	ESE-3	SE-1	ESE-5	12.1	11.5	o	1012.6	
Cruise 172													
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)	
US09214	44-11.0	140-57.5	6/30	2200-2228	301	NE-1	NE-1	NE-3	17.5	16.0	o	1006.1	
US09215	45-03.0	140-57.7	7/1	0349-0400	118	ENE-3	NE-1	ENE-5	14.4	14.3	r	1004.5	
US09216	45-11.8	141-05.5	7/1	0557-0604	75	NNE-3	NNE-1	NNE-5	13.5	14.1	r	1005.1	
US09217	45-06.3	141-06.0	7/1	0626-0635	64	NNE-3	NNE-1	NNE-5	13.4	14.0	r	1005.2	
US09218	45-10.3	141-05.8	7/1	0700-0708	76	NNE-3	NNE-1	NNE-5	13.7	14.0	c	1005.1	
US09219	45-10.2	141-06.4	7/1	0730-0741	67	NNE-3	NNE-1	NNE-4	14.1	14.0	c	1005.1	
US09220	45-08.1	141-06.4	7/1	0832-0840	67	NNW-2	NNW-1	NNW-3	15.7	14.2	c	1005.0	
US09221	45-08.0	141-06.1	7/1	0854-0857	76	NNW-2	NNW-1	NNW-4	14.1	14.0	c	1005.0	
US09222	45-06.3	141-07.3	7/1	0922-0930	71	East-2	NNW-1	East-4	16.5	14.2	o	1005.0	
US09223	45-06.4	141-07.9	7/1	0942-0951	64	East-2	NNW-1	East-4	16.4	14.3	c	1004.0	
US09224	45-06.8	141-10.5	7/1	1006-1013	39	ESE-2	ESE-1	ESE-4	16.7	14.3	c	1004.2	
US09225	45-06.8	141-09.9	7/1	1048-1059	49	ESE-2	ESE-1	ESE-4	18.1	14.5	c	1004.0	
US09226	45-06.8	141-10.1	7/1	1140-1148	74	ESE-2	ESE-1	ESE-4	16.8	14.2	c	1004.2	
US09227	45-04.8	141-14.2	7/1	1246-1256	74	ENE-2	ESE-1	ENE-4	17.5	14.6	r	1004.3	
US09228	45-05.6	141-17.3	7/1	1315-1323	74	NNE-1	ESE-1	NNE-4	17.2	14.4	o	1004.0	
US09229	45-07.3	141-19.9	7/1	1341-1348	69	NE-1	South-1	NE-3	16.9	14.5	r	1004.2	
US09230	45-09.1	141-21.4	7/1	1402-1412	72	NE-1	South-1	NE-3	15.9	14.7	r	1004.2	
US09231	45-11.2	141-20.5	7/1	1425-1436	60	ENE-1	North-1	ENE-3	15.3	14.7	r	1004.4	
US09232	45-12.9	141-19.3	7/1	1450-1459	55	East-1	North-1	East-2	15.1	15.2	r	1004.5	
US09233	45-13.5	141-18.4	7/1	1511-1514	42	East-1	North-1	East-3	15.3	14.7	r	1004.5	
US09234	45-27.2	142-50.2	7/3	1202-1211	119	NE-1	East-1	NE-3	9.6	8.3	o	1007.1	
US09235	45-20.4	142-41.1	7/3	1307-1315	96	NE-1	NE-2	NE-8	11.0	11.8	o	1007.2	
US09236	45-18.4	142-38.3	7/3	1333-1340	88	NE-1	East-1	NE-3	10.9	10.1	o	1007.1	
US09237	45-17.0	142-36.3	7/3	1354-1400	80	NE-1	East-1	NE-2	11.4	10.8	o	1007.1	
US09238	45-14.4	142-34.0	7/3	1416-1422	67	East-1	East-1	East-3	12.0	11.6	o	1007.2	
US09239	45-12.1	142-29.1	7/3	1452-1456	49	NE-1	East-1	NE-3	13.0	12.3	o	1007.2	
US09240	45-10.7	142-27.9	7/3	1706-1712	50	East-1	East-1	East-1	11.5	11.4	c	1007.2	
US09241	44-53.3	142-53.0	7/3	1744-1751	87	ENE-1	East-1	ENE-2	10.9	11.0	o	1008.6	
US09242	44-55.1	142-56.3	7/3	1815-1823	113	ENE-1	East-1	ENE-2	10.3	9.6	o	1008.6	
US09243	44-57.0	142-59.7	7/3	1844-1853	126	Calm	East-1	Calm	10.2	9.3	o	1008.9	
US09244	44-58.7	143-03.0	7/3	1915-1923	131	ENE-2	East-1	ENE-2	10.0	9.3	o	1009.1	
US09245	45-04.4	143-12.6	7/3	2018-2029	138	Calm	ENE-1	Calm	9.7	9.0	o	1009.7	
US09246	44-57.8	144-09.7	7/4	0554-0610	230	Calm	ENE-1	Calm	9.9	8.3	o	1011.9	
US09247	44-49.7	144-00.1	7/4	0726-0740	185	SE-1	ENE-1	SE-2	10.9	9.0	o	1012.3	
US09248	44-43.0	143-52.1	7/4	0844-0858	169	Calm	ENE-1	Calm	11.8	10.4	o	1012.6	
US09249	44-39.5	143-47.1	7/4	1054-1105	159	NE-1	East-1	NE-2	12.5	9.8	o	1012.6	
US09250	44-35.7	143-42.1	7/4	1140-1151	148	NE-1	East-1	NE-2	14.2	12.0	c	1012.8	
US09251	44-32.9	143-38.9	7/4	1217-1226	135	ENE-2	East-1	ENE-4	13.8	9.2	bc	1012.6	
US09252	44-28.0	143-33.1	7/4	1407-1411	83	NE-1	East-1	NE-2	14.6	13.4	bc	1012.5	
US09253	44-24.8	143-29.4	7/4	1443-1448	58	East-1	East-1	East-2	16.8	14.6	bc	1012.5	
US09254	44-10.1	143-58.7	7/4	1713-1711	38	ENE-1	East-1	ENE-2	15.0	15.2	bc	1011.4	
US09255	44-17.2	145-02.5	7/5	0709-0727	769	Calm	NE-1	Calm	14.0	12.4	c	1014.2	
US09256	44-15.9	145-06.3	7/5	0746-0803	776	WSW-1	NE-1	WSW-2	14.5	14.5	c	1014.3	
US09257	44-14.2	145-09.8	7/5	0823-0838	280	Calm	NE-1	Calm	15.3	14.5	bc	1014.4	
US09258	44-20.4	145-12.2	7/5	0910-0928	931	SSW-1	North-1	SSW-3	17.6	14.6	bc	1013.9	
US09259	44-26.9	145-14.0	7/5	1001-1017	1692	Calm	North-1	Calm	15.5	12.7	c	1013.9	
US09260	44-24.2	145-20.4	7/5	1052-1109	575	SSW-1	North-1	SSW-3	16.6	14.1	c	1013.9	
US09261	44-20.7	145-27.8	7/5	1151-1206	1738	SSW-1	South-1	SSW-3	13.1	11.4	bc	1014.0	
US09262	44-17.6	145-34.3	7/5	1243-1259	2327	SSW-1	South-1	SSW-2	11.2	11.2	bc	1014.0	
US09263	44-13.2	145-27.4	7/5	1337-1352	1512	SSW-1	South-1	SSW-2	15.2	11.8	bc	1013.8	
US09264	44-08.5	145-19.9	7/5	1436-1453	437	Calm	South-1	Calm	16.5	12.4	bc	1013.7	
US09265	44-06.8	145-22.8	7/5	1510-1527	785	Calm	South-1	Calm	16.3	12.4			

Table 2: Oceanographic data

STATION US09182				STATION US09183				STATION US09184			
LATITUDE 41-10.9				LATITUDE 40-52.0				LATITUDE 40-55.5			
LONGITUDE 140-42.0				LONGITUDE 140-46.0				LONGITUDE 140-46.4			
DEPTH (m) 73				DEPTH (m) 28				DEPTH (m) 43			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13.186	33.109	24.892	5	13.561	33.140	24.840	5	13.689	33.280	24.922
10	13.055	33.162	24.959	10	12.890	33.366	25.149	10	12.815	33.334	25.139
20	13.126	33.801	25.439	20	12.286	33.568	25.423	20	11.689	33.554	25.524
30	13.170	33.947	25.543					30	11.095	33.502	25.592
40	12.561	33.997	25.702					40	11.508	33.787	25.739
50	11.789	34.030	25.876								
STATION US09185				STATION US09186				STATION US09187			
LATITUDE 40-57.1				LATITUDE 41-00.3				LATITUDE 140-43.3			
LONGITUDE 140-45.6				LONGITUDE 140-47.2				LONGITUDE 140-46.3			
DEPTH (m) 50				DEPTH (m) 52				DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13.184	33.260	25.009	5	13.325	33.306	25.016	5	13.035	33.144	24.948
10	12.865	33.307	25.108	10	13.066	33.288	25.054	10	12.905	33.247	25.054
20	12.685	33.821	25.541	20	12.659	33.812	25.540	20	12.837	33.641	25.372
30	12.526	33.874	25.614	30	11.977	33.891	25.732	30	12.210	34.002	25.774
40	11.417	33.792	25.759	40	11.302	33.904	25.867	40	11.867	34.019	25.852
				50	10.694	33.884	25.960	50	11.263	34.005	25.953
STATION US09188				STATION US09189				STATION US09190			
LATITUDE 41-02.6				LATITUDE 41-05.2				LATITUDE 41-03.9			
LONGITUDE 140-46.0				LONGITUDE 140-52.3				LONGITUDE 140-51.6			
DEPTH (m) 52				DEPTH (m) 53				DEPTH (m) 51			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13.196	33.295	25.034	5	12.080	33.235	25.203	5	12.026	33.438	25.371
10	12.911	33.310	25.102	10	11.974	33.396	25.348	10	11.879	33.358	25.337
20	12.608	33.689	25.454	20	11.661	33.414	25.421	20	11.472	33.429	25.467
30	11.888	33.932	25.781	30	11.707	33.761	25.682	30	11.643	33.632	25.593
40	11.242	33.990	25.945	40	11.135	33.748	25.776	40	10.999	33.663	25.735
50	11.016	34.071	26.049	50	10.512	33.785	25.916	50	10.455	33.693	25.853
STATION US09191				STATION US09192				STATION US09193			
LATITUDE 41-04.4				LATITUDE 40-57.6				LATITUDE 40-59.9			
LONGITUDE 140-58.1				LONGITUDE 141-06.4				LONGITUDE 141-06.7			
DEPTH (m) 50				DEPTH (m) 39				DEPTH (m) 44			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13.593	33.055	24.768	5	13.709	32.887	24.615	5	13.571	33.057	24.774
10	13.083	33.027	24.849	10	13.318	32.986	24.770	10	12.833	33.048	24.913
20	11.890	33.164	25.184	20	11.129	33.311	25.437	20	12.122	33.158	25.135
30	11.351	33.744	25.734	30	10.584	33.641	25.791	30	10.176	33.410	25.681
40	10.812	33.741	25.829					40	10.180	33.764	25.957
50	10.516	33.837	25.956								
STATION US09194				STATION US09195				STATION US09196			
LATITUDE 41-05.3				LATITUDE 41-08.6				LATITUDE 41-10.9			
LONGITUDE 141-09.7				LONGITUDE 141-11.2				LONGITUDE 141-10.9			
DEPTH (m) 40				DEPTH (m) 35				DEPTH (m) 31			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13.490	33.270	24.955	5	13.266	33.164	24.918	5	13.690	33.186	24.849
10	13.124	33.195	24.970	10	12.861	33.067	24.923	10	12.818	33.027	24.901
20	11.857	33.085	25.129	20	11.326	33.287	25.383	20	11.273	33.334	25.429
30	10.709	33.409	25.588	30	9.247	33.455	25.869	30	9.171	33.438	25.868
STATION US09197				STATION US09198				STATION US09199			
LATITUDE 41-07.6				LATITUDE 41-05.4				LATITUDE 41-06.5			
LONGITUDE 141-04.1				LONGITUDE 141-01.9				LONGITUDE 140-56.1			
DEPTH (m) 39				DEPTH (m) 47				DEPTH (m) 47			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.120	33.133	24.720	5	13.999	33.093	24.714	5	14.142	32.944	24.569
10	13.302	33.114	24.872	10	13.697	33.030	24.727	10	13.782	33.058	24.732
20	12.684	33.090	24.976	20	12.922	33.069	24.913	20	11.154	33.245	25.382
30	11.661	33.524	25.506	30	11.213	33.338	25.444	30	11.112	33.729	25.766
				40	11.136	33.856	25.860	40	10.492	33.667	25.827
STATION US09200				STATION US09201				STATION US09202			
LATITUDE 41-06.1				LATITUDE 41-05.7				LATITUDE 41-05.9			
LONGITUDE 140-51.9				LONGITUDE 140-48.3				LONGITUDE 140-44.4			
DEPTH (m) 53				DEPTH (m) 59				DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	12.190	33.041	25.032	5	13.283	33.270	24.997	5	14.101	33.254	24.817
10	11.782	33.164	25.204	10	12.653	33.333	25.170	10	12.633	33.321	25.164
20	11.773	33.422	25.406	20	12.476	33.750	25.527	20	12.219	33.554	25.424
30	11.743	33.672	25.606	30	11.421	33.755	25.730	30	12.081	33.888	25.710
40	11.180	33.754	25.773	40	11.088	33.756	25.791	40	11.542	33.912	25.829
				50	10.622	33.736	25.858	50	10.718	33.936	25.997

STATION US09203 LATITUDE 41-08.5 N LONGITUDE 140-43.3 E DEPTH (m) 82				STATION US09204 LATITUDE 41-08.9 N LONGITUDE 140-41.9 E DEPTH (m) 56				STATION US09205 LATITUDE 41-57.4 N LONGITUDE 140-58.3 E DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.743	33.077	24.545	5	13.877	33.058	24.712	5	11.609	32.060	24.379
10	13.578	33.121	24.822	10	13.269	33.210	24.953	10	11.394	32.096	24.445
20	13.108	33.623	25.305	20	13.055	33.512	25.229	20	10.001	32.276	24.825
30	13.080	33.837	25.476	30	12.984	33.861	25.514	30	9.002	32.412	25.092
40	12.670	33.956	25.649	40	12.536	33.984	25.697	40	7.353	32.606	25.485
50	11.879	33.994	25.8 30	50	12.491	34.003	25.721	50	5.278	32.893	25.974
75	10.624	34.109	26.149					75	4.124	33.175	26.322
STATION US09206 LATITUDE 41-57.8 N LONGITUDE 140-59.1 E DEPTH (m) 85				STATION US09207 LATITUDE 41-58.2 N LONGITUDE 140-59.8 E DEPTH (m) 89				STATION US09208 LATITUDE 41-58.7 N LONGITUDE 141-01.1 E DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.953	32.036	24.296	5	12.424	32.025	24.200	5	12.748	32.014	24.130
10	11.955	32.036	24.296	10	12.227	32.049	24.256	10	12.616	32.061	24.191
20	9.972	32.263	24.820	20	9.802	32.305	24.880	20	8.815	32.474	25.169
30	8.370	32.486	25.246	30	7.318	32.621	25.502	30	9.761	33.409	25.750
40	6.293	32.716	25.712	40	6.721	33.004	25.884	40	8.035	33.406	26.017
50	4.937	32.954	26.060	50	6.190	33.103	26.030	50	7.158	33.444	26.171
75	5.532	33.413	26.355	75	5.612	33.412	26.345	75	5.746	33.464	26.370
STATION US09209 LATITUDE 41-59.0 N LONGITUDE 141-10.8 E DEPTH (m) 168				STATION US09210 LATITUDE 42-03.9 N LONGITUDE 141-20.1 E DEPTH (m) 325				STATION US09211 LATITUDE 42-15.8 N LONGITUDE 140-35.8 E DEPTH (m) 92			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	12.566	32.161	24.278	5	11.574	33.104	25.196	5	12.513	32.056	24.207
10	11.913	32.382	24.573	10	11.446	33.356	25.415	10	12.515	32.075	24.221
20	10.115	33.155	25.492	20	11.276	33.490	25.551	20	10.790	32.433	24.814
30	9.528	33.639	25.967	30	10.859	33.766	25.840	30	9.832	33.189	25.566
40	9.383	33.846	26.153	40	9.981	33.781	26.003	40	5.408	32.909	25.971
50	8.937	33.837	26.217	50	9.342	33.837	26.153	50	4.473	33.010	26.155
75	7.765	33.731	26.312	75	8.207	33.810	26.309	75	3.882	33.328	26.468
100	6.931	33.674	26.384	100	6.757	33.660	26.396				
125	6.553	33.716	26.467	125	6.688	33.716	26.449				
150	5.904	33.645	26.494	150	6.383	33.730	26.500				
				175	5.021	33.573	26.542				
				200	4.547	33.593	26.610				
				250	3.324	33.527	26.680				
STATION US09212 LATITUDE 42-18.6 N LONGITUDE 140-30.9 E DEPTH (m) 93				STATION US09213 LATITUDE 42-11.2 N LONGITUDE 140-39.1 E DEPTH (m) 87				STATION US09214 LATITUDE 44-11.0 N LONGITUDE 140-57.5 E DEPTH (m) 301			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	12.801	32.035	24.135	5	12.079	32.183	24.388	5	16.410	34.047	24.921
10	12.800	32.057	24.153	10	12.096	32.194	24.393	10	16.397	34.049	24.925
20	10.571	32.479	24.888	20	11.197	32.563	24.843	20	15.617	34.044	25.099
30	6.991	32.735	25.636	30	9.183	32.842	25.399	30	14.377	34.040	25.366
40	5.219	32.923	26.004	40	5.363	32.860	25.937	40	13.566	34.074	25.561
50	4.423	33.018	26.166	50	4.744	32.969	26.093	50	12.001	34.113	25.900
75	3.945	33.353	26.482	75	3.959	33.261	26.407	75	9.491	34.125	26.353
								100	7.952	34.109	26.581
								125	6.902	34.103	26.725
								150	6.197	34.099	26.816
								175	5.115	34.097	26.946
								200	4.500	34.106	27.022
								250	3.789	34.102	27.093
STATION US09215 LATITUDE 45-03.0 N LONGITUDE 140-57.7 E DEPTH (m) 118				STATION US09216 LATITUDE 45-11.8 N LONGITUDE 141-05.5 E DEPTH (m) 75				STATION US09217 LATITUDE 45-11.8 N LONGITUDE 141-06.0 E DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.541	33.766	25.120	5	14.388	33.798	25.176	5	14.476	33.762	25.130
10	14.540	33.770	25.123	10	14.385	33.806	25.183	10	14.385	33.796	25.176
20	14.269	33.776	25.185	20	13.785	33.798	25.303	20	13.844	33.807	25.298
30	12.127	33.890	25.703	30	12.534	33.869	25.609	30	12.512	33.879	25.620
40	10.015	33.973	26.147	40	10.221	34.012	26.143	40	10.051	34.003	26.165
50	9.396	34.024	26.290	50	9.589	34.016	26.252	50	9.752	34.009	26.220
75	7.949	34.064	26.547								
100	6.798	34.086	26.726								

STATION US09218 LATITUDE 45-10.3 N LONGITUDE 141-05.8 E DEPTH (m) 76				STATION US09219 LATITUDE 45-10.2 N LONGITUDE 141-06.4 E DEPTH (m) 67				STATION US09220 LATITUDE 45-08.1 N LONGITUDE 141-06.4 E DEPTH (m) 67			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.277	33.804	25.205	5	14.533	33.774	25.128	5	14.369	33.822	25.200
10	14.273	33.805	25.206	10	14.331	33.798	25.189	10	14.318	33.825	25.212
20	14.183	33.828	25.243	20	14.142	33.822	25.247	20	14.137	33.832	25.256
30	11.529	33.926	25.843	30	11.390	33.923	25.866	30	11.387	33.941	25.881
40	10.347	34.015	26.123	40	10.189	34.024	26.157	40	10.384	34.016	26.118
50	9.693	34.027	26.243	50	9.486	34.036	26.285	50	9.612	34.016	26.249
STATION US09221 LATITUDE 45-08.0 N LONGITUDE 141-06.1 E DEPTH (m) 76				STATION US09222 LATITUDE 45-06.3 N LONGITUDE 141-07.3 E DEPTH (m) 71				STATION US09223 LATITUDE 45-06.4 N LONGITUDE 141-07.9 E DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.330	33.818	25.205	5	14.511	33.837	25.181	5	14.540	33.838	25.176
10	14.342	33.833	25.213	10	14.419	33.841	25.204	10	14.424	33.842	25.203
20	14.132	33.834	25.259	20	14.274	33.845	25.237	20	14.257	33.844	25.240
30	11.107	33.951	25.940	30	12.047	33.851	25.688	30	11.333	33.908	25.865
40	10.742	34.019	26.058	40	10.339	34.005	26.117	40	10.129	34.011	26.158
50	9.935	34.040	26.213	50	9.747	34.032	26.239	50	9.726	34.033	26.242
STATION US09224 LATITUDE 45-06.8 N LONGITUDE 141-10.5 E DEPTH (m) 39				STATION US09225 LATITUDE 45-06.8 N LONGITUDE 141-09.9 E DEPTH (m) 49				STATION US09226 LATITUDE 45-06.8 N LONGITUDE 141-10.1 E DEPTH (m) 44			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.483	33.813	25.168	5	14.583	33.803	25.139	5	14.731	33.788	25.096
10	14.432	33.823	25.187	10	14.433	33.816	25.181	10	14.447	33.804	25.169
20	14.306	33.837	25.224	20	14.161	33.831	25.250	20	14.210	33.831	25.240
30	11.391	33.889	25.839	30	10.693	33.951	26.013	30	11.209	33.936	25.909
				40	9.769	34.011	26.219	40	9.792	34.016	26.219
STATION US09227 LATITUDE 45-04.8 N LONGITUDE 141-14.2 E DEPTH (m) 74				STATION US09228 LATITUDE 45-05.6 N LONGITUDE 141-17.3 E DEPTH (m) 74				STATION US09229 LATITUDE 45-07.3 N LONGITUDE 141-19.9 E DEPTH (m) 69			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.917	33.763	25.037	5	14.619	33.814	25.140	5	14.675	33.824	25.136
10	14.562	33.812	25.151	10	14.552	33.809	25.150	10	14.663	33.823	25.137
20	13.712	33.832	25.344	20	13.703	33.828	25.343	20	14.568	33.814	25.151
30	11.386	33.930	25.872	30	11.405	33.940	25.877	30	13.976	33.830	25.288
40	10.006	34.007	26.175	40	10.003	34.003	26.173	40	9.034	33.992	26.323
50	9.498	34.001	26.255	50	9.188	34.023	26.323	50	8.679	34.037	26.415
STATION US09230 LATITUDE 45-09.1 N LONGITUDE 141-21.4 E DEPTH (m) 72				STATION US09231 LATITUDE 45-11.2 N LONGITUDE 141-20.5 E DEPTH (m) 60				STATION US09232 LATITUDE 45-12.9 N LONGITUDE 141-19.3 E DEPTH (m) 55			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.823	33.794	25.080	5	14.882	33.773	25.052	5	13.609	33.830	25.363
10	14.790	33.793	25.087	10	14.485	33.786	25.147	10	12.754	33.869	25.566
20	14.576	33.829	25.161	20	12.545	33.871	25.608	20	11.480	33.925	25.851
30	11.317	33.882	25.847	30	10.858	33.947	25.981	30	10.851	33.962	25.994
40	10.152	33.976	26.127	40	9.789	33.991	26.199	40	10.377	33.985	26.095
50	9.266	34.007	26.298	50	8.410	34.042	26.460	50	9.582	34.013	26.251
STATION US09233 LATITUDE 45-13.5 N LONGITUDE 141-18.4 E DEPTH (m) 42				STATION US09234 LATITUDE 45-27.2 N LONGITUDE 142-50.2 E DEPTH (m) 119				STATION US09235 LATITUDE 45-20.4 N LONGITUDE 142-41.1 E DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.227	33.654	25.099	5	8.707	32.150	24.932	5	7.470	33.229	25.959
10	13.286	33.779	25.390	10	8.453	32.131	24.955	10	6.816	33.171	26.003
20	12.130	33.884	25.698	20	4.039	32.573	25.852	20	6.326	33.225	26.109
30	11.664	33.926	25.818	30	1.399	32.650	26.131	30	5.673	33.444	26.363
				40	-0.707	32.787	26.350	40	5.823	33.762	26.596
				50	-0.875	32.878	26.429	50	6.404	33.912	26.641
				75	-1.228	33.023	26.558	75	6.466	33.920	26.639
				100	-0.433	33.134	26.619				
STATION US09236 LATITUDE 45-18.4 N LONGITUDE 142-38.3 E DEPTH (m) 88				STATION US09237 LATITUDE 45-17.0 N LONGITUDE 142-36.3 E DEPTH (m) 80				STATION US09238 LATITUDE 45-14.4 N LONGITUDE 142-34.0 E DEPTH (m) 67			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	9.386	33.652	26.001	5	11.055	33.711	25.762	5	11.845	33.856	25.730
10	9.116	33.698	26.080	10	10.615	33.703	25.834	10	11.247	33.876	25.856
20	9.334	33.961	26.251	20	10.163	33.908	26.072	20	10.874	33.895	25.937
30	9.272	33.962	26.262	30	10.156	33.924	26.086	30	10.861	33.902	25.945
40	9.218	33.963	26.271	40	10.139	33.930	26.093	40	10.869	33.902	25.944
50	9.194	33.964	26.276	50	10.083	33.933	26.105	50	10.840	33.902	25.949
75	8.906	33.970	26.326	75	10.014	33.937	26.119				

STATION LATITUDE LONGITUDE DEPTH (m)				US09239 45-12.3 N 142-29.1 E 49			
Press.	Temp.	Salinity	Sigma-T				
5	12.222	33.813	25.625				
10	11.993	33.838	25.688				
20	11.858	33.852	25.724				
30	11.796	33.857	25.740				
40	11.780	33.859	25.744				

STATION LATITUDE LONGITUDE DEPTH (m)				US09242 44-55.1 N 142-56.3 E 113			
Press.	Temp.	Salinity	Sigma-T				
5	8.994	32.586	25.229				
10	8.645	32.876	25.510				
20	8.996	33.450	25.905				
30	4.113	32.914	26.116				
40	5.438	33.362	26.327				
50	5.518	33.419	26.362				
75	5.925	33.635	26.484				
100	6.898	33.921	26.582				

STATION LATITUDE LONGITUDE DEPTH (m)				US09245 45-04.4 N 143-12.6 E 138			
Press.	Temp.	Salinity	Sigma-T				
5	7.490	32.728	25.563				
10	3.396	32.683	26.000				
20	0.180	32.767	26.295				
30	2.976	33.229	26.473				
40	1.229	33.109	26.510				
50	-0.830	33.033	26.553				
75	-0.726	33.088	26.594				
100	-0.359	33.172	26.647				
125	2.430	33.627	26.838				

STATION LATITUDE LONGITUDE DEPTH (m)				US09248 44-43.0 N 143-52.1 E 169			
Press.	Temp.	Salinity	Sigma-T				
5	8.750	32.406	25.126				
10	7.864	32.544	25.365				
20	2.327	32.569	26.000				
30	0.687	32.730	26.239				
40	-0.069	32.869	26.389				
50	-0.324	32.927	26.447				
75	-0.438	33.136	26.621				
100	-0.030	33.213	26.665				
125	2.355	33.505	26.747				
150	4.447	33.912	26.874				

STATION LATITUDE LONGITUDE DEPTH (m)				US09251 44-32.9 N 143-38.9 E 135			
Press.	Temp.	Salinity	Sigma-T				
5	7.218	33.033	25.840				
10	6.700	33.127	25.984				
20	6.790	33.805	26.506				
30	6.845	33.827	26.516				
40	6.774	33.845	26.540				
50	6.850	33.861	26.542				
75	6.709	33.866	26.565				
100	6.700	33.877	26.574				
125	6.736	33.900	26.588				

STATION LATITUDE LONGITUDE DEPTH (m)				US09254 44-10.1 N 143-58.7 E 38			
Press.	Temp.	Salinity	Sigma-T				
5	15.031	33.447	24.768				
10	14.400	33.557	24.989				
20	13.542	33.652	25.240				
30	13.270	33.716	25.344				

STATION LATITUDE LONGITUDE DEPTH (m)				US09240 44-50.7 N 142-47.9 E 50			
Press.	Temp.	Salinity	Sigma-T				
5	13.270	33.698	25.330				
10	13.096	33.713	25.377				
20	12.799	33.738	25.455				
30	12.693	33.749	25.485				
40	12.598	33.760	25.512				

STATION LATITUDE LONGITUDE DEPTH (m)				US09243 44-57.0 N 142-59.7 E 126			
Press.	Temp.	Salinity	Sigma-T				
5	9.356	32.095	24.789				
10	8.789	32.094	24.875				
20	3.987	32.325	25.660				
30	2.835	32.794	26.138				
40	4.068	33.125	26.288				
50	5.620	33.529	26.437				
75	5.361	33.673	26.581				
100	6.133	33.995	26.742				

STATION LATITUDE LONGITUDE DEPTH (m)				US09246 44-57.8 N 144-09.7 E 230			
Press.	Temp.	Salinity	Sigma-T				
5	8.067	32.392	25.217				
10	6.406	32.422	25.466				
20	3.136	32.558	25.925				
30	1.645	32.681	26.140				
40	0.424	32.813	26.320				
50	0.005	32.945	26.447				
75	-0.112	33.079	26.561				
100	-0.117	33.146	26.615				
125	-0.033	33.185	26.642				
150	-0.045	33.228	26.678				
175	0.083	33.281	26.715				
200	0.006	33.319	26.749				

STATION LATITUDE LONGITUDE DEPTH (m)				US09249 44-39.5 N 143-47.1 E 159			
Press.	Temp.	Salinity	Sigma-T				
5	9.245	32.796	25.354				
10	7.334	32.757	25.606				
20	5.218	33.174	26.203				
30	5.700	33.568	26.458				
40	2.474	33.211	26.502				
50	1.486	33.127	26.508				
75	1.406	33.263	26.622				
100	0.882	33.238	26.636				
125	3.821	33.672	26.748				
150	4.213	33.941	26.922				

STATION LATITUDE LONGITUDE DEPTH (m)				US09252 44-28.0 N 143-33.1 E 83			
Press.	Temp.	Salinity	Sigma-T				
5	13.400	33.719	25.320				
10	11.596	33.585	25.565				
20	9.911	33.904	26.111				
30	9.738	33.940	26.168				
40	9.121	33.870	26.214				
50	8.998	33.953	26.298				
75	7.166	33.772	26.428				

STATION LATITUDE LONGITUDE DEPTH (m)				US09255 44-17.2 N 145-02.5 E 769			
Press.	Temp.	Salinity	Sigma-T				
5	11.956	32.336	24.529				
10	9.688	32.393	24.968				
20	3.632	32.558	25.879				
30	0.820	32.719	26.222				
40	0.281	32.788	26.307				
50	0.137	32.865	26.376				
75	3.521	33.422	26.578				
100	2.869	33.445	26.655				
125	2.682	33.490	26.707				
150	3.425	33.622	26.746				
175	3.940	33.693	26.753				
200	3.690	33.689	26.774				
250	3.811	33.750	26.811				
300	3.784	33.767	26.827				

STATION LATITUDE LONGITUDE DEPTH (m)				US09241 44-53.3 N 142-53.0 E 87			
Press.	Temp.	Salinity	Sigma-T				
5	11.811	33.795	25.689				
10	11.246	33.799	25.796				
20	11.304	33.864	25.836				
30	10.638	33.845	25.941				
40	10.086	33.900	26.078				
50	9.633	33.899	26.154				
75	9.225	33.907	26.226				

STATION		US09244	
LATITUDE		44-58.7	
LONGITUDE		143-03.0	
DEPTH (m)		131	
Press.	Temp.	Salinity	Sigma-T
5	9.395	32.116	24.799
10	8.449	32.150	24.971
20	5.011	32.377	25.595
30	0.618	32.610	26.145
40	-0.143	32.769	26.312
50	-0.764	32.876	26.424
75	-0.387	33.162	26.640
100	4.795	33.856	26.792
125	5.561	33.934	26.764

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STATION US09269 LATITUDE 43-45.4 N LONGITUDE 145-12.9 E DEPTH (m) 86				STATION US09270 LATITUDE 43-57.4 N LONGITUDE 145-11.3 E DEPTH (m) 91				STATION US09271 LATITUDE 43-50.2 N LONGITUDE 145-08.7 E DEPTH (m) 34			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.897	32.463	24.638	5	10.819	32.775	25.075	5	11.306	31.890	24.301
10	10.529	32.945	25.258	10	10.607	33.377	25.581	10	9.185	32.843	25.400
20	10.313	33.564	25.778	20	10.475	33.574	25.757	20	9.951	33.401	25.712
30	10.270	33.618	25.827	30	10.485	33.643	25.810				
40	10.135	33.641	25.868	40	10.278	33.652	25.853				
50	9.923	33.639	25.902	50	9.934	33.673	25.927				
75	8.852	33.617	26.059	75	8.750	33.610	26.069				
STATION US09272 LATITUDE 43-49.1 N LONGITUDE 145-10.8 E DEPTH (m) 41				STATION US09273 LATITUDE 43-42.9 N LONGITUDE 145-13.2 E DEPTH (m) 17				STATION US09274 LATITUDE 43-37.3 N LONGITUDE 145-22.7 E DEPTH (m) 9			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	10.084	32.476	24.967	5	10.582	31.594	24.196	5	9.816	32.242	24.829
10	9.145	32.810	25.381	10	8.160	32.867	25.576				
20	8.830	33.155	25.700								
30	9.259	33.396	25.821								
STATION US09275 LATITUDE 43-34.9 N LONGITUDE 145-25.4 E DEPTH (m) 10				STATION US09276 LATITUDE 43-27.4 N LONGITUDE 145-26.1 E DEPTH (m) 19				STATION US09277 LATITUDE 43-20.0 N LONGITUDE 145-27.7 E DEPTH (m) 15			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	9.574	32.196	24.833	5	11.103	31.629	24.134	5	11.135	31.666	24.156
				10	9.881	31.961	24.600	10	9.644	31.857	24.556
STATION US09278 LATITUDE 43-19.2 N LONGITUDE 145-25.6 E DEPTH (m) 12				STATION US09279 LATITUDE 43-24.8 N LONGITUDE 145-20.3 E DEPTH (m) 10				STATION US09280 LATITUDE 43-25.5 N LONGITUDE 145-21.7 E DEPTH (m) 11			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.309	31.535	24.024	5	12.106	31.413	23.785	5	11.567	31.616	24.041
10	9.686	31.858	24.551								
STATION US09281 LATITUDE 43-30.4 N LONGITUDE 145-18.4 E DEPTH (m) 7				STATION US09282 LATITUDE 43-31.3 N LONGITUDE 145-19.9 E DEPTH (m) 7				STATION US09283 LATITUDE 43-33.6 N LONGITUDE 145-23.5 E DEPTH (m) 12			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
4	11.239	31.828	24.265	4	11.003	31.988	24.430	5	11.117	31.834	24.291
								10	11.122	31.843	24.296
STATION US09284 LATITUDE 43-29.7 N LONGITUDE 145-29.8 E DEPTH (m) 24				STATION US09285 LATITUDE 43-29.8 N LONGITUDE 145-34.6 E DEPTH (m) 30				STATION US09286 LATITUDE 43-22.6 N LONGITUDE 145-31.9 E DEPTH (m) 19			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	10.187	32.032	24.603	5	10.289	32.084	24.628	5	12.443	31.295	23.631
10	8.831	32.215	24.964	10	8.361	32.205	25.027	10	11.122	31.706	24.190
20	7.363	32.411	25.331	20	6.749	32.480	25.467				
STATION US09287 LATITUDE 43-24.7 N LONGITUDE 145-36.2 E DEPTH (m) 27				STATION US09288 LATITUDE 43-26.3 N LONGITUDE 145-39.5 E DEPTH (m) 31							
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T				
5	12.294	31.331	23.687	5	12.243	31.331	23.696				
10	9.655	31.977	24.648	10	11.701	31.496	23.924				
20	6.990	32.437	25.401	20	7.343	32.445	25.360				