



HOKKAIDO UNIVERSITY

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THE “USHIO MARU”

CRUISE 173

CRUISE 174

CRUISE 175

IN JULY-AUGUST 2009

1. Cruise Itinerary

Cruise 173		
Departure from Hakodate	Jul.	16 , 2009
Start hydrographic research (US09289)		16
Arrival at and departure from Usujiri		16
Start frame trawl net sampling		16
Finish frame trawl net sampling		18
Arrival at Usujiri		18
Departure from Usujiri		20
Start trawl net research		20
Arrival at Usujiri		20
Departure from Usujiri		21
Finish hydrographic research (US09303) and trawl net research		21
Arrival at Usujiri		21
Departure from Usujiri		22
Return to Hakodate		23
Total coverage 283.4 miles		
Cruise 174		
Departure from Hakodate	Aug.	1 , 2009
Start hydrographic research (US09304) and trawl net research		1
Arrival at Wakinosawa		1
Departure from Wakinosawa		2
Finish hydrographic research (US09317) and trawl net research		2
Arrival at Aomori		2
Departure from Aomori		3
Return to Hakodate		3
Total coverage 140.2 miles		
Cruise 175		
Departure from Hakodate	Aug.	18 , 2009
Start hydrographic research (US09318)		18
Arrival at Usujiri		18
Departure from Usujiri		19
Retrieval sediment trap system		19
Start trawl net research		19
Set sediment trap system		19
Arrival at Usujiri		19
Departure from Usujiri		20
Arrival at Muroran		20
Departure from Muroran		21
Finish trawl net research		21
Arrival at Usujiri		21
Departure from Usujiri		22
Research by bottom long line		22
Finish hydrographic research (US09343)		22
Arrival at Hakodate		23
Departure from Hakodate		24
Sampling by squid jigging		24
Return to Hakodate		25
Total coverage 339.4 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 173	
Research Staff:	Associate Professor	(Laboratory of Marine Bioresource and Environment Sensing)	Tohru Mukai
	Associate Professor	(Laboratory of Marine Industrial Science and Technology)	Yasuzumi Fujimori
	Associate Professor	(Laboratory of Marine Environmental Science)	Toshikuni Nakatani
Graduate Students:	Chair of Marine Bioresource and Environment Sensing:		4 persons
	Chair of Marine Industrial Science and Technology:		1 person
	Chair of Marine Bioresource Science:		5 persons
Under Graduate Students:	Department of Marine Biology:		2 persons
	Department of Applied Marine Science:		1 person
	Department of Applied Marine Science (Third grade):		1 person
		Cruise 174	
Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Tetsuya Takatsu
Practice Assistant (Graduate Students):		Chair of Marine Bioresource Science:	3 persons
Practice Assistant (Under Graduate Students):		Department of Marine Biological Science:	1 person
Student:	Teacher of Yokohama Senior High School		Akio Yasuda
	Teacher of Hokkaido Hakodate Fisheries High School		Jun Muraoka
	Teacher of Hokkaido Otaru Fisheries High School		Masahiro Umezaki
	Teacher of Hokkaido Otaru Fisheries High School		Takeshi Murakami
	Teacher of Hokkaido Akkeshi Syouyou High School		Satoshi Ishizawa
		Cruise 175	
Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Shigeru Montani
	Associate Professor	(Laboratory of Marine Industrial Science and Technology)	Isao Kudo
	Assistant Professor	(Laboratory of Marine Environmental Science)	Hiroji Onishi
Guest Scientist (Domestic):		(Ehime University)	Michinobu Kuwae
Graduate Students:	Chair of Marine Bioresource Science:		5 persons
	Chair of Marine Environmental Science:		3 persons
Under Graduate Students:	Department of Marine Biological Science:		2 persons
	Department of Applied Marine Science:		5 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”.

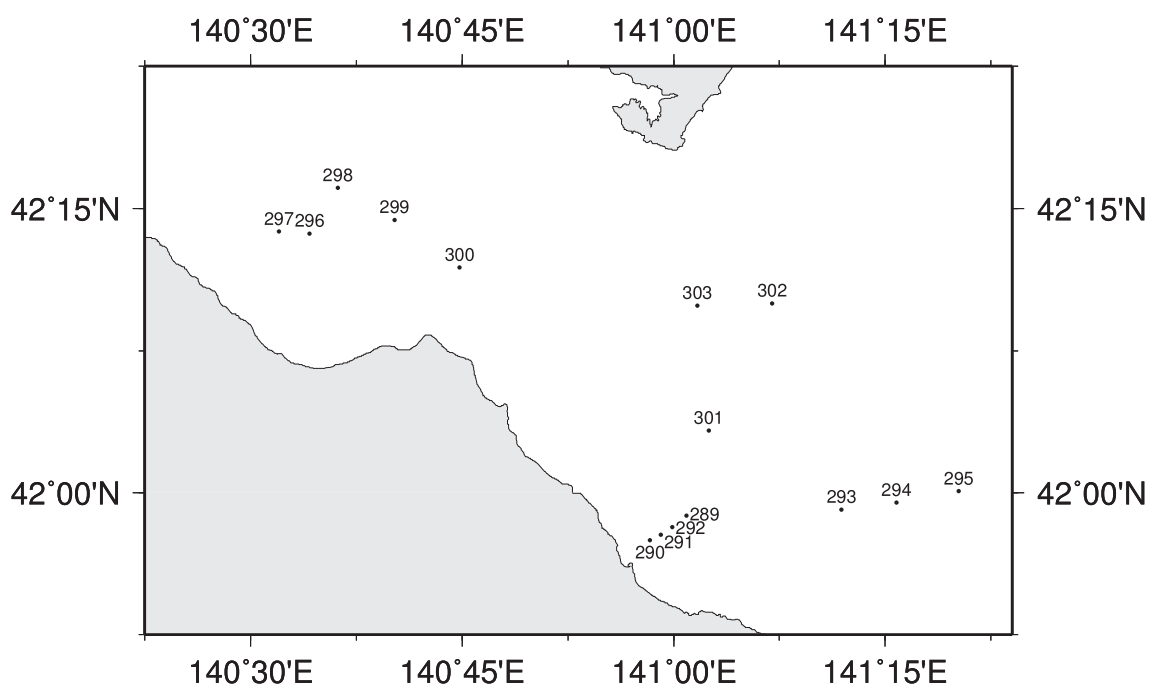


Figure 1: Oceanographic stations (Cruise 173)

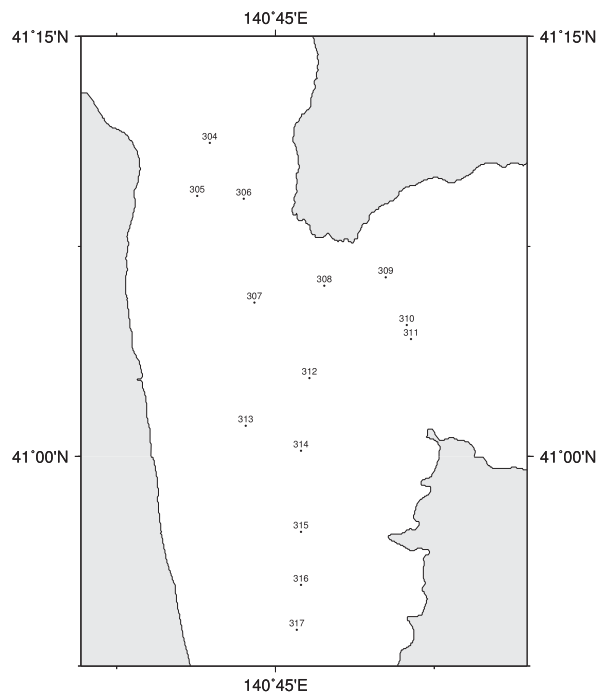


Figure 2: Oceanographic stations (Cruise 174)

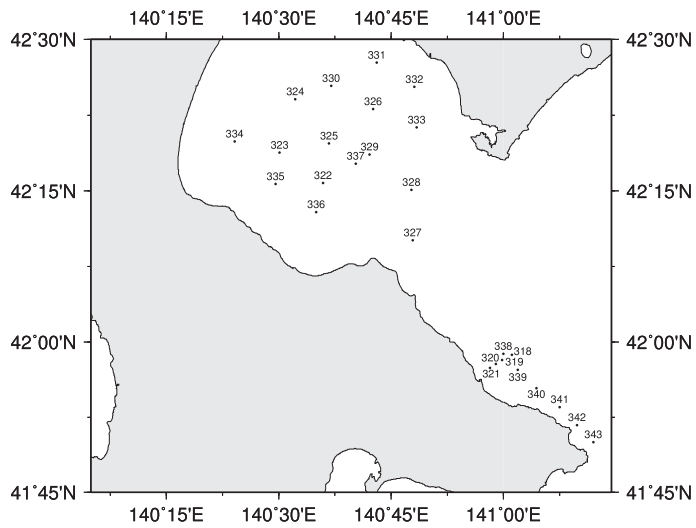


Figure 3: Oceanographic stations (Cruise 175)

Table 1: List of oceanographic stations

Cruise 173

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09289	41-58.8	141-00.9	7/16	1339-1344	96	NW -1	NW -1	NW -2	21.8	16.5	bc 1003.9
US09290	41-57.5	140-58.3	7/16	1526-1530	80	Calm	NW -1	Calm	21.8	16.9	c 1004.2
US09291	41-57.8	140-59.1	7/16	1536-1540	85	Calm	NW -1	Calm	21.5	16.9	c 1004.3
US09292	41-58.2	140-59.9	7/16	1546-1551	89	Calm	NW -1	Calm	21.9	16.4	c 1004.5
US09293	41-59.1	141-11.9	7/16	1647-1650	194	SE -1	NW -1	SE -3	18.2	15.2	c 1005.5
US09294	41-59.5	141-15.8	7/16	1817-1827	253	SE -1	NW -1	SE -2	18.3	15.7	c 1006.5
US09295	42-00.1	141-20.2	7/17	1727-1740	317	SE -1	SE -1	SE -3	17.2	16.3	bc 1010.2
US09296	42-13.7	140-34.2	7/20	1059-1103	87	NNW-2	NW -1	NNW-4	18.6	17.0	bc 1008.6
US09297	42-13.8	140-32.0	7/20	1115-1119	85	NNW-2	NW -1	NNW-4	18.6	17.1	bc 1008.7
US09298	42-16.1	140-36.2	7/20	1236-1240	91	NNW-2	NW -1	NNW-4	21.0	17.3	bc 1008.6
US09299	42-14.4	140-40.2	7/20	1325-1329	87	NNW-1	NW -1	NNW-3	22.9	17.3	bc 1008.6
US09300	42-11.9	140-44.8	7/20	1415-1420	93	WNW-1	NW -1	WNW-2	21.5	17.9	bc 1008.5
US09301	42-03.3	141-02.5	7/21	0734-0739	95	East-2	ENE-1	East-4	16.5	15.7	o 1008.6
US09302	42-10.0	141-07.0	7/21	0844-0849	98	East-3	ENE-1	East-5	16.1	16.1	r 1008.5
US09303	42-09.9	141-01.7	7/21	0934-0938	82	ESE-3	East-1	ESE-5	16.2	16.2	r 1008.4

Cruise 174

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09304	41-11.2	140-41.9	8/1	1252-1256	70	NW -1	South-1	NW -2	24.0	21.1	bc 1010.7
US09305	41-09.3	140-41.3	8/1	1319-1322	53	SE -2	South-1	SE -4	24.2	21.1	bc 1010.6
US09306	41-09.2	140-43.5	8/1	1334-1337	58	SE -2	SE -1	SE -4	22.9	20.9	bc 1010.5
US09307	41-05.5	140-44.0	8/1	1432-1436	62	East-3	East-1	East-5	21.5	20.7	c 1010.2
US09308	41-06.1	140-47.3	8/1	1454-1457	61	East-3	East-1	East-5	20.2	20.7	c 1010.1
US09309	41-06.4	140-50.2	8/1	1520-1523	52	East-3	East-1	East-5	19.7	20.0	c 1010.1
US09310	41-04.7	140-51.2	8/2	0649-0652	53	ENE-3	East-1	ENE-5	19.0	19.6	o 1009.6
US09311	41-04.2	140-51.4	8/2	0706-0709	52	ENE-3	East-1	ENE-5	18.5	19.7	o 1009.6
US09312	41-02.8	140-46.6	8/2	0735-0741	51	ENE-3	East-1	ENE-5	18.5	20.3	o 1009.7
US09313	41-01.1	140-43.6	8/2	0803-0807	56	ENE-3	East-1	ENE-5	18.7	20.3	o 1009.6
US09314	41-00.2	140-46.2	8/2	0852-0855	53	East-3	East-1	East-5	19.1	20.4	c 1009.6
US09315	40-57.3	140-46.2	8/2	0958-1001	50	ENE-3	East-1	ENE-5	19.4	20.7	c 1009.3
US09316	40-55.4	140-46.2	8/2	1020-1023	42	East-3	East-1	East-5	20.2	20.4	c 1009.1
US09317	40-53.8	140-46.0	8/2	1039-1042	36	East-3	East-1	East-5	20.5	21.0	c 1009.0

Cruise 175

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr. Bar. (hPa)
US09318	41-58.7	141-01.1	8/18	1307-1311	97	ESE-3	East-1	ESE-5	20.0	20.5	c 1019.6
US09319	41-58.2	140-59.8	8/18	1318-1322	88	SE -3	East-1	SE-5	20.3	20.3	c 1019.5
US09320	41-57.8	140-59.0	8/18	1329-1333	84	SE -3	East-1	SE-5	20.2	20.1	c 1019.4
US09321	41-57.4	140-58.2	8/18	1339-1344	78	ESE-3	East-1	ESE-5	20.2	19.6	c 1019.2
US09322	42-15.8	140-35.9	8/19	0857-0906	90	SE -3	East-1	SE-5	19.8	20.2	r 1017.1
US09323	42-18.8	140-30.1	8/19	1103-1111	91	SE -3	East-1	SE-5	20.1	20.2	o 1017.0
US09324	42-24.1	140-32.2	8/19	1234-1243	95	ESE-3	East-1	ESE-5	19.8	20.4	o 1016.2
US09325	42-19.7	140-36.7	8/19	1422-1427	88	East-3	East-1	East-5	19.9	19.9	o 1015.6
US09326	42-23.1	140-42.6	8/19	1520-1524	61	ESE-3	East-1	ESE-5	19.4	20.2	o 1015.1
US09327	42-10.1	140-47.9	8/20	0732-0736	91	ESE-2	East-1	ESE-4	19.8	20.1	f 1012.1
US09328	42-15.1	140-47.7	8/20	0816-0820	71	East-3	East-1	East-5	19.5	18.3	f 1012.1
US09329	42-18.6	140-42.1	8/20	0928-0932	66	East-3	East-1	East-5	19.6	20.0	f 1011.6
US09330	42-25.4	140-37.0	8/20	1036-1040	84	East-3	East-1	East-5	19.4	20.2	f 1011.2
US09331	42-27.7	140-43.1	8/20	1148-1151	61	ESE-3	ESE-1	ESE-5	19.7	20.1	o 1010.6
US09332	42-25.3	140-48.1	8/20	1226-1229	45	ESE-4	ESE-1	ESE-6	20.2	20.7	o 1010.2
US09333	42-21.3	140-48.4	8/20	1259-1302	51	ESE-3	ESE-1	ESE-5	20.3	20.4	r 1009.8
US09334	42-19.9	140-24.1	8/21	1452-1455	61	WSW-3	ESE-1	WSW-5	25.0	20.9	bc 998.2
US09335	42-15.7	140-29.6	8/21	1610-1614	84	SW -2	ESE-1	SW -4	24.0	21.1	bc 998.5
US09336	42-12.9	140-35.0	8/21	1724-1728	87	SW -2	ESE-1	SW -3	23.2	21.0	bc 999.1
US09337	42-17.7	140-40.3	8/21	1812-1817	90	South-1	ESE-1	South-3	22.8	20.4	bc 999.1
US09338	41-58.8	141-00.0	8/22	0908-0912	88	SW -2	ESE-1	SW -4	25.2	20.1	bc 999.6
US09339	41-57.2	141-01.9	8/22	0926-0931	101	SW -2	ESE-1	SW -4	24.2	20.0	bc 999.6
US09340	41-55.4	141-04.4	8/22	0947-0952	111	SW -2	ESE-1	SW -4	24.3	20.2	bc 999.7
US09341	41-53.5	141-07.5	8/22	1057-1102	96	SW -3	ESS	SW -5	25.5	20.0	bc 999.6
US09342	41-51.7	141-09.8	8/22	1118-1124	105	WSW-2	ESE-1	WSW-4	25.7	19.9	bc 999.2
US09343	41-50.0	141-12.0	8/22	1141-1147	127	SW -2	ESE-1	SW -4	25.1	19.9	bc 999.5

(*) : Fixed position by Global Positioning System

Table 2: Oceanographic data

STATION US09289 LATITUDE 41-58.8 N LONGITUDE 141-00.9 E DEPTH (m) 96				STATION US09290 LATITUDE 41-57.5 N LONGITUDE 140-58.3 E DEPTH (m) 80				STATION US09291 LATITUDE 41-57.8 N LONGITUDE 140-59.1 E DEPTH (m) 85			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.287	32.260	23.576	5	16.523	32.135	23.427	5	15.938	32.294	23.681
10	15.598	32.383	23.825	10	16.109	32.232	23.595	10	15.743	32.362	23.777
20	13.426	32.981	24.744	20	15.549	32.467	23.900	20	14.069	32.514	24.252
30	10.458	33.478	25.685	30	10.849	33.104	25.326	30	10.878	33.360	25.521
40	10.700	33.761	25.864	40	8.720	33.273	25.810	40	9.394	33.265	25.697
50	10.432	33.817	25.955	50	7.631	33.328	26.014	50	9.515	33.473	25.840
75	8.786	33.762	26.182	75	5.070	33.158	26.207	75	4.952	33.205	26.258
STATION US09292 LATITUDE 41-58.2 N LONGITUDE 140-59.9 E DEPTH (m) 89				STATION US09293 LATITUDE 41-59.1 N LONGITUDE 141-11.9 E DEPTH (m) 194				STATION US09294 LATITUDE 41-59.5 N LONGITUDE 141-15.8 E DEPTH (m) 253			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.342	32.280	23.579	5	15.115	32.652	24.137	5	15.115	32.524	24.039
10	16.036	32.309	23.670	10	14.834	32.681	24.220	10	15.039	32.536	24.065
20	15.624	32.400	23.832	20	10.951	33.179	25.367	20	13.695	32.842	24.582
30	14.641	32.731	24.300	30	10.040	33.565	25.825	30	10.191	33.431	25.695
40	10.743	33.397	25.572	40	9.417	33.658	26.000	40	9.637	33.543	25.875
50	9.979	33.574	25.842	50	9.876	33.920	26.129	50	9.139	33.602	26.001
75	7.639	33.552	26.189	75	8.531	33.826	26.272	75	8.876	33.806	26.203
				100	6.542	33.605	26.381	100	7.143	33.642	26.330
				125	6.898	33.752	26.450	125	6.127	33.583	26.417
				150	5.716	33.643	26.515	150	6.225	33.697	26.495
				175	5.485	33.634	26.536	175	4.657	33.558	26.570
								200	4.244	33.580	26.631
STATION US09295 LATITUDE 42-00.1 N LONGITUDE 141-20.2 E DEPTH (m) 317				STATION US09296 LATITUDE 42-13.7 N LONGITUDE 140-34.2 E DEPTH (m) 87				STATION US09297 LATITUDE 42-13.8 N LONGITUDE 140-32.0 E DEPTH (m) 85			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	16.343	32.643	23.857	5	17.353	31.762	22.948	5	17.288	31.696	22.913
10	14.930	32.634	24.163	10	16.982	31.680	22.972	10	16.824	31.785	23.089
20	11.117	33.255	25.396	20	16.137	31.883	23.320	20	16.173	31.822	23.266
30	11.346	33.861	25.826	30	12.567	32.994	24.924	30	12.479	32.679	24.697
40	10.974	33.995	25.998	40	10.366	33.222	25.501	40	9.931	33.002	25.404
50	10.396	33.965	26.076	50	7.160	33.019	25.837	50	7.540	32.974	25.749
75	8.530	33.781	26.237	75	4.006	33.201	26.355	75	4.057	33.154	26.312
100	7.102	33.691	26.374								
125	6.728	33.703	26.433								
150	6.066	33.660	26.486								
175	4.655	33.514	26.535								
200	4.493	33.547	26.579								
250	2.847	33.488	26.692								
300	2.865	33.591	26.772								
STATION US09298 LATITUDE 42-16.1 N LONGITUDE 140-36.2 E DEPTH (m) 91				STATION US09299 LATITUDE 42-14.4 N LONGITUDE 140-40.2 E DEPTH (m) 87				STATION US09300 LATITUDE 42-11.9 N LONGITUDE 140-44.8 E DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	18.202	31.973	22.906	5	17.479	31.666	22.845	5	17.784	31.168	22.392
10	17.298	31.603	22.839	10	17.147	31.569	22.848	10	16.891	31.619	22.946
20	16.889	31.734	23.035	20	16.818	31.708	23.031	20	16.138	31.972	23.389
30	14.799	32.720	24.258	30	14.766	32.769	24.303	30	14.092	32.880	24.530
40	11.084	33.311	25.445	40	11.255	33.309	25.413	40	11.211	33.271	25.392
50	8.675	33.195	25.755	50	9.744	33.587	25.891	50	11.149	33.693	25.731
75	4.024	33.254	26.395	75	4.982	33.382	26.394	75	4.339	33.246	26.356
STATION US09301 LATITUDE 42-03.3 N LONGITUDE 141-02.5 E DEPTH (m) 95				STATION US09302 LATITUDE 42-10.0 N LONGITUDE 141-07.0 E DEPTH (m) 98				STATION US09303 LATITUDE 42-09.9 N LONGITUDE 141-01.7 E DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	15.964	32.556	23.876	5	16.433	32.465	23.700	5	16.429	32.471	23.706
10	15.900	32.534	23.874	10	16.429	32.481	23.714	10	16.372	32.486	23.730
20	12.649	33.364	25.194	20	11.197	33.399	25.493	20	11.085	33.117	25.295
30	10.419	33.581	25.773	30	10.300	33.722	25.903	30	9.937	33.347	25.672
40	10.388	33.764	25.920	40	10.402	33.890	26.016	40	10.178	33.720	25.922
50	9.759	33.758	26.022	50	10.167	33.927	26.086	50	9.805	33.811	26.056
75	7.938	33.691	26.255	75	8.707	33.833	26.250	75	8.527	33.750	26.213

STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09304 41-11.2 140-41.9 70				US09305 41-09.3 140-41.3 53				US09306 41-09.2 140-43.5 58			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	21.277	32.939	22.851	5	21.206	32.922	22.857	5	21.191	32.530	22.564
10	21.101	33.445	23.283	10	20.615	33.458	23.424	10	21.248	33.152	23.021
20	20.778	33.682	23.550	20	20.387	33.709	23.675	20	20.378	33.492	23.512
30	19.105	33.647	23.961	30	17.687	33.788	24.421	30	19.224	33.643	23.927
40	17.369	33.871	24.560	40	16.267	33.921	24.857	40	17.179	33.837	24.580
50	14.186	34.062	25.423	50	14.940	34.048	25.251	50	16.454	33.918	24.812
STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09307 41-05.5 140-44.0 62				US09308 41-06.1 140-47.3 61				US09309 41-06.4 140-50.2 52			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.931	32.569	22.663	5	20.718	32.814	22.906	5	20.143	32.962	23.171
10	20.701	32.867	22.951	10	20.571	33.046	23.122	10	20.138	33.029	23.223
20	20.055	33.496	23.601	20	19.827	33.483	23.650	20	20.147	33.130	23.297
30	19.777	33.549	23.714	30	18.969	33.649	23.997	30	18.373	33.557	24.076
40	18.168	33.628	24.181	40	17.670	33.608	24.287	40	17.811	33.683	24.310
50	16.640	33.611	24.533	50	16.504	33.635	24.582	50	15.235	33.455	24.730
STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09310 41-04.7 140-51.2 53				US09311 41-04.2 140-51.4 52				US09312 41-02.8 140-46.6 51			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	19.838	33.040	23.310	5	19.726	33.247	23.496	5	20.480	32.886	23.024
10	19.754	33.116	23.390	10	19.543	33.319	23.599	10	19.439	33.343	23.644
20	19.082	33.249	23.663	20	19.185	33.322	23.692	20	18.728	33.594	24.015
30	18.965	33.491	23.877	30	18.878	33.538	23.935	30	18.081	33.695	24.253
40	18.545	33.656	24.109	40	18.526	33.630	24.094	40	16.859	33.667	24.524
50	14.937	33.595	24.902	50	15.089	33.554	24.838				
STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09313 41-01.1 140-43.6 56				US09314 41-00.2 140-46.2 53				US09315 40-57.3 140-46.2 50			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.220	32.987	23.169	5	20.602	32.878	22.986	5	20.921	32.725	22.784
10	20.215	32.989	23.172	10	19.655	33.262	23.526	10	19.939	33.384	23.545
20	18.966	33.470	23.860	20	18.454	33.645	24.123	20	18.899	33.493	23.895
30	17.439	33.736	24.440	30	17.809	33.753	24.364	30	18.304	33.658	24.170
40	15.266	33.586	24.823	40	16.777	33.781	24.631	40	17.075	33.667	24.474
50	14.920	34.011	25.226	50	15.475	33.858	24.987				
STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09316 40-55.4 140-46.2 42				US09317 40-53.8 140-46.0 36				US09318 41-58.7 141-01.1 97			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.873	32.584	22.690	5	20.548	33.210	23.253	5	20.892	31.056	21.523
10	20.426	33.005	23.129	10	20.152	33.417	23.515	10	18.342	31.311	22.366
20	18.959	33.411	23.818	20	19.380	33.414	23.712	20	12.839	32.389	24.402
30	18.362	33.713	24.198	30	18.481	33.631	24.106	30	9.893	32.418	24.954
40	16.890	33.821	24.635					40	9.318	32.682	25.253
								50	10.587	33.512	25.690
								75	9.902	33.804	26.034
STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)				STATION LATITUDE LONGITUDE DEPTH (m)			
US09319 41-58.2 140-59.8 88				US09320 41-57.8 140-59.0 84				US09321 41-57.4 140-58.2 78			
		N	E			N	E			N	E
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.187	31.397	21.967	5	20.055	31.467	22.055	5	19.094	31.588	22.392
10	16.759	31.838	23.145	10	16.701	31.796	23.126	10	16.596	32.057	23.351
20	13.710	32.567	24.366	20	12.590	32.126	24.247	20	14.351	32.812	24.424
30	11.811	32.623	24.778	30	12.574	32.886	24.839	30	12.316	32.973	24.956
40	10.310	32.961	25.308	40	10.833	33.305	25.485	40	10.548	33.168	25.429
50	9.558	33.242	25.653	50	10.822	33.670	25.772	50	9.882	33.358	25.690
75	9.707	33.730	26.009	75	7.091	33.313	26.078	75	7.417	33.309	26.030

STATION US09322 LATITUDE 42-15.8 N LONGITUDE 140-35.9 E DEPTH (m) 90				STATION US09323 LATITUDE 42-18.8 N LONGITUDE 140-30.1 E DEPTH (m) 91				STATION US09324 LATITUDE 42-24.1 N LONGITUDE 140-32.2 E DEPTH (m) 95			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.288	31.176	21.773	5	20.386	31.173	21.746	5	20.509	31.190	21.726
10	20.284	31.177	21.775	10	20.306	31.188	21.778	10	20.503	31.190	21.728
20	18.245	31.450	22.496	20	18.204	31.470	22.521	20	18.716	31.404	22.346
30	14.381	32.293	24.017	30	15.476	32.095	23.630	30	16.438	32.053	23.383
40	12.081	33.168	25.151	40	12.077	32.990	25.014	40	12.113	32.878	24.920
50	10.151	33.409	25.685	50	10.142	33.306	25.605	50	10.181	33.210	25.524
75	5.550	33.189	26.176	75	5.963	33.252	26.176	75	5.605	33.262	26.227
STATION US09325 LATITUDE 42-19.7 N LONGITUDE 140-36.7 E DEPTH (m) 88				STATION US09326 LATITUDE 42-23.1 N LONGITUDE 140-42.6 E DEPTH (m) 61				STATION US09327 LATITUDE 42-10.1 N LONGITUDE 140-47.9 E DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.083	31.262	21.892	5	20.407	31.254	21.801	5	19.118	31.374	22.221
10	20.073	31.262	21.894	10	20.398	31.255	21.805	10	16.507	32.357	23.601
20	20.001	31.276	21.923	20	17.911	31.508	22.621	20	13.798	32.700	24.452
30	15.510	32.050	23.588	30	14.513	32.474	24.129	30	12.132	33.021	25.027
40	11.899	32.871	24.955	40	12.510	32.990	24.931	40	10.606	33.115	25.377
50	10.362	33.153	25.448	50	11.066	33.227	25.383	50	9.965	33.316	25.643
75	5.536	33.228	26.209					75	6.105	33.221	26.134
STATION US09328 LATITUDE 42-15.1 N LONGITUDE 140-47.7 E DEPTH (m) 71				STATION US09329 LATITUDE 42-18.6 N LONGITUDE 140-42.1 E DEPTH (m) 66				STATION US09330 LATITUDE 42-25.4 N LONGITUDE 140-37.0 E DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	18.602	31.695	22.596	5	20.179	31.273	21.875	5	20.285	31.239	21.822
10	17.271	32.099	23.225	10	20.147	31.296	21.901	10	20.284	31.239	21.822
20	13.904	32.478	24.259	20	16.931	32.730	23.788	20	20.167	31.255	21.865
30	12.255	32.505	24.604	30	13.698	32.742	24.504	30	17.035	31.827	23.073
40	10.871	32.626	24.950	40	9.929	32.707	25.173	40	12.659	32.640	24.632
50	10.174	33.164	25.489	50	10.349	33.300	25.565	50	10.159	33.076	25.423
								75	5.081	33.225	26.259
STATION US09331 LATITUDE 42-27.7 N LONGITUDE 140-43.1 E DEPTH (m) 61				STATION US09332 LATITUDE 42-25.3 N LONGITUDE 140-48.1 E DEPTH (m) 45				STATION US09333 LATITUDE 42-21.3 N LONGITUDE 140-48.4 E DEPTH (m) 51			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.236	31.256	21.847	5	20.830	31.024	21.515	5	20.496	31.448	21.926
10	20.233	31.255	21.848	10	20.789	31.036	21.535	10	20.481	31.456	21.936
20	19.502	31.346	22.105	20	17.705	31.637	22.767	20	15.631	32.250	23.715
30	14.638	32.504	24.126	30	13.543	32.647	24.463	30	12.170	32.396	24.535
40	12.262	32.924	24.927	40	12.389	33.086	25.029	40	11.732	32.937	25.037
50	11.098	33.283	25.421								
STATION US09334 LATITUDE 42-19.9 N LONGITUDE 140-24.1 E DEPTH (m) 61				STATION US09335 LATITUDE 42-15.7 N LONGITUDE 140-29.6 E DEPTH (m) 84				STATION US09336 LATITUDE 42-12.9 N LONGITUDE 140-35.0 E DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	21.105	31.035	21.451	5	20.956	31.041	21.495	5	21.114	31.077	21.480
10	20.757	31.146	21.627	10	20.364	31.361	21.894	10	20.312	31.415	21.948
20	18.164	31.476	22.536	20	17.339	31.635	22.854	20	16.493	31.879	23.237
30	14.266	32.338	24.075	30	14.043	32.411	24.178	30	13.007	32.802	24.689
40	12.615	32.906	24.846	40	11.399	32.903	25.072	40	10.933	32.934	25.179
50	11.523	33.099	25.201	50	10.201	33.232	25.537	50	9.864	33.326	25.667
				75	5.635	33.162	26.145	75	4.898	33.153	26.223

STATION US09337 LATITUDE 42-17.7 N LONGITUDE 140-40.3 E DEPTH (m) 90				STATION US09338 LATITUDE 41-58.8 N LONGITUDE 141-00.0 E DEPTH (m) 88				STATION US09339 LATITUDE 41-57.2 N LONGITUDE 141-01.9 E DEPTH (m) 101			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.197	31.395	21.964	5	20.029	31.338	21.964	5	19.871	31.385	22.040
10	19.505	31.527	22.241	10	18.915	31.662	22.493	10	17.683	31.659	22.791
20	14.809	32.450	24.048	20	14.396	32.157	23.909	20	15.295	32.274	23.807
30	13.032	32.847	24.719	30	12.893	32.898	24.786	30	12.204	32.804	24.846
40	11.414	33.272	25.356	40	11.302	33.033	25.190	40	11.084	32.990	25.195
50	10.059	33.352	25.656	50	10.489	33.207	25.469	50	10.317	33.214	25.504
75	6.016	33.363	26.257	75	6.925	33.370	26.144	75	9.990	33.771	25.994

STATION US09340 LATITUDE 41-55.4 N LONGITUDE 141-04.4 E DEPTH (m) 111				STATION US09341 LATITUDE 41-53.5 N LONGITUDE 141-07.5 E DEPTH (m) 96				STATION US09342 LATITUDE 41-51.7 N LONGITUDE 141-09.8 E DEPTH (m) 105			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	19.914	31.345	21.998	5	19.831	31.347	22.022	5	18.872	31.486	22.369
10	17.452	31.733	22.903	10	17.398	31.728	22.911	10	17.310	31.788	22.978
20	15.295	32.276	23.809	20	14.328	32.434	24.137	20	15.258	32.256	23.801
30	12.744	32.719	24.676	30	11.748	32.963	25.055	30	11.691	32.929	25.038
40	11.132	32.986	25.184	40	10.161	33.126	25.462	40	10.723	33.043	25.300
50	10.463	33.299	25.545	50	9.691	33.379	25.738	50	9.774	33.276	25.643
75	10.394	33.788	25.938	75	9.474	33.673	26.003	75	7.858	33.523	26.135
100	6.159	33.285	26.178								

STATION US09343 LATITUDE 41-50.0 N LONGITUDE 141-12.0 E DEPTH (m) 127			
Press.	Temp.	Salinity	Sigma-T
5	17.477	31.752	22.911
10	16.056	32.004	23.432
20	13.885	32.564	24.329
30	12.255	32.831	24.857
40	11.467	32.974	25.114
50	10.154	33.214	25.532
75	7.383	33.447	26.143
100	7.077	33.475	26.207