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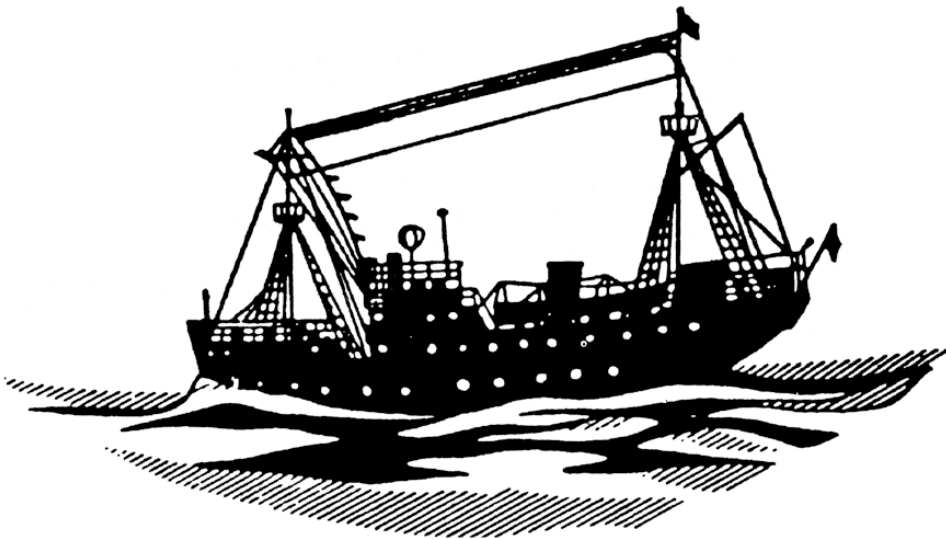


DATA RECORD
OF
OCEANOGRAPHIC OBSERVATIONS AND
EXPLORATORY FISHING

No.59

海洋調査漁業試験要報

第 59 号



GRADUATE SCHOOL OF FISHERIES SCIENCES
AND
FACULTY OF FISHERIES SCIENCES
HOKKAIDO UNIVERSITY
HAKODATE, JAPAN
JANUARY 2019

北海道大学大学院水産科学研究院・水産学部
函館市
平成31年1月

NOTICE

This publication is being undertaken for the sake of making available to interested persons, as soon as possible, some preliminary data derived from oceanographic, biological or exploratory fishing researches carried out on the regular or occasional cruises of the training ships of Faculty of Fisheries Sciences, Hokkaido University.

The priority of these data belongs to the research scientists and officers on board. Please ask for permission to the Chief Editor of this volume, when you quote the data from this “Data Record”

本学部練習船を用いて行われた海洋観測，生物調査，漁業試験の結果が，各研究担当者によって研究論文として纏められ，印刷公表されるまでにはかなりの時日を要し，且研究論文には個々の測定値が表示されない場合が多いことを考慮し，練習船の調査航海毎に調査成果を本要報として逐次刊行し，各方面の参考に供することとした。

本要報のデータは乗船研究者並びに士官に帰属している。本報に掲載されたデータを引用する場合は編集委員長に許可を求められたい。

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PART I

OSHORU MARU CRUISES FROM APRIL TO
DECEMBER 2015

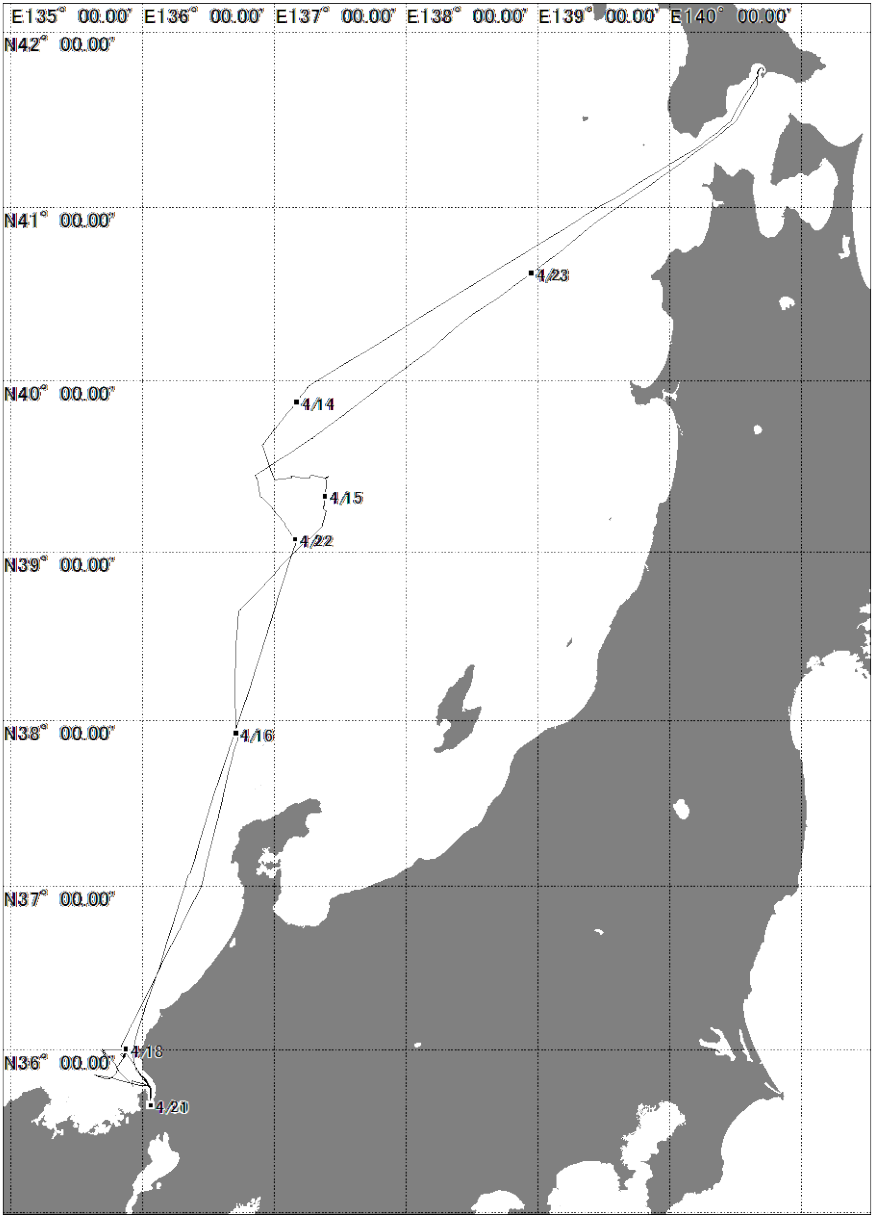
**THE "OSHORO MARU" CRUISE 011
TO SEA OF JAPAN and TSURUGA-WAN
IN APRIL 2015**

1. Cruise Itinerary

Cruise 011

Departure from Hakodate (Leg1)	Apr. 13, 2015
Start hydrographic research (OS15001)	14
Arrival at Tsuruga	17
Departure from Tsuruga (Leg2)	17
Return to Tsuruga	19
Departure from Tsuruga (Leg3)	19
Return to Tsuruga	19
Departure from Tsuruga (Leg4)	21
Finish hydrographic research (OS15019)	23
Return to Hakodate	24

Total coverage 1106.7 miles



■ 正午位置

Fig.-1: Noon Position

2. Vessel Personnel

Crew: Captain: Associate Professor Shogo Takagi
And 31 persons

Research Staff: Professor (Laboratory of Marine Environmental Science, Hokkaido University)
Leg1,4 Kenshi Kuma
Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)
Leg1,4 Yutaka Isoda

Under Graduate instructor: Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Toshiaki Miyadai
Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Ryuji Kondo
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Daisuke Tahara
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Atsushi Kaneda
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Yoshitake Takao

Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Tadahisa Oumi
Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Shigeyuki Hattori
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Yoko Shimizu
Lecturer (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Ryou Matsumoto
Researcher (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Ryou Nakamura

Teaching Assistant: 4 persons
Under Graduate Student: 51 persons (Leg2)
31 persons (Leg3)

3. Items of Research

Hydrographic observations: (Observation of Temperature, Salinity, and Computed Dynamic Depth Anomaly)
Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoromaru”.

Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus and XCTD).

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

Water and Plankton sampling were also carried out at almost every hydrographic stations.

Fig.-2,3 Table-1,2

4. Observation of Temperature, Salinity, and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “*Oshoromaru*”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus and XCTD2 or 4). Dynamic computations were made using a desk-top computer aboard the “*Oshoromaru*”. Water and Plankton sampling were also carried out at almost hydrographic stations.

Figure 2 Oceanographic and gillnet stations

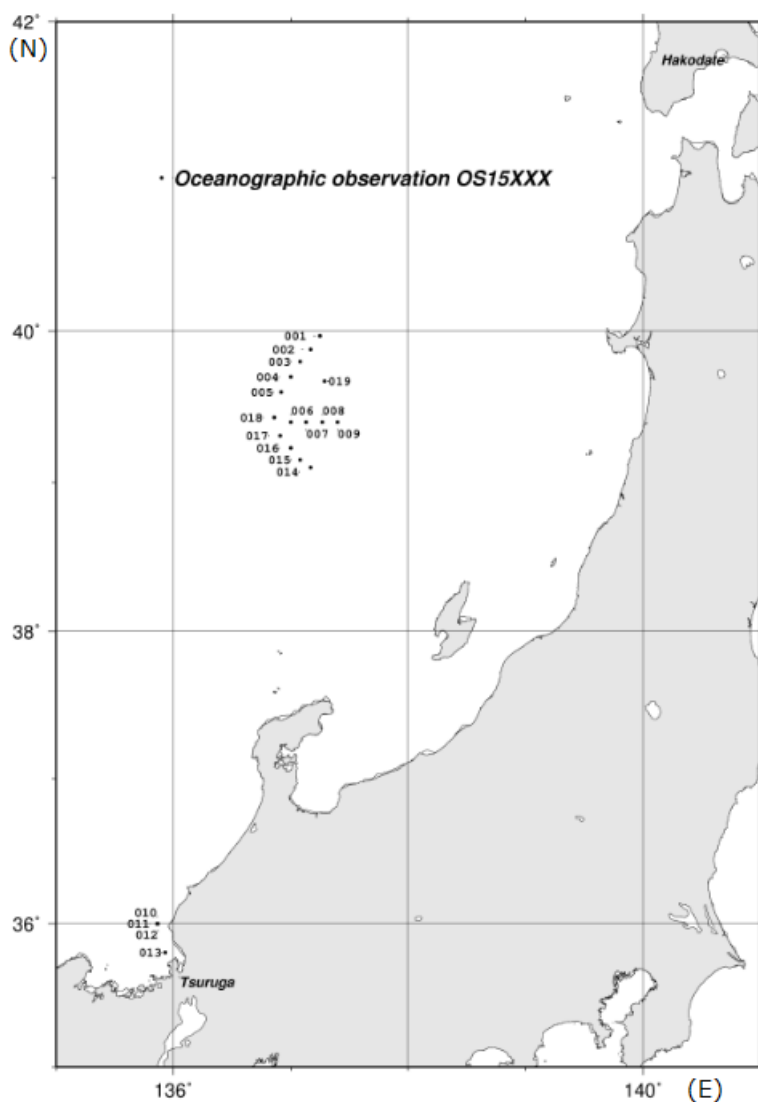


Table 1. List of Oceanographic station.

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS15001	39-57.95N	137-15.29E	4/13	23:08	9	2229	-	-	8.5	bc	9p-1171
OS15002	39-52.93N	137-10.09E	4/14	1:55	9	2406	-	-	8.8	bc	9p-1171
OS15003	39-47.97N	137-05.08E	4/14	4:43	9	2438	-	-	10.3	bc	9p-1171
OS15004	39-42.96N	137-00.04E	4/14	7:23	9	2603	-	-	9.7	bc	9p-1171
OS15005	39-37.89N	136-54.98E	4/14	10:18	9	2605	-	-	9.7	bc	9p-1171
OS15006	39-25.98N	137-00.20E	4/14	13:58	9	2526	-	-	9.5	r	9p-1171
OS15007	39-26.08N	137-07.95E	4/14	17:01	9	2451	-	-	9.6	r	9p-1171
OS15008	39-26.03N	137-16.11E	4/14	19:50	9	2565	-	-	10.0	r	9p-1171
OS15009	39-26.00N	137-24.09E	4/14	22:35	9	2472	-	-	10.2	bc	9p-1171
OS15010	35-57.84N	135-51.43E	4/18	0:37	9	253	3	15	13.0	bc	9p-1171
OS15011	35-57.32N	135-51.69E	4/18	4:07	9	250	3	14	13.3	bc	9p-1171
OS15012	35-59.54N	135-52.10E	4/18	6:03	9	253	3	15	13.3	b	9p-1171
OS15013	35-46.84N	135-55.62E	4/18	23:39	9	81	3	12	13.6	r	9p-1171
OS15014	39-04.16N	137-09.94E	4/22	2:09	9	2416	-	-	10.9	o	9p-1171
OS15015	39-09.24N	137-05.01E	4/22	5:01	9	2414	-	-	11.1	bc	9p-1171
OS15016	39-13.98N	137-00.18E	4/22	7:47	9	2433	-	-	11.3	bc	9p-1171
OS15017	39-18.86N	136-54.89E	4/22	10:11	9	2517	-	-	11.1	bc	9p-1171
OS15018	39-26.08N	136-51.82E	4/22	13:12	9	2600	-	-	9.5	bc	9p-1171
OS15019	39-39.90N	137-17.14E	4/22	18:07	9	2551	-	-	10.0	f	9p-1171

T.Z.: Time difference between Greenwich Mean Time (G.M.T.) and Ship's Mean Time (S.M.T.)

Col.: Water color in Forel-Ule scale

Tr.: Transparency in meters with Secchi disc

SST: Sea Surface temperature

Wr.: Weather in WMO Code 4501

Table 2. Oceanographic data

Station OS15001				Station OS15002				Station OS15003			
Latitude 39-57.95 N				Latitude 39-52.93 N				Latitude 39-47.97 N			
Longitude 137-15.29 E				Longitude 137-10.09 E				Longitude 137-05.08 E			
Depth(m) 2233				Depth(m) 2406				Depth(m) 2438			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	8.238	34.153	26.573	5	8.514	34.158	26.535	5	10.129	34.217	26.319
10	8.222	34.154	26.576	10	8.395	34.158	26.553	10	9.982	34.215	26.342
20	8.206	34.154	26.578	20	8.356	34.158	26.559	20	8.550	34.163	26.533
30	8.195	34.153	26.580	30	8.020	34.147	26.601	30	8.041	34.153	26.603
40	8.156	34.149	26.582	40	8.004	34.147	26.603	40	7.962	34.150	26.612
50	7.825	34.147	26.629	50	7.970	34.146	26.607	50	7.854	34.146	26.624
75	6.834	34.120	26.748	75	6.860	34.115	26.741	75	7.647	34.140	26.650
100	4.893	34.076	26.955	100	5.600	34.094	26.886	100	5.726	34.087	26.865
125	3.956	34.055	27.039	125	4.551	34.069	26.987	125	4.573	34.069	26.985
150	3.024	34.051	27.126	150	3.724	34.057	27.064	150	3.424	34.050	27.088
175	2.585	34.053	27.166	175	3.129	34.054	27.118	175	2.749	34.050	27.149
200	2.104	34.040	27.195	200	2.194	34.037	27.185	200	2.279	34.034	27.176
250	1.363	34.027	27.239	250	1.320	34.025	27.240	250	1.594	34.028	27.223
300	1.103	34.041	27.268	300	1.225	34.036	27.256	300	1.191	34.042	27.263
400	0.805	34.059	27.301	400	0.950	34.054	27.288	400	0.877	34.054	27.293
500	0.693	34.064	27.312	500	0.747	34.061	27.307	500	0.731	34.063	27.309
600	0.570	34.067	27.321	600	0.632	34.066	27.317	600	0.626	34.067	27.318
700	0.513	34.067	27.325	700	0.543	34.067	27.323	700	0.519	34.067	27.325
800	0.433	34.067	27.329	800	0.474	34.067	27.327	800	0.454	34.067	27.329
900	0.377	34.066	27.332	900	0.410	34.067	27.331	900	0.408	34.067	27.331
1000	0.333	34.066	27.334	1000	0.366	34.066	27.333	1000	0.350	34.066	27.334
1200	0.270	34.065	27.338	1200	0.290	34.066	27.336	1200	0.288	34.066	27.337
1500	0.232	34.065	27.339	1500	0.230	34.065	27.339	1500	0.242	34.065	27.339
2000	0.225	34.065	27.340	2000	0.227	34.065	27.340	2000	0.229	34.065	27.340

Station OS15004			
Latitude 39-42.96 N			
Longitude 137-0.04 E			
Depth(m) 2603			
Press.	Temp.	Sal.	SIG-T
5	9.540	34.181	26.389
10	8.967	34.177	26.479
20	8.672	34.169	26.519
30	8.435	34.162	26.550
40	7.916	34.147	26.616
50	7.568	34.139	26.661
75	6.622	34.102	26.763
100	4.871	34.073	26.955
125	3.497	34.040	27.072
150	2.717	34.030	27.136
175	2.290	34.033	27.174
200	2.001	34.032	27.196
250	1.530	34.035	27.233
300	1.140	34.044	27.267
400	0.825	34.056	27.298
500	0.707	34.064	27.311
600	0.576	34.067	27.321
700	0.487	34.067	27.327
800	0.433	34.067	27.330
900	0.382	34.067	27.332
1000	0.334	34.066	27.335
1200	0.273	34.066	27.337
1500	0.240	34.065	27.339
2000	0.226	34.066	27.340
2500	0.240	34.066	27.340

Station OS15005			
Latitude 39-37.89 N			
Longitude 136-54.98 E			
Depth(m) 2605			
Press.	Temp.	Sal.	SIG-T
5	9.765	34.196	26.364
10	9.767	34.196	26.363
20	9.371	34.196	26.429
30	9.000	34.180	26.476
40	8.589	34.161	26.526
50	8.137	34.155	26.590
75	7.468	34.134	26.671
100	5.172	34.074	26.921
125	3.822	34.045	27.045
150	2.686	34.037	27.144
175	2.247	34.034	27.178
200	1.924	34.042	27.210
250	1.278	34.043	27.257
300	1.053	34.053	27.281
400	0.783	34.062	27.304
500	0.657	34.066	27.315
600	0.555	34.067	27.323
700	0.480	34.067	27.327
800	0.420	34.067	27.331
900	0.373	34.067	27.333
1000	0.329	34.066	27.335
1200	0.274	34.066	27.338
1500	0.237	34.065	27.339
2000	0.229	34.066	27.340
2500	0.243	34.066	27.340

Station OS15006			
Latitude 39-25.98 N			
Longitude 137-0.20 E			
Depth(m) 2526			
Press.	Temp.	Sal.	SIG-T
5	9.555	34.195	26.398
10	9.547	34.193	26.398
20	9.294	34.191	26.437
30	9.002	34.180	26.475
40	8.641	34.166	26.521
50	7.794	34.134	26.624
75	5.478	34.082	26.891
100	4.016	34.051	27.030
125	3.301	34.037	27.089
150	2.699	34.036	27.142
175	2.155	34.030	27.183
200	1.662	34.032	27.222
250	1.147	34.047	27.269
300	0.917	34.052	27.289
400	0.734	34.062	27.308
500	0.625	34.066	27.318
600	0.544	34.067	27.323
700	0.442	34.067	27.329
800	0.399	34.067	27.331
900	0.353	34.066	27.334
1000	0.313	34.066	27.336
1200	0.260	34.066	27.338
1500	0.231	34.065	27.340
2000	0.227	34.066	27.340

Station OS15007			
Latitude 39-06.08 N			
Longitude 137-07.95 E			
Depth(m) 2451			
Press.	Temp.	Sal.	SIG-T
5	9.346	34.136	26.386
10	9.312	34.152	26.404
20	8.951	34.179	26.483
30	8.166	34.147	26.579
40	7.899	34.142	26.615
50	7.619	34.132	26.648
75	5.348	34.077	26.903
100	3.601	34.041	27.063
125	2.837	34.044	27.137
150	2.229	34.042	27.186
175	1.737	34.042	27.224
200	1.491	34.040	27.240
250	1.158	34.049	27.270
300	0.942	34.057	27.291
400	0.725	34.064	27.310
500	0.597	34.066	27.319
600	0.517	34.067	27.325
700	0.428	34.067	27.330
800	0.383	34.066	27.332
900	0.339	34.066	27.334
1000	0.310	34.066	27.336
1200	0.261	34.066	27.338
1500	0.225	34.065	27.340
2000	0.224	34.065	27.340

Station OS15008			
Latitude 39-26.03 N			
Longitude 137-16.11 E			
Depth(m) 2565			
Press.	Temp.	Sal.	SIG-T
5	9.764	34.144	26.323
10	9.752	34.150	26.330
20	9.647	34.205	26.391
30	8.933	34.178	26.485
40	8.171	34.157	26.586
50	7.348	34.129	26.685
75	5.691	34.087	26.870
100	4.343	34.054	26.998
125	3.426	34.040	27.079
150	2.397	34.027	27.161
175	2.027	34.041	27.201
200	1.672	34.043	27.230
250	1.156	34.049	27.271
300	0.950	34.055	27.289
400	0.778	34.062	27.305
500	0.638	34.066	27.317
600	0.501	34.067	27.326
700	0.434	34.067	27.330
800	0.382	34.067	27.332
900	0.345	34.067	27.334
1000	0.304	34.066	27.336
1200	0.260	34.066	27.338
1500	0.229	34.065	27.340
2000	0.226	34.066	27.340
2500	0.253	34.066	27.339

Station OS15009			
Latitude 39-26.00 N			
Longitude 137-24.09 E			
Depth(m) 2472			
Press.	Temp.	Sal.	SIG-T
5	9.998	34.151	26.289
10	9.974	34.154	26.296
20	9.625	34.202	26.391
30	8.893	34.186	26.498
40	8.410	34.169	26.560
50	7.809	34.153	26.637
75	5.794	34.089	26.859
100	4.574	34.067	26.983
125	3.374	34.046	27.089
150	3.020	34.041	27.118
175	2.530	34.036	27.157
200	1.678	34.044	27.230
250	1.196	34.048	27.267
300	0.972	34.054	27.286
400	0.784	34.062	27.305
500	0.649	34.066	27.316
600	0.530	34.067	27.324
700	0.444	34.067	27.329
800	0.387	34.067	27.332
900	0.335	34.066	27.335
1000	0.299	34.066	27.336
1200	0.257	34.066	27.338
1500	0.222	34.065	27.340
2000	0.217	34.066	27.340

Station OS15010
Latitude 35-57.84 N
Longitude 135-51.43 E
Depth(m) 253

Press.	Temp.	Sal.	SIG-T
5	12.819	34.338	25.916
10	12.792	34.341	25.924
20	12.757	34.344	25.933
30	12.704	34.357	25.953
40	12.685	34.372	25.969
50	12.618	34.394	25.999
75	12.252	34.437	26.103
100	12.041	34.453	26.156
125	11.946	34.446	26.169
150	11.735	34.427	26.194
175	11.401	34.412	26.244
200	10.981	34.373	26.290

Station OS15011
Latitude 35-57.32 N
Longitude 135-51.69 E
Depth(m) 250

Press.	Temp.	Sal.	SIG-T
5	12.890	34.317	25.886
10	12.751	34.312	25.910
20	12.590	34.290	25.924
30	12.651	34.327	25.940
40	12.632	34.390	25.993
50	12.630	34.413	26.011
75	12.463	34.462	26.082
100	12.169	34.461	26.138
125	11.805	34.440	26.191
150	11.532	34.411	26.220
175	11.342	34.395	26.242
200	11.039	34.386	26.290

Station OS15012
Latitude 35-59.54 N
Longitude 135-52.10 E
Depth(m) 253

Press.	Temp.	Sal.	SIG-T
5	13.099	34.300	25.831
10	12.712	34.309	25.914
20	12.727	34.335	25.932
30	12.694	34.351	25.950
40	12.646	34.369	25.974
50	12.625	34.387	25.993
75	12.481	34.482	26.094
100	12.329	34.487	26.127
125	11.983	34.455	26.169
150	11.623	34.422	26.211
175	11.484	34.424	26.238
200	10.880	34.366	26.304

Station OS15013
Latitude 35-46.84 N
Longitude 135-55.62 E
Depth(m) 81

Press.	Temp.	Sal.	SIG-T
5	13.144	33.909	25.519
10	12.848	34.117	25.739
20	12.709	34.224	25.849
30	12.604	34.344	25.963
40	12.468	34.428	26.055
50	12.349	34.423	26.074
75	12.282	34.446	26.105

Station OS15014
Latitude 39-04.18 N
Longitude 137-09.94 E
Depth(m) 2416

Press.	Temp.	Sal.	SIG-T
5	10.737	34.107	26.127
10	10.728	34.108	26.129
20	10.651	34.107	26.142
30	10.625	34.108	26.147
40	10.557	34.123	26.172
50	9.983	34.175	26.310
75	9.658	34.185	26.373
100	9.080	34.175	26.459
125	8.180	34.155	26.583
150	6.370	34.108	26.800
175	4.381	34.057	26.996
200	3.181	34.034	27.098
250	1.762	34.039	27.220
300	1.245	34.049	27.265
400	0.864	34.061	27.299
500	0.653	34.066	27.316
600	0.545	34.066	27.322
700	0.459	34.066	27.328
800	0.399	34.067	27.331
900	0.358	34.066	27.333
1000	0.310	34.066	27.336
1200	0.267	34.066	27.338
1500	0.239	34.065	27.339
2000	0.226	34.066	27.340

Station OS15015
Latitude 39-09.24 N
Longitude 137-05.01 E
Depth(m) 2414

Press.	Temp.	Sal.	SIG-T
5	10.843	34.118	26.117
10	10.866	34.118	26.113
20	10.620	34.117	26.156
30	10.588	34.117	26.161
40	10.505	34.130	26.186
50	10.117	34.168	26.282
75	9.598	34.195	26.390
100	7.882	34.139	26.615
125	6.924	34.121	26.736
150	4.948	34.073	26.946
175	3.443	34.037	27.075
200	2.295	34.026	27.168
250	1.526	34.044	27.241
300	1.111	34.053	27.277
400	0.755	34.064	27.308
500	0.595	34.067	27.320
600	0.506	34.067	27.325
700	0.433	34.067	27.330
800	0.375	34.067	27.333
900	0.330	34.066	27.335
1000	0.294	34.066	27.337
1200	0.251	34.065	27.338
1500	0.221	34.065	27.340
2000	0.228	34.066	27.340

Station OS15016
Latitude 39-13.98 N
Longitude 137-00.18 E
Depth(m) 2433

Press.	Temp.	Sal.	SIG-T
5	10.930	34.110	26.095
10	10.851	34.108	26.107
20	10.713	34.105	26.130
30	10.570	34.141	26.183
40	10.115	34.192	26.302
50	9.519	34.212	26.417
75	7.994	34.159	26.614
100	6.459	34.111	26.791
125	5.202	34.077	26.920
150	3.872	34.045	27.040
175	2.986	34.030	27.112
200	2.253	34.029	27.174
250	1.446	34.042	27.245
300	1.177	34.050	27.270
400	0.760	34.063	27.307
500	0.615	34.065	27.317
600	0.511	34.066	27.325
700	0.435	34.067	27.330
800	0.375	34.067	27.333
900	0.336	34.066	27.335
1000	0.305	34.066	27.336
1200	0.263	34.066	27.338
1500	0.229	34.066	27.340
2000	0.228	34.066	27.340

Station OS15017
Latitude 39-18.86 N
Longitude 136-54.89 E
Depth(m) 2517

Press.	Temp.	Sal.	SIG-T
5	10.757	34.116	26.131
10	10.716	34.117	26.138
20	10.460	34.129	26.193
30	10.384	34.129	26.206
40	9.996	34.144	26.284
50	8.357	34.157	26.558
75	6.454	34.117	26.796
100	6.022	34.105	26.842
125	4.862	34.065	26.949
150	3.494	34.039	27.072
175	2.425	34.030	27.160
200	1.959	34.031	27.199
250	1.317	34.042	27.254
300	1.003	34.056	27.286
400	0.754	34.063	27.308
500	0.608	34.066	27.319
600	0.514	34.067	27.325
700	0.444	34.067	27.329
800	0.384	34.067	27.332
900	0.337	34.066	27.334
1000	0.307	34.066	27.336
1200	0.266	34.066	27.338
1500	0.236	34.066	27.339
2000	0.231	34.066	27.340

Station OS15018
Latitude 39-26.08 N
Longitude 136-51.82 E
Depth(m) 2600

Press.	Temp.	Sal.	SIG-T
5	9.147	34.128	26.412
10	8.951	34.127	26.442
20	8.847	34.125	26.457
30	8.836	34.125	26.458
40	8.831	34.125	26.459
50	8.810	34.125	26.463
75	7.988	34.150	26.608
100	6.241	34.107	26.816
125	4.665	34.069	26.975
150	3.616	34.045	27.065
175	2.897	34.032	27.122
200	2.167	34.025	27.178
250	1.617	34.034	27.226
300	1.300	34.035	27.249
400	0.903	34.055	27.292
500	0.719	34.063	27.310
600	0.576	34.067	27.321
700	0.475	34.067	27.327
800	0.406	34.067	27.331
900	0.361	34.067	27.334
1000	0.325	34.066	27.335
1200	0.265	34.066	27.338
1500	0.231	34.065	27.340
2000	0.227	34.066	27.340
2500	0.254	34.066	27.339

Station OS15019
Latitude 39-39.90 N
Longitude 137-17.14 E
Depth(m) 2551

Press.	Temp.	Sal.	SIG-T
5	9.808	34.136	26.309
10	9.735	34.135	26.321
20	9.526	34.138	26.358
30	9.481	34.137	26.364
40	9.309	34.134	26.390
50	8.045	34.143	26.594
75	7.178	34.125	26.705
100	5.692	34.089	26.871
125	4.513	34.059	26.983
150	3.494	34.042	27.074
175	2.589	34.031	27.147
200	2.063	34.035	27.193
250	1.396	34.045	27.251
300	1.137	34.055	27.277
400	0.818	34.062	27.303
500	0.665	34.065	27.315
600	0.535	34.067	27.324
700	0.458	34.067	27.329
800	0.393	34.067	27.332
900	0.339	34.067	27.335
1000	0.314	34.066	27.336
1200	0.259	34.066	27.338
1500	0.226	34.065	27.340
2000	0.223	34.066	27.340
2500	0.240	34.066	27.340

**THE "OSHORO MARU" CRUISE 012
TO THE WESTERN NORTH PACIFIC OCEAN
IN MAY 2015**

1.Cruise Itinerary

Cruise 012

Departure from Hakodate
 Start hydrographic research (OS15020)
 Start gillnet research (OSG1501)
 Finish hydrographic research (OS15035)
 Start and finish long-line research (OSSL1501), and finish gillnet research (OSG1503)
 Return to Hakodate

May. 08, 2015
 09
 11
 16
 17
 19

Total coverage 2004.0miles

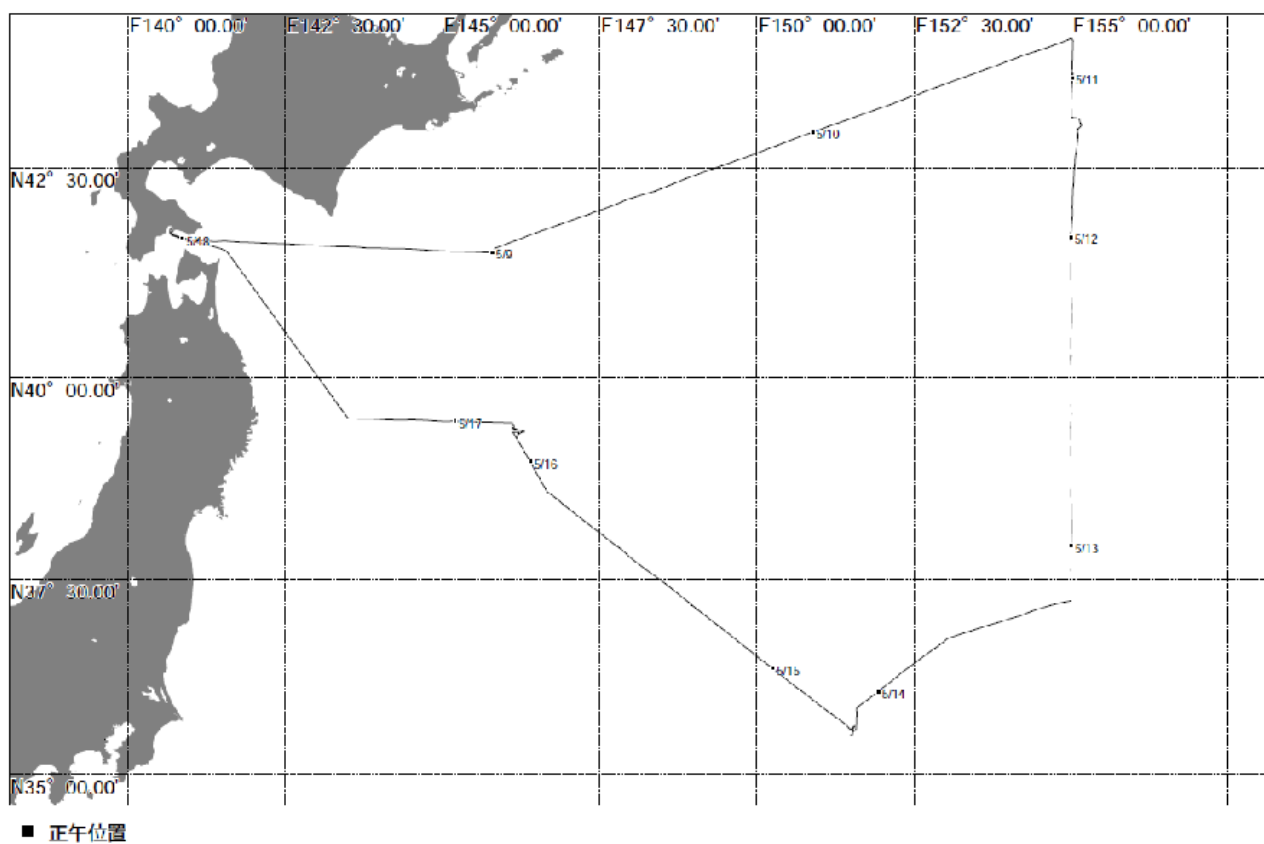


Fig.-1 Noon Position

2. Vessel Personnel

Crew: Captain: Associate Professor Shogo Takagi
And 31 persons

Under Graduate instructor: Associate Professor (Laboratory of Strategic on Marine Bioresource Conservation and Management, Hokkaido University) Hideaki Kudo

Teaching Assistant: 2 persons
Under Graduate Student: 49 persons

Research stuff: Associate Professor (Laboratory of Marine Biodiversity, Hokkaido University) Atsushi Yamaguchi

Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University) Atsuchi Ooki

(JSPS)

Jose M. L.Sanchez

Graduate Student: 1 person
Under Graduate Student: 6 persons

3. Items of Research

Hydrographic observations: (Observation of Temperature, Salinity, and Computed Dynamic Depth Anomaly)

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “*Oshoromaru*”.

Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus and XCTD).

Dynamic computations were made using a desk-top computer aboard the “*Oshoromaru*”.

Water sampling were also carried out at almost every hydrographic stations.

Fig. 2, Table-1, 2

Biological research for fishes caught by non-selective drift gillnets, surface longline and Hook-and-Line, Those were performed during this cruise. The gillnet was composed of different mesh size, and extended from the surface to 6 meters depth. The operations were supervised by the captain, and were conducted by deck officers, crews, research staff and cadets.

Fig. 2, Table-3, 4, 5, 6

4. Observation of Temperature, Salinity, and Computed Dynamic Depth Anomaly

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

Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus and XCTD2 or 4).

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

Water and Plankton sampling were also carried out at almost hydrographic stations.

Figure 2 Oceanographic and gillnet stations

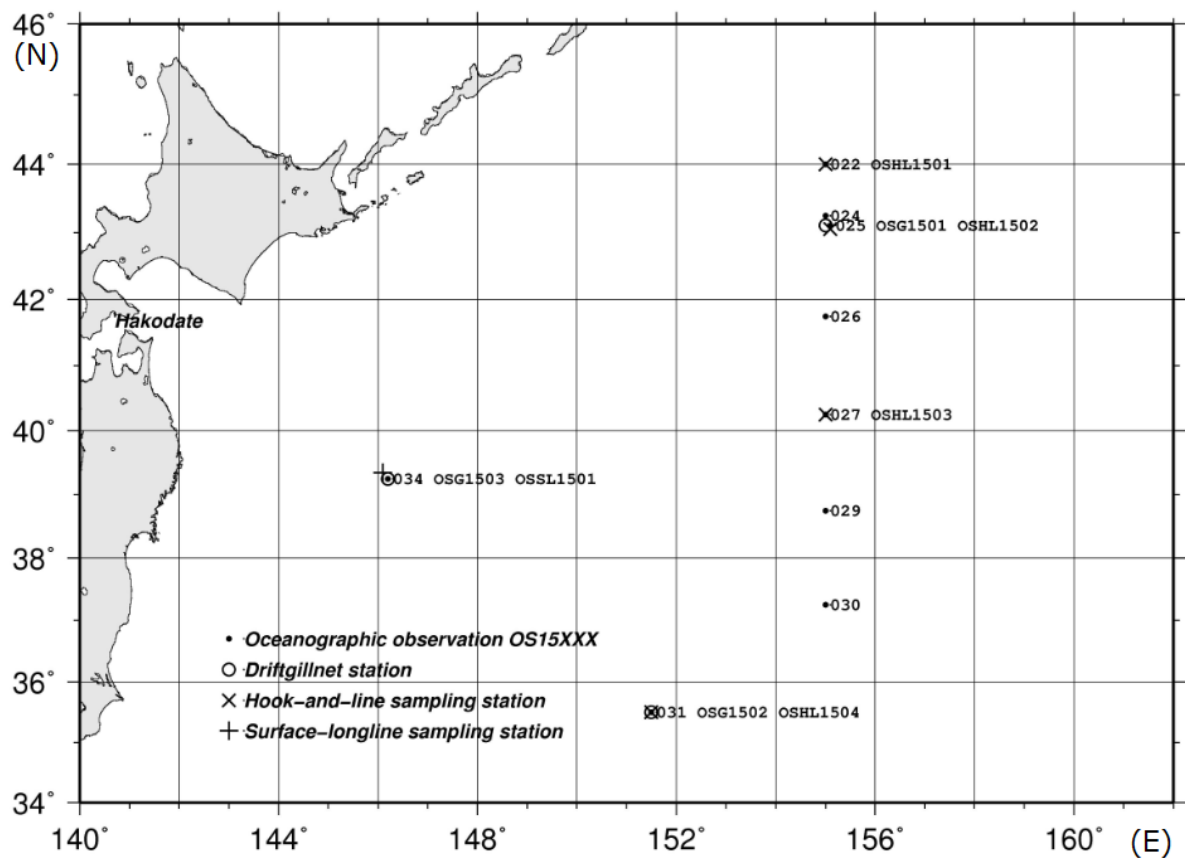


Table 1 List of Oceanographic station.

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS15020	41-30.16N	145-47.16E	5/9	2:40	9	6867	-	-	8.3	bc	9p-1171
OS15021	41-32.60N	145-49.87E	5/9	6:47	9	6925	-	-	8.7	bc	9p-1171
OS15022	43-59.90N	155-00.00E	5/10	19:46	10	5286	-	-	4.8	o	9p-1171
OS15023	43-58.82N	155-01.54E	5/10	23:47	10	5297	-	-	4.9	bc	9p-1171
OS15024	43-14.98N	154-59.95E	5/11	7:35	10	5465	-	-	6.2	bc	XCTD
OS15025	43-05.13N	155-05.05E	5/11	9:28	10	5374	-	-	5.8	bc	9p-1171
OS15026	41-45.03N	154-59.93E	5/12	2:29	10	5535	-	-	7.3	bc	XCTD
OS15027	40-14.91N	155-00.00E	5/12	10:10	10	5532	-	-	11.4	bc	9p-1171
OS15028	40-15.73N	155-00.22E	5/12	14:02	10	5506	-	-	11.4	bc	9p-1171
OS15029	38-45.00N	154-59.99E	5/12	22:59	10	5749	-	-	13.6	bc	XCTD
OS15030	37-14.99N	154-59.94E	5/13	6:39	10	5725	-	-	16.3	bc	XCTD
OS15031	35-30.72N	151-31.23E	5/14	8:38	10	6083	-	-	17.6	bc	9p-1171
OS15032	35-32.60N	151-31.82E	5/14	12:10	10	6113	-	-	17.7	bc	9p-1171
OS15033	37-10.37N	148-57.66E	5/15	10:03	10	5791	-	-	19.2	bc	9p-1171
OS15034	39-15.63N	146-11.24E	5/16	6:03	9	5269	-	-	12.1	r	9p-1171
OS15035	39-16.11N	146-11.46E	5/16	9:28	9	5267	-	-	12.6	o	9p-1171

T.Z.: Time difference between Greenwich Mean Time (G.M.T.) and Ship's Mean Time (S.M.T.)

Col.: Water color in Forel-Ule scale

Tr.: Transparency in meters with Secchi disc

SST: Sea Surface temperature

Wr.: Weather in WMO Code 4501

Table 2. Oceanographic data

Station OS15020				Station OS15021				Station OS15022			
Latitude 41-30.16 N				Latitude 41-32.60 N				Latitude 43-59.88 N			
Longitude 145-47.16 E				Longitude 145-49.87 E				Longitude 155-00.00 E			
Depth(m) 6867				Depth(m) 6925				Depth(m) 5286			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	7.855	33.040	25.756	5	8.496	33.087	25.698	5	4.515	32.903	26.066
10	7.952	33.044	25.745	10	8.405	33.082	25.708	10	4.501	32.902	26.066
20	7.172	33.043	25.854	20	8.075	33.078	25.753	20	4.383	32.899	26.076
30	6.525	33.062	25.955	30	7.124	33.035	25.854	30	4.251	32.905	26.094
40	5.687	33.067	26.063	40	6.262	33.058	25.985	40	4.166	32.912	26.109
50	4.813	33.128	26.212	50	5.489	33.130	26.137	50	3.807	32.940	26.167
75	3.788	33.141	26.329	75	3.723	33.158	26.348	75	3.148	32.985	26.263
100	3.614	33.193	26.386	100	3.676	33.208	26.392	100	3.557	33.145	26.353
125	4.084	33.356	26.470	125	4.034	33.318	26.445	125	3.284	33.335	26.531
150	3.460	33.403	26.568	150	3.568	33.393	26.550	150	2.797	33.465	26.678
175	3.240	33.466	26.639	175	4.064	33.555	26.630	175	2.747	33.562	26.759
200	3.583	33.585	26.702	200	3.442	33.575	26.707	200	2.957	33.664	26.822
250	2.963	33.649	26.810					250	3.256	33.812	26.913
300	3.191	33.756	26.874					300	3.176	33.862	26.961
400	3.507	33.951	27.000					400	3.354	34.033	27.081
500	3.352	34.076	27.115					500	3.259	34.137	27.173
600	3.333	34.194	27.211					600	3.233	34.240	27.257
700	3.197	34.265	27.280					700	2.968	34.283	27.315
800	3.006	34.324	27.345					800	2.946	34.343	27.366
900	2.820	34.376	27.403					900	2.790	34.383	27.411
1000	2.690	34.414	27.445					1000	2.625	34.412	27.449
1200	2.430	34.476	27.517					1200	2.406	34.474	27.517
1500	2.190	34.536	27.584					1500	2.185	34.531	27.581
2000	1.881	34.602	27.662					2000	1.880	34.597	27.658
2500	1.686	34.638	27.706					2500	1.665	34.638	27.708
3000	1.564	34.659	27.732					3000	1.543	34.661	27.735

Station OS15023
Latitude 43-58.82 N
Longitude 155-01.54 E
Depth(m) 5297

Press.	Temp.	Sal.	SIG-T
5	4.603	32.906	26.059
10	4.596	32.906	26.059
20	4.343	32.897	26.079
30	4.273	32.906	26.093
40	4.108	32.919	26.120
50	3.816	32.948	26.172
75	3.300	33.035	26.290
100	3.827	33.216	26.384
125	2.920	33.315	26.547
150	2.747	33.489	26.701
175	2.832	33.594	26.777
200	2.932	33.650	26.813

Station OS15024
Latitude 43-13.96 N
Longitude 154-59.95 E
Depth(m) 5465

Depth	Temp.	Sal.	SIG-T
5	6.026	33.019	-
10	6.017	33.039	-
20	6.007	33.047	-
30	5.203	32.980	-
40	6.907	33.433	-
50	7.053	33.578	-
75	5.108	33.405	-
100	6.464	33.680	-
125	4.516	33.441	-
150	5.078	33.587	-
175	3.868	33.492	-
200	4.156	33.644	-
250	2.926	33.618	-
300	4.179	33.879	-
400	3.818	34.027	-
500	3.757	34.132	-
600	3.287	34.163	-
700	3.192	34.241	-
800	2.999	34.305	-
900	2.817	34.349	-
1000	2.635	34.386	-

Station OS15025
Latitude 43-05.13 N
Longitude 155-05.05 E
Depth(m) 5374

Press.	Temp.	Sal.	SIG-T
5	5.428	32.971	26.018
10	5.428	32.971	26.018
20	5.499	33.006	26.037
30	5.693	33.214	26.179
40	5.993	33.421	26.306
50	7.003	33.679	26.378
75	6.039	33.552	26.403
100	5.022	33.483	26.470
125	3.646	33.379	26.532
150	3.174	33.423	26.611
175	3.666	33.598	26.704
200	4.085	33.712	26.753
250	3.760	33.768	26.830
300	4.149	33.905	26.900
400	3.405	33.946	27.007
500	3.429	34.074	27.106
600	3.278	34.171	27.197
700	3.154	34.240	27.265
800	2.950	34.294	27.326
900	2.803	34.345	27.380
1000	2.672	34.383	27.422
1200	2.501	34.450	27.490
1500	2.227	34.519	27.568

Station OS15026
Latitude 41-45.03 N
Longitude 154-59.93 E
Depth(m) 5535

Depth	Temp.	Sal.	SIG-T
5	6.807	32.803	-
10	6.796	32.817	-
20	3.906	32.810	-
30	3.727	32.861	-
40	3.395	32.945	-
50	3.628	33.046	-
75	2.701	33.061	-
100	2.117	33.053	-
125	1.652	33.093	-
150	2.310	33.224	-
175	3.083	33.377	-
200	2.555	33.375	-
250	2.464	33.484	-
300	3.586	33.712	-
400	4.553	34.033	-
500	3.505	34.019	-
600	3.327	34.114	-
700	3.756	34.275	-
800	3.465	34.312	-
900	2.901	34.314	-
1000	2.951	34.379	-
1200	2.685	34.450	-
1500	2.355	34.523	-

Station OS15027
Latitude 40-14.91 N
Longitude 155-00.00 E
Depth(m) 5374

Press.	Temp.	Sal.	SIG-T
5	11.168	34.191	26.115
10	11.169	34.191	26.115
20	11.170	34.191	26.115
30	11.092	34.192	26.130
40	10.990	34.195	26.150
50	10.964	34.197	26.157
75	10.523	34.225	26.257
100	10.422	34.227	26.276
125	10.524	34.263	26.286
150	10.375	34.240	26.295
175	10.118	34.196	26.304
200	9.624	34.121	26.328
250	8.596	33.975	26.379
300	7.065	33.795	26.460
400	6.031	33.898	26.678
500	4.379	33.890	26.864
600	4.211	34.028	26.991
700	3.934	34.135	27.105
800	3.632	34.213	27.198
900	3.443	34.290	27.277
1000	3.214	34.334	27.334
1200	2.796	34.403	27.427
1500	2.420	34.484	27.524
2000	1.999	34.581	27.636
2500	1.730	34.631	27.697
3000	1.577	34.657	27.730

Station OS15028
Latitude 40-15.73 N
Longitude 155-00.22 E
Depth(m) 5506

Press.	Temp.	Sal.	SIG-T
5	11.160	34.188	26.115
10	11.162	34.188	26.114
20	11.151	34.189	26.117
30	11.112	34.192	26.126
40	11.001	34.194	26.148
50	10.961	34.196	26.156
75	10.658	34.213	26.223
100	10.430	34.228	26.276
125	10.536	34.261	26.283
150	10.500	34.260	26.288
175	10.415	34.248	26.293
200	10.064	34.190	26.309

Station OS15029
Latitude 38-45.00 N
Longitude 154-59.99 E
Depth(m) 5749

Depth	Temp.	Sal.	SIG-T
5	13.418	34.332	-
10	13.409	34.336	-
20	13.390	34.343	-
30	13.371	34.349	-
40	13.334	34.343	-
50	13.096	34.345	-
75	11.916	34.322	-
100	10.817	34.202	-
125	10.145	34.139	-
150	9.715	34.105	-
175	8.897	34.017	-
200	8.141	33.950	-
250	6.947	33.904	-
300	6.323	33.915	-
400	4.978	33.962	-
500	4.706	34.121	-
600	4.279	34.204	-
700	3.810	34.275	-
800	3.574	34.322	-
900	3.339	34.364	-
1000	3.077	34.408	-
1200	2.641	34.480	-
1500	2.356	34.496	-

Station OS15030
Latitude 37-14.99
Longitude 154-59.94
Depth(m) 5725

Depth	Temp.	Sal.	SIG-T
5	16.169	34.613	-
10	16.169	34.625	-
20	16.169	34.633	-
30	16.160	34.635	-
40	16.150	34.633	-
50	16.047	34.630	-
75	15.260	34.656	-
100	14.908	34.622	-
125	14.345	34.571	-
150	13.527	34.492	-
175	13.040	34.441	-
200	12.693	34.412	-
250	11.594	34.307	-
300	9.825	34.143	-
400	7.150	33.967	-
500	5.369	33.924	-
600	4.669	34.009	-
700	4.421	34.156	-
800	4.013	34.253	-
900	3.663	34.316	-
1000	3.362	34.365	-
1200	2.858	34.457	-
1500	2.401	34.539	-

Station OS15031
Latitude 35-30.72 N
Longitude 151-31.23 E
Depth(m) 6083

Press.	Temp.	Sal.	SIG-T
5	17.475	34.516	25.029
10	17.345	34.503	25.051
20	16.110	34.429	25.284
30	15.649	34.390	25.358
40	15.311	34.360	25.411
50	14.808	34.343	25.507
75	12.544	34.297	25.939
100	11.885	34.269	26.043
125	11.490	34.265	26.114
150	11.047	34.240	26.175
175	10.382	34.198	26.260
200	10.020	34.154	26.288
250	7.447	33.792	26.405
300	7.709	33.972	26.509
400	5.487	33.921	26.763
500	5.367	34.088	26.910
600	4.713	34.149	27.033
700	4.166	34.226	27.153
800	3.837	34.281	27.231
900	3.518	34.338	27.308
1000	3.235	34.379	27.368
1200	2.780	34.446	27.463
1500	2.355	34.516	27.555
2000	1.923	34.596	27.654
2500	1.698	34.637	27.704
3000	1.561	34.660	27.733

Station OS15032
Latitude 35-32.60 N
Longitude 151-31.82 E
Depth(m) 6113

Press.	Temp.	Sal.	SIG-T
10	17.494	34.514	25.023
20	16.208	34.426	25.259
30	15.916	34.418	25.319
40	15.791	34.413	25.344
50	14.479	34.341	25.576
75	11.990	34.274	26.027
100	11.428	34.258	26.120
125	10.875	34.219	26.190
150	10.565	34.202	26.232
175	10.242	34.183	26.273
200	9.457	34.091	26.333

Station OS15033
Latitude 37-10.37 N
Longitude 148-57.66 E
Depth(m) 5791

Press.	Temp.	Sal.	SIG-T
10	19.067	34.747	24.810
20	19.007	34.744	24.823
30	18.683	34.722	24.889
40	18.324	34.702	24.964
50	18.052	34.692	25.023
75	15.881	34.621	25.483
100	14.888	34.570	25.665
125	14.392	34.532	25.743
150	12.976	34.425	25.953
175	12.819	34.426	25.984
200	12.478	34.399	26.030
250	9.781	34.108	26.292
300	8.293	34.013	26.455
400	5.155	33.793	26.701
500	5.307	34.022	26.864
600	4.663	34.113	27.010
700	4.208	34.191	27.121
800	3.776	34.270	27.228
900	3.450	34.329	27.308
1000	3.201	34.374	27.367

Station OS15034
Latitude 39-15.63 N
Longitude 146-11.24 E
Depth(m) 5269

Press.	Temp.	Sal.	SIG-T
5	12.176	33.735	25.573
10	12.510	33.857	25.604
20	13.082	34.058	25.646
30	13.207	34.172	25.710
40	12.377	34.157	25.862
50	11.960	34.230	25.998
75	9.553	33.981	26.231
100	8.336	33.832	26.306
125	7.807	33.771	26.337
150	6.671	33.614	26.371
175	7.455	33.822	26.428
200	7.668	33.931	26.483
250	6.934	33.936	26.590
300	6.344	33.976	26.700
400	5.150	34.037	26.894
500	4.552	34.110	27.020
600	4.266	34.189	27.113
700	3.857	34.267	27.217
800	3.556	34.313	27.285
900	3.150	34.341	27.345
1000	2.940	34.377	27.393
1200	2.673	34.450	27.475
1500	2.354	34.514	27.553
2000	1.965	34.590	27.646
2500	1.703	34.635	27.702
3000	1.563	34.659	27.732

Station	OS15035			
Latitude	39-16.11 N			
Longitude	146-11.46 E			
Depth(m)	5267			
Press.	Temp.	Sal.	SIG-T	
5	12.354	33.771	25.567	
10	12.353	33.772	25.568	
20	12.241	33.801	25.612	
30	11.988	33.921	25.753	
40	12.213	34.243	25.961	
50	11.347	34.174	26.069	
75	9.921	34.038	26.214	
100	8.762	33.917	26.308	
125	6.710	33.615	26.367	
150	6.574	33.655	26.417	
175	7.194	33.791	26.439	
200	7.499	33.900	26.483	

5. Drift Gillnet Research

Table 3. Position and research conditions of surface drift gillnet, surface longline and hook-and-line sampling at each station during the Oshoro maru Cruise #012, 2015.

Station	Date and Time (S.M.T.*1)				T.D.*2	Set Position		D.S.*3	Number of baskets	Wr*4	Wind (Force)
	Net set		Net haul			Lat.	Long.				
OSHL1501	May 11	06:00	May 11	10:00	+10h	43-59.9 N	155-00.0 E	-	-	c	NNE-4
OSG 1501	May 11	18:40-19:07	May 12	04:55-06:05	+10h	43-05.4 N	155-01.4 E	090	-	bc	North-3
OSHL1502	May 11	22:50	May 12	04:00	+10h	43-03.3 N	155-08.0 E	-	-	bc	West-3
OSHL1503	May 12	20:05	May 13	01:35	+10h	40-15.0 N	155-00.0 E	-	-	bc	West-4
OSG 1502	May 14	17:50-18:10	May 15	04:58-06:05	+10h	35-30.6 N	151-30.0 E	240	-	b	SW-4
OSHL1504	May 14	18:30	May 14	24:00	+10h	35-30.0 N	151-30.0 E	-	-	bc	SW-4
OSG 1503	May 16	17:50-18:06	May 17	05:08-06:12	+9h	39-14.9 N	146-11.3 E	310	-	o	NW-5
	Line set		Line haul								
OSSL 1501	May 17	03:55-04:27	May 17	06:36-07:52	+9h	39-22.6 N	146-08.4 E	300	10	bc	NW-3

*1 S.M.T. : Ship's Mean Time.

*2 T.D. : Time Difference between Greenwich Mean Time (G.M.T.) and Ship's Mean Time (S.M.T.).

*3 D.S. : Direction of net set.

*4 Wr : Weather (b:0-25%clouded, bc: 25-75% clouded, c: 75-99% clouded, o: 100% clouded).

Table 4 Amount of net cast (Tan)

Stations	net	A-Gear				C-gear										Total
	Mesh size (mm)	112	115	118	121	48	55	63	72	82	93	106	121	138	157	
OSG1501,03	Number	3	3	3	3	3	3	3	5	6	5	3	3	3	3	49
OSG1502	of tan	3	3	6	7	3	3	3	3	3	3	3	3	3	3	49

Table 5 Biological characteristics of salmonds

CHUM SALMON																	
Station	Gear	F.L.	B.W.	Sex	G.W.	Station	Gear	F.L.	B.W.	Sex	G.W.	Station	Gear	F.L.	B.W.	Sex	G.W.
	(mesh)	(mm)	(g)		(g)		(mesh)	(mm)	(g)		(g)		(mesh)	(mm)	(g)		(g)
HL02	O000	518	1570	2	10	G01	C93	552	2035	2	10	G01	C93	416	734	-	-

Table 5 Biological characteristics of salmonids (continued)

PINK SALMON																	
Station	Gear	F.L.	B.W.	Sex	G.W.	Station	Gear	F.L.	B.W.	Sex	G.W.	Station	Gear	F.L.	B.W.	Sex	G.W.
(mesh)	(mm)	(g)	(g)		(g)	(mesh)	(mm)	(g)	(g)		(g)	(mesh)		(mm)	(g)		(g)
HL01	O000	422	1030	1	20	G01	C82	420	840	-	-	G01	3	420	830	-	-
HL01	O000	388	750	1	15	G01	C82	412	846	1	21	G01	3	422	845	-	-
HL01	O000	423	970	1	13	G01	C82	449	996	2	1	G01	3	418	853	-	-
HL02	O000	398	700	2	3	G01	C82	406	791	1	25	G01	3	394	765	-	-
HL02	O000	404	860	2	4	G01	C82	424	795	2	2	G01	3	432	853	-	-
HL02	O000	421	850	2	4	G01	C82	386	625	2	2	G01	3	406	750	-	-
HL02	O000	418	730	2	3	G01	C82	409	736	2	2	G01	3	400	695	-	-
HL02	O000	369	600	1	7	G01	C82	409	734	2	3	G01	3	400	743	-	-
HL02	O000	414	680	1	7	G01	C82	417	785	2	4	G01	3	400	683	-	-
HL02	O000	410	700	2	1	G01	C82	356	505	2	3	G01	3	420	928	-	-
HL02	O000	412	760	1	12	G01	C93	412	785	2	1	G01	3	-	-	-	-
G01	C72	404	740	-	-	G01	C93	420	851	2	3	G01	3	398	724	-	-
G01	C72	399	780	-	-	G01	C93	400	775	1	12	G01	3	428	803	-	-
G01	C82	413	756	-	-	G01	C93	409	838	2	3	G01	3	472	1215	-	-
G01	C82	396	730	-	-	G01	C93	411	795	2	1	G01	3	406	834	-	-
G01	C82	400	746	-	-	G01	C93	420	830	1	28	G01	3	398	773	-	-
G01	C82	409	746	-	-	G01	C93	419	846	2	1	G01	3	431	850	-	-
G01	C82	412	814	-	-	G01	C93	429	935	1	11	G01	3	424	900	-	-
G01	C82	414	807	-	-	G01	C93	404	770	-	-	G01	3	451	1057	2	7
G01	C82	420	818	-	-	G01	C93	432	958	-	-	G01	3	425	985	2	4
G01	C82	418	725	-	-	G01	C93	390	690	-	-	G01	3	454	1025	2	4
G01	C82	451	990	-	-	G01	C93	396	730	-	-	G01	3	415	863	2	6
G01	C82	409	713	-	-	G01	C93	422	801	-	-	G01	3	458	1064	1	13
G01	C82	404	784	-	-	G01	C93	400	760	-	-	HL03	3	420	810	2	2

Table 6. Data on number of organisms except salmoids caught by dgift gillnet

Species	Scientific name	Number		
		OSG1501	OSG1502	OSG1503
Japanese scaled sardine	<i>Sardinops melanostictus</i>	0	0	3
Pilotfish	<i>Naucrates ductor</i>	0	4	0
Japanese amberjack	<i>Seriola quinqueradiata</i>	0	1	0
Yellowtail	<i>Seriola lalandi</i>	0	2	0
Greater Amberjack	<i>Seriola dumerili</i>	0	1	0
Dolphinfish	<i>Coryphaena hippurus</i>	0	11	0
Pacific pomfret	<i>Brama japonica</i>	0	22	1
Mackerel	<i>Scombroidae</i>	0	0	226
Skipjack tuna	<i>Katsuwonus pelamis</i>	0	92	0
Boreal clubhook squid	<i>Onychoteuthis borealijaponicus</i>	1	0	2
Eight-armed squid	<i>Gonatopsis borealis</i>	3	0	0
Flying squid	<i>Ommastrephes bartramii</i>	0	2	0
Spiny dogfish	<i>Squalus acanthias</i>	1	0	0
Blue shark	<i>Prionace glauca</i>	0	5	1
Tufted puffin	<i>Fratercula cirrhata</i>	1	0	0
Short-tailed shearwater	<i>Puffinus tenuirostris</i>	2	0	1
Auks	<i>Alcinae</i>	1	0	0
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	0	0	1*
Northern right whale dolphin	<i>Lissodelphis borealis</i>	0	0	1
Northern fur seal	<i>Callorhinus ursinus</i>	0	0	1*

*Released

**THE "OSHORO MARU" CRUISE 014
TO FUKUSHIMA OFFING
IN JULY AND AUGUST 2015**

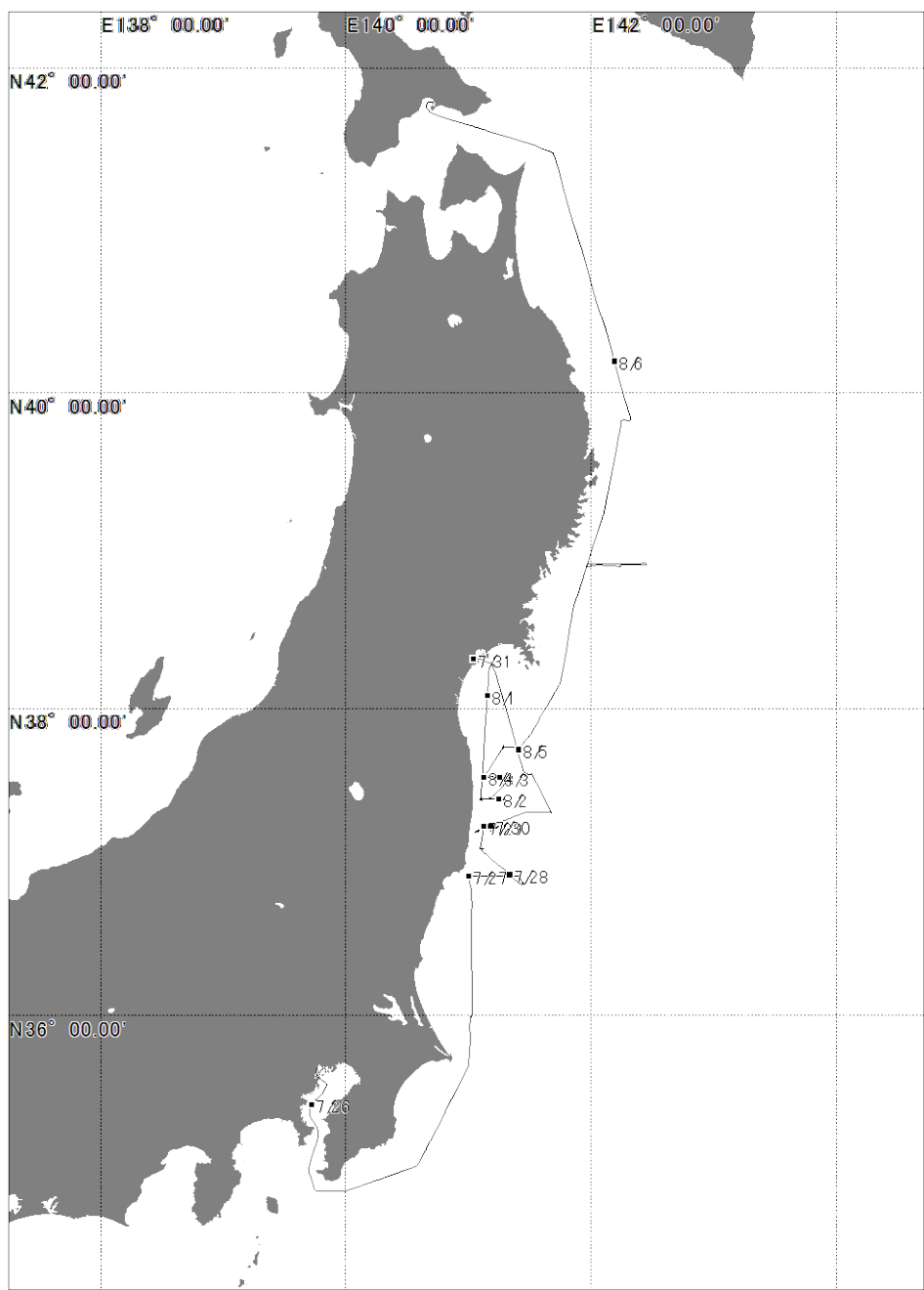
1.Cruise Itinerary

Cruise 014

Departure from Tokyo (Leg1)
Start hydrographic research (OS15037)
Arrival at Shiogama
Departure from Shiogama (Leg2)
Finish hydrographic research(OS15050)
Return to Hakodate

July.	26, 2015
	27
	31
August.	01
	05
	07

Total coverage 931.7miles



■ 正午位置

Fig.-1: Noon Position

2. Vessel Personnel

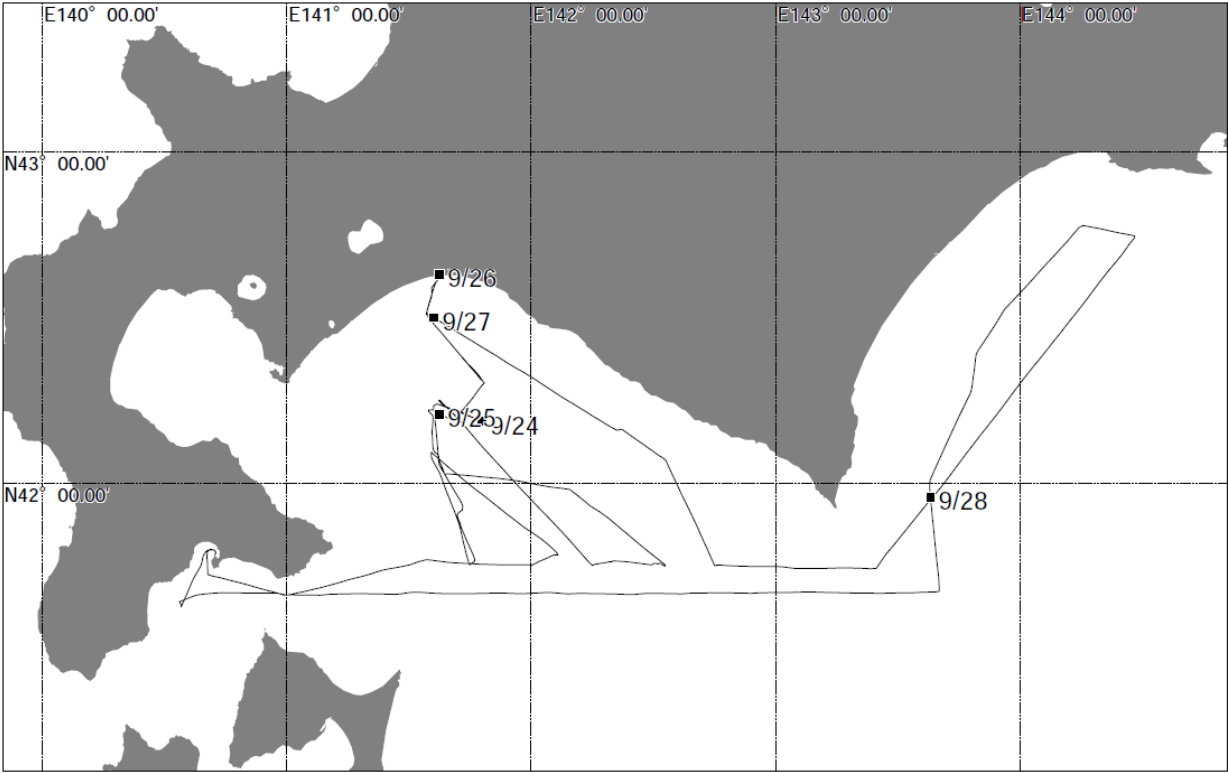
Crew:	Captain:	Associate Professor	Shogo Takagi		
			And 31 persons (Leg1)		
			30 persons (Leg2)		
Research Staff:	Associate Professor	(Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	Toru Hirawake		
	Associate Professor	(Laboratory of Marine Biodiversity, Hokkaido University)	Atsushi Yamaguchi		
	Associate Professor	(Faculty of Environmental Earth Science, Hokkaido University)	Yutaka Watanabe		
	Professor	(Tokyo University of Marine Science and Technology)	Takashi Ishimaru		
	Researcher	(Tokyo University of Marine Science and Technology)	Kaori Uchiyama		
	Postdoctoral Fellow	(Tokyo University of Marine Science and Technology)	Atsushi Kubo		
	Assistant Professor	(Tokyo University of Marine Science and Technology)	Leg1	Naho Miyazaki	
	Technical staff	(Tokyo University of Marine Science and Technology)	Leg2	Yukari Ito	
	Associate Professor	(Fukushima University)	Leg1	Toshihiro Wada	
	Visiting Professor	(Tokai University)	Leg1	Yoshihisa Kato	
	Associate Professor	(Nagoya University)	Leg1	Yoshihisa Mino	
	Researcher	(Nagoya University)	Leg1	Chiho Sukigara	
	Associate Professor	(Stockholm University)		Clare Bradshaw	
	Researcher	(Stockholm University)		Filip Svensson	
	Graduate Student:	Leg1	6 persons	Leg2	3 persons
	Under Graduate Student:		3 persons		

**THE "OSHORU MARU" CRUISE 018
TO EAST OF THE TSUGARU STRAIT
(IBURI / HIDAKA OFFING)
IN SEPTEMBER 2015**

1.Cruise Itinerary

Cruise 018

Departure from Hakodate (Leg1) and Start hydrographic research	Sep. 23, 2015
Start bottom trawl research (OST1501)	24
Finish bottom trawl research (OST1502)	25
Arrival at Tomakomai	26
Departure from Tomakomai (Leg2) and finish hydrographic research	27
Return to Hakodate	29
Total coverage 763nm	



■ 正午位置

Fig. 1 Noon Position

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 31 persons
Under Graduate instructor:	Professor	(Laboratory of Marine Bio-resources Science, Hokkaido University)	Leg1 Tetsuya Takatsu
	Associate Professor	(Laboratory of Marine Bio-resources Ecology, Hokkaido University)	Takashi Matsuishi
	Associate Professor	(Laboratory of Marine Environmental Science, Hokkaido University)	Atsushi Ooki
	Associate Professor	(Laboratory of Marine Biology and Biodiversity, Hokkaido University)	Leg1 Hisashi Imamura
	Associate Professor	(Laboratory of Marine Biodiversity, Hokkaido University)	Leg1 Atsushi Yamaguchi
	Associate Professor	(Laboratory of Marine Ecology, Hokkaido University)	Leg2 Yutaka Watanuki
	Specially Appointed Assistant Professor	(School of Fisheries Sciences, Hokkaido University)	Leg2 Mitsuhiro Nakaya
	Teaching Assistant:	Leg1 12 persons	Leg2 9 persons
	Under Graduate Student:	Leg1 46 persons	Leg2 45 persons

3. Items of Research

A short cruise to conduct shipboard training in hydrographic observations, plankton samplings, sighting survey of marine mammals and biological processing of trawl for undergraduate students in the department of marine biological science.

Bottom trawl observations:

Two operations of the stern otter bottom trawl were carried out. These operations were supervised by the captain, Deck officer, Science officer, crew, research staff, and cadets were engaged in the work.

Fig. 2 Table 1, 2

4. Bottom Trawl Research

Figure 2 Locations of bottom trawl research

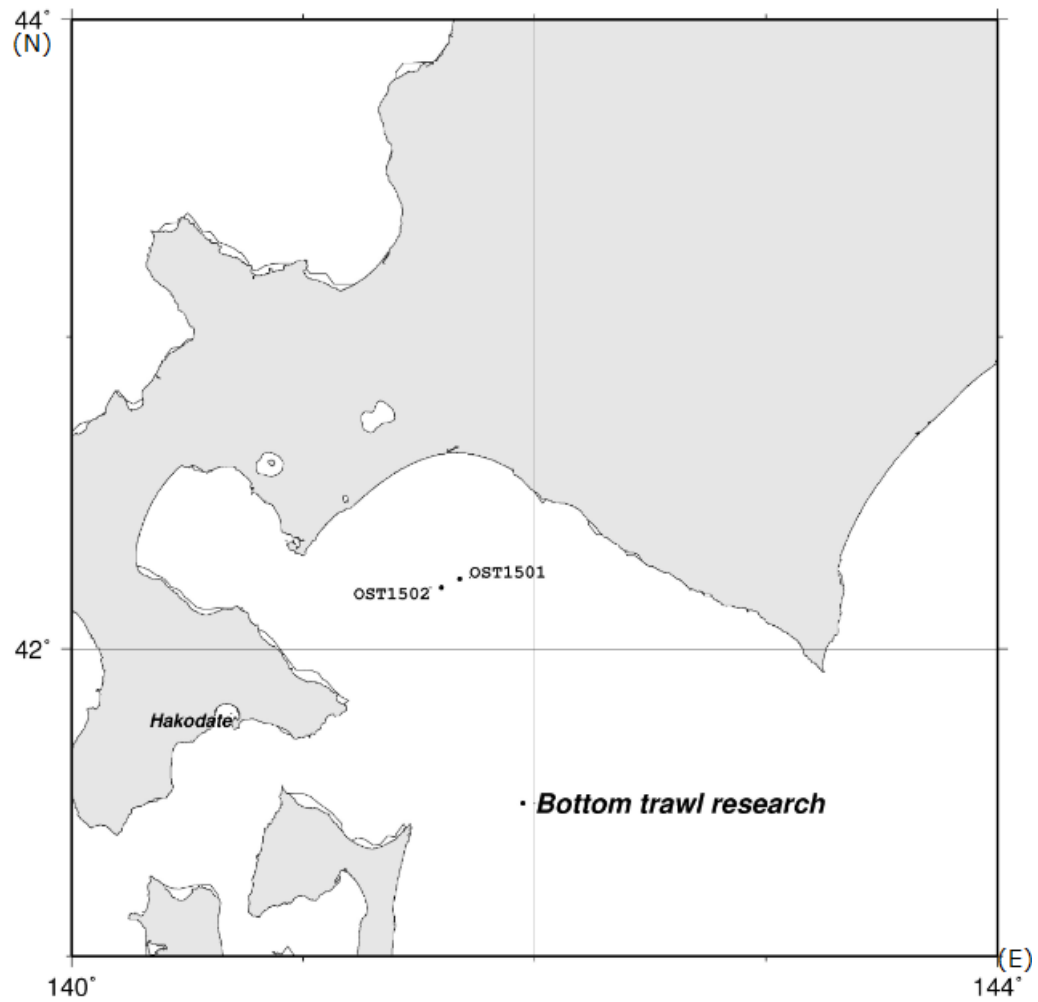


Table 1. Data on Bottom trawl research during the Oshoromaru Cruise#018

No. of research	Date and time of net tow		Position		T.D.*2	D.S.*3	Speed of tow	Bottom depth	Wr.*4	Wind	SST*5
	(S.M.T*1)		Lat. (N)	Long. (E)							
OST1501	Sep. 24	1322-1430	42-13.5	141-40.6	+9h	290°	3.5	681	bc	SSE-3	20.3
OST1502	Sep. 25	0923-1030	42-11.9	141-35.9	+9h	5°	2.9	680	o	SE-5	19.9

*1 S.M.T.: Ship's Mean Time.

*2 T.D.: Time difference between Greenwich Mean Time (G.M.T.) and S.M.T.

*3 D.S.: Direction of tow

*4 Wr.: Weather in WMO Code 4501(bc: 25-75% clouded, o: 100% clouded)

*5 SST: Sea Surface temperature

Table 2. Data on catches by Bottom trawl research

Japanese name	Scientific name	OST1501		OST1502	
		Number	Weight (kg)	Number	Weight (kg)
Kanadadara	<i>Antimora microlepis</i>	10	0.48	12	2.95
Yasesokoiwashi	<i>Bathylagus pacificus</i>	1	0.1	-	-
Sokogangiei-zoku	<i>Bathyraja sp.</i>	5	1.6	2	1.7
Norogenge	<i>Bothrocara hollandi</i>	1	9	-	-
Shirogenge	<i>Bothrocara molle</i>	154	65.73	692	230.96
Kantengenge	<i>Bothrocara tanakae</i>	2	1.2	10	10.16
Ezobaigai-rui	<i>Buccinidae spp.</i>	19	0.8	166	12
Ogurokonnyakuuo	<i>Careproctus furcellus</i>	-	-	1	0.1
Higashihouraesio	<i>Chauliodus macouni</i>	2	0.1	-	-
Benizuwaigani	<i>Chionoecetes japonicus</i>	3	1	30	16.66
Samegarei	<i>Clidoderma asperrimum</i>	1	2.6	-	-
Ibarahige	<i>Coryphaenoides acrolepis</i>	1	0.3	-	-
Karahutosokodara	<i>Coryphaenoides cinereus</i>	280	59.7	14	3.5
Munedara	<i>Coryphaenoides pectoralis</i>	14	23.7	-	-
Ganko	<i>Dasycottus setiger</i>	4	0.5	8	1
Ika-rui	<i>Decapodiformes spp.</i>	320	97.05	49	9
Todohadaka	<i>Diaphus theta</i>	2	0.01	-	-
Akadonko	<i>Ebinania vermiculata</i>	1	1.2	-	-
Fujikujira	<i>Etmopterus splendidus</i>	-	-	1	0.08
Yokoeso	<i>Gonostoma gracile</i>	6	0.1	-	-
Karasudara	<i>Halargyreus johnsonii</i>	36	8	-	-
Namako-rui	<i>Holothuroidea spp.</i>	17	5.7	47	4.2
Yukihoraanago	<i>Ilyophs nigeli</i>	4	0.14	-	-
Itohikidara	<i>Laemonema longipes</i>	47	26.42	165	109.32
Mamehadaka	<i>Lampanyctus jordani</i>	5	0.1	3	0.06
Futasujinamehadaka	<i>Lestrolepis intermedia</i>	2	0.06	-	-
Togariichimonjiwashi	<i>Leuroglossus schmidtii</i>	31	0.1	5	0.015
Sokoiwashi	<i>Lipolagus ochotensis</i>	1	0.5	-	-
Nezumiginpo	<i>Lumpenella longirostris</i>	26	1.5	9	0.52
Kobushikajika	<i>Malacocottus zonurus</i>	-	-	1	0.05
Kyurieso	<i>Maurollicus japonicus</i>	-	-	1	0.005
Kurosokogisu	<i>Notacanthus chemnitzii</i>	1	0.25	-	-
Okuchiiwashi	<i>Notoscopelus japonicus</i>	-	-	1	0.05
Isaribihadaka	<i>Notoscopelus resplendens</i>	1	0.02	-	-
Tako-rui	<i>Octopodiformes spp.</i>	84	25.7	115	42.16
Hirainkiuo	<i>Paraliparis grandis</i>	-	-	1	0.25
Kurosokoiwashi	<i>Pseudobathylagus milleri</i>	3	0.2	1	0.01
Kichiji	<i>Sebastolobus macrochir</i>	144	31.5	187	37.16
Sekkihadaka	<i>Stenobranchius nannochir</i>	2	0.015	-	-
Irakoanago	<i>Synphobranchius kaupii</i>	15	7.7	10	5.2

**THE "OSHORO MARU" CRUISE 019
TO SEA OF JAPAN
IN OCTOBER 2015**

1.Cruise Itinerary

Cruise 019

Departure from Hakodate (Leg1)

Oct. 17, 2015

Start hydrographic research

18

Finish hydrographic research

21

Arrival at Niigata

22

Departure from Niigata (Leg2) and finish hydrographic research

23

Return to Hakodate

24

Total coverage 789.7 miles

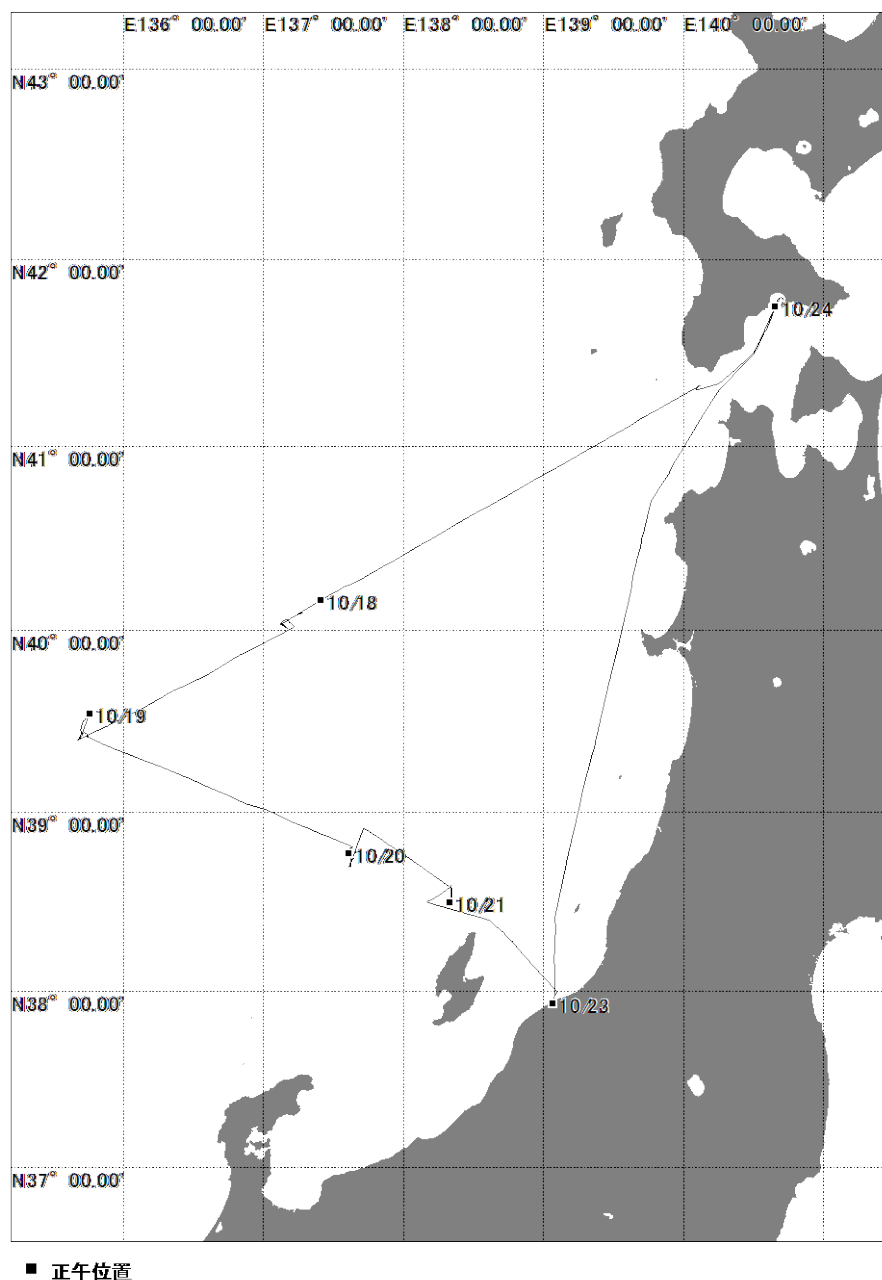


Fig. 1 Noon Position

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi And 30 persons
Under Graduate instructor:	Professor	(Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	Leg1 Yasuzumi Fujimori
	Assistant Professor	(Field Science Center for Northern Biosphere, Hokkaido University)	Jun Yamamoto
		Teaching Assistant:	4 persons
		Under Graduate Student:	35 persons

**THE "OSHORO MARU" CRUISE 020
TO SEA OF OKHOTSK
IN November 2015**

1.Cruise Itinerary

Cruise 020

Departure from Hakodate (Leg1)	Nov. 12, 2015
Arrival at Abashiri	14
Departure from Abashiri (Leg2) and start hydrographic research	15
Arrival at Abashiri	18
Departure from Abashiri (Leg3)	20
Finish hydrographic research	22
Arrival and departure from Abashiri (Leg4)	23
Return to Hakodate	25
Total coverage 1445.9 miles	

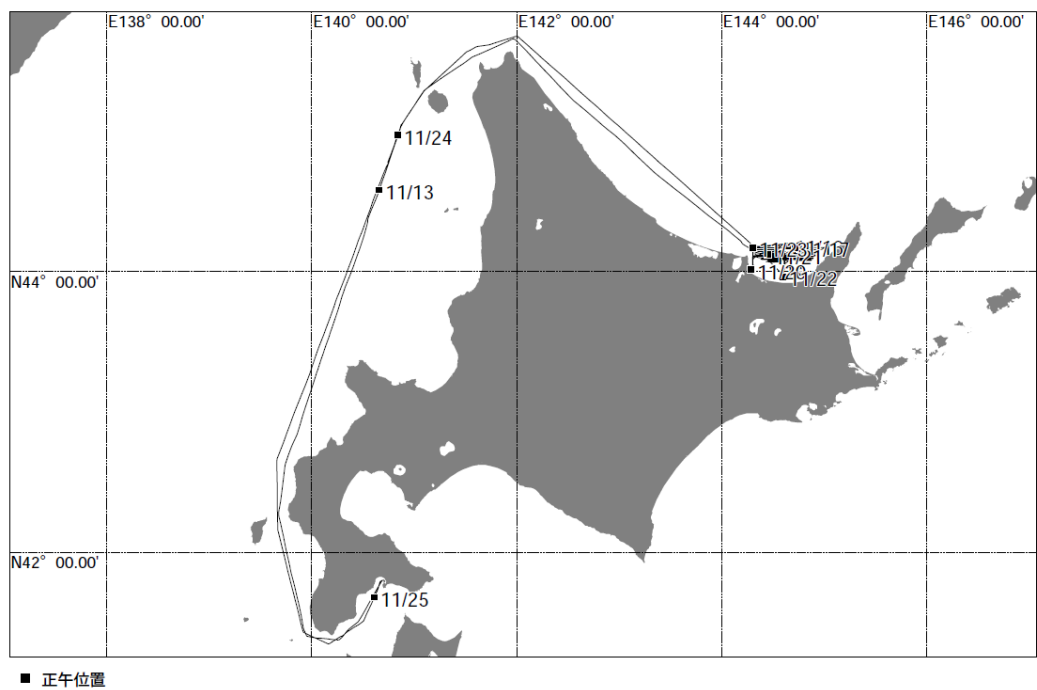


Fig. 1-1: Noon Position

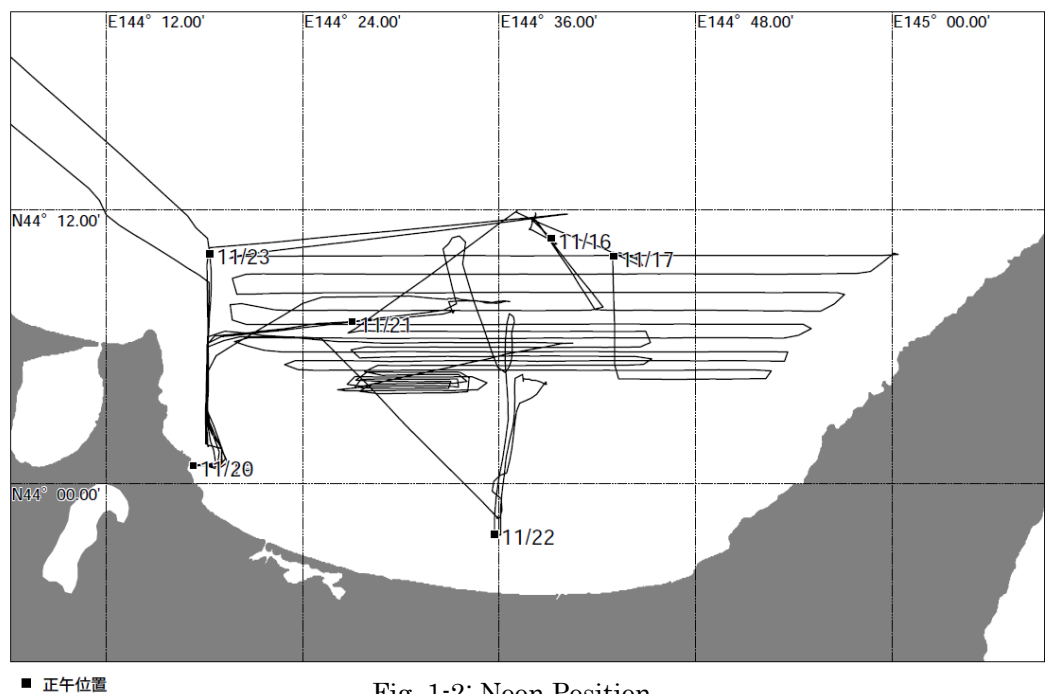


Fig. 1-2: Noon Position

2. Vessel Personnel

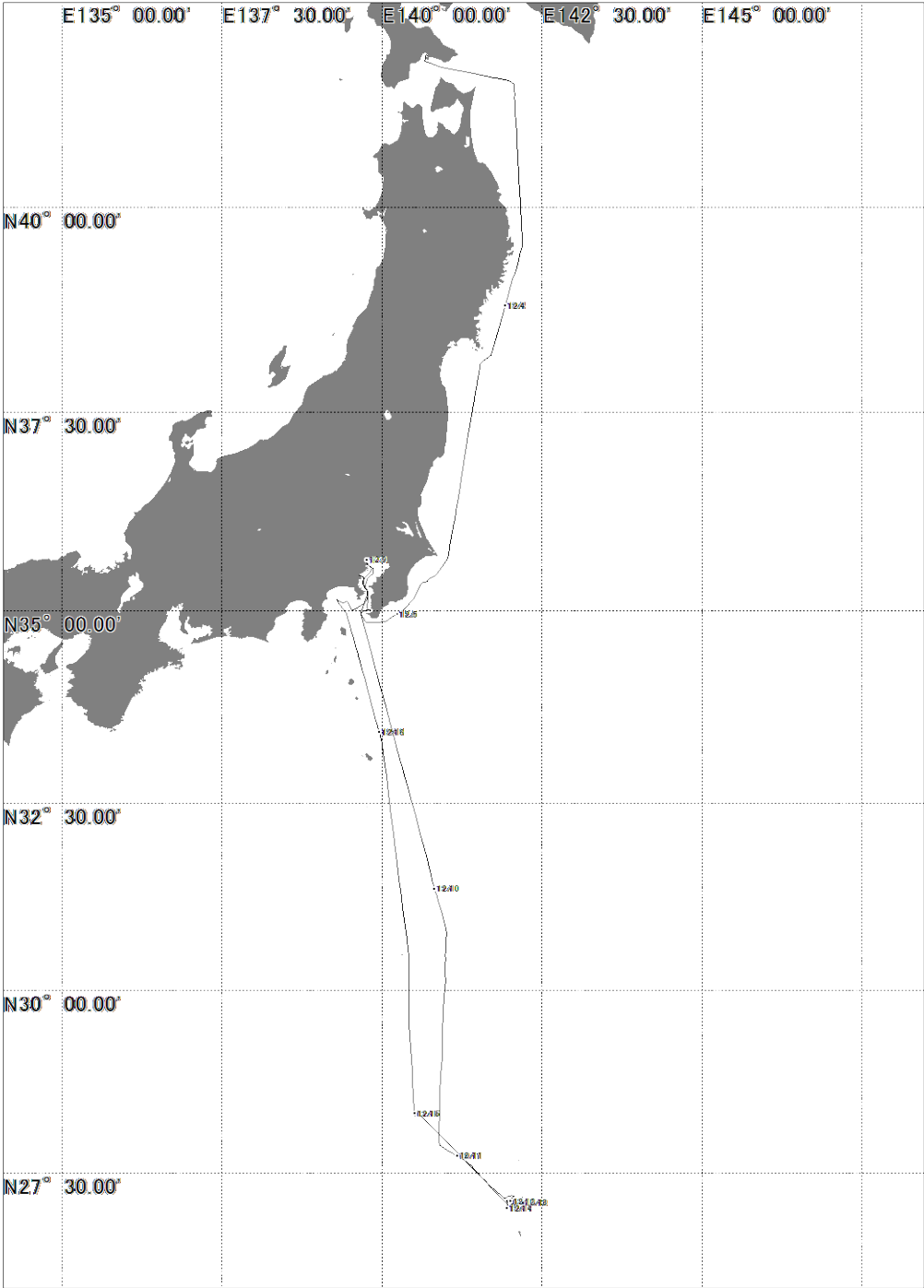
Crew:	Captain:	Associate Professor	Shogo Takagi	
			And 31 persons	
Research Staff:	Professor	(Civil and Environmental Engineering, Kitami Institute of Technology)		
			Leg1,2	Satoshi Yamashita
	Professor	(Environmental and Energy Engineering, Kitami Institute of Technology)		
			Leg1,2	Akihiro Hachikubo
	Assistant Professor	(Materials Science and Engineering, Kitami Institute of Technology)		
			Leg1,2	Hirotohi Sakagami
	Assistant Professor	(Civil and Environmental Engineering, Kitami Institute of Technology)		
			Leg1,2	Shintaro Yamasaki
	Technical Staff	(New Energy Resources Research Center, Kitami Institute of Technology)		
			Leg1,2	Kinji Hyakutake
	Assistant Professor	(Department of Civil Engineering, Kobe University)		
			Let1,2	Satsuki Kataoka
	Associate Professor	(School of Regional Innovation and Social Design Engineering, Kitami Institute of Technology)		
			Leg 2	Masaaki Konishi
	Assistant Professor	(Graduate School of Advanced Science of Matter, Hiroshima University)		
			Leg 2	Takahisa Tajima
	Professor	(Aqua Bioscience and Industry, Tokyo University of Agriculture)		
			Leg3	Akihiro Shiimoto
	Specially Appointed Assistant Professor	(School of Fisheries Sciences, Hokkaido University)		
			Leg3	Mitsuhiro Nakaya
Teaching Assistant:	Leg2	6 persons	Leg3	1 person
Under Graduate Student:	Leg1	5 persons	Leg2	33 persons
			Leg3	26 persons

**THE "OSHORO MARU" CRUISE 021
TO THE OGASAWARA ISLANDS
IN DECEMBER 2015**

1.Cruise Itinerary

Cruise 021

Departure from Hakodate (Leg1)	Dec. 03, 2015
Arrival at Tokyo	06
Departure from Tokyo (Leg2)	09
Start vertical long-line research(OSVL1501), hydrographic research and arrival at Futami	12
Departure from Futami (Leg3)	14
Finish hydrographic research and vertical long-line research (OSVL1503)	15
Arrival at Yokohama	17
Total coverage 1752.4 miles	



■ 正午位置

Fig.-1: Noon Position

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 30 persons
Research Staff:	Professor	(Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	
			Leg1 Tohru Mukai
Under Graduate instructor:	Professor	(Department of Marine Science and Resources, Nihon University)	
			Leg2,3 Takahito Kojima
		Professor (Teikyo University of Science and Technology)	
			Leg2,3 Kyoichi Mori
	Teaching Assistant:		Leg2,3 4 persons
	Under Graduate Student:		Leg2,3 54 persons

**THE "OSHORO MARU" CRUISE 022
TO TATEYAMA-BAY and SAGAMI-NADA
IN DECEMBER 2015**

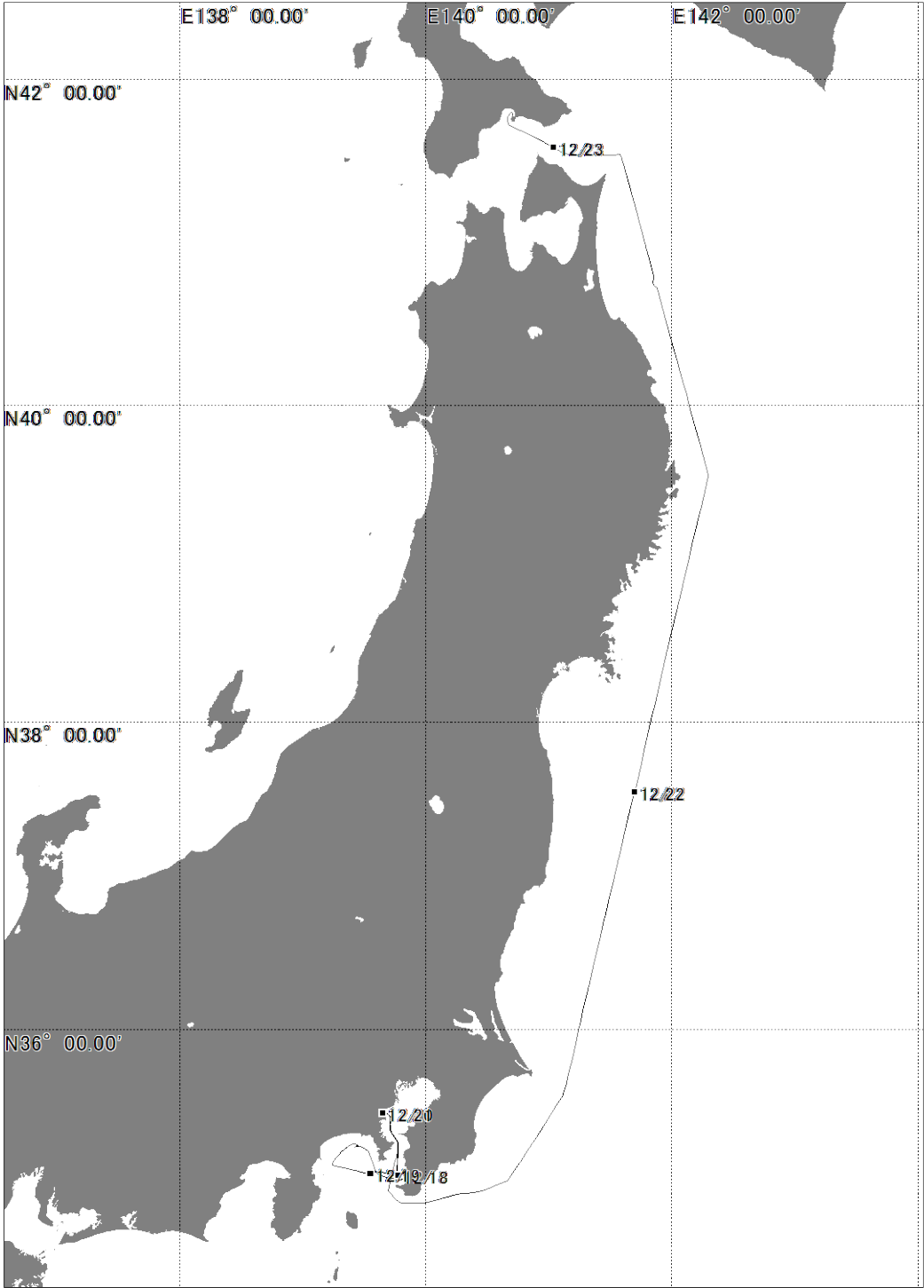
1.Cruise Itinerary

Cruise 022

Departure from Yokohama (Leg1) and start hydrographic research
Finish hydrographic research
Arrival at Yokohama
Departure from Yokohama (Leg2)
Return to Hakodate

Dec. 18, 2015
19
20
21
24

Total coverage 565.6 miles



■ 正午位置

Fig.-1: Noon Position

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 30 persons
Under Graduate instructor:	Specially Appointed Assistant Professor (School of Fisheries Sciences, Hokkaido University)	Leg1	Mitsuhiro Nakaya
	Professor (Laboratory of Coastal Marine Biology and Ecology, Kitasato University)	Leg1	Ryusuke Kado
	Lecturer (School of Marine Bioscience, Kitasato University)	Leg1	Noriko Amiya
	Teaching Assistant:	Leg1	3persons
	Under Graduate Student:	Leg1	59persons

PART II

USHIO MARU CRUISES FROM JANUARY TO DECEMBER 2015

THE " USHIO MARU "

CRUISE 324

CRUISE 325

CRUISE 326

IN JANUARY 2015

IN FEBRUARY 2015

1.Cruise Itinerary

Cruise 324

Departure from Hakodate	Jan.	9, 2015
Start hydrographic research (US15001)		9
Arrival at Hakodate		9
Departure from Hakodate		10
Arrival at Hakodate		10
Departure from Hakodate		13
Finish hydrographic research (US15019)		13
Return to Hakodate		14
Total coverage 199.9 miles		

Cruise 325

Departure from Hakodate	Jan.	21, 2015
Start hydrographic research (US15020)		21
Arrival at Usujiri		21
Departure from Usujiri		22
Arrival at Muroran		22
Departure from Muroran		24
Anchorage at Muroran		24
Departure from Muroran		25
Finish hydrographic research (US15044)		25
Return to Hakodate		26
Total coverage 298.5 miles		

Cruise 326

Departure from Hakodate	Feb.	3, 2015
Start hydrographic research (US15045)		3
Arrival at and departure from Hakodate		6
Finish hydrographic research (US15075)		7
Return to Hakodate		7
Total coverage 420.6 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

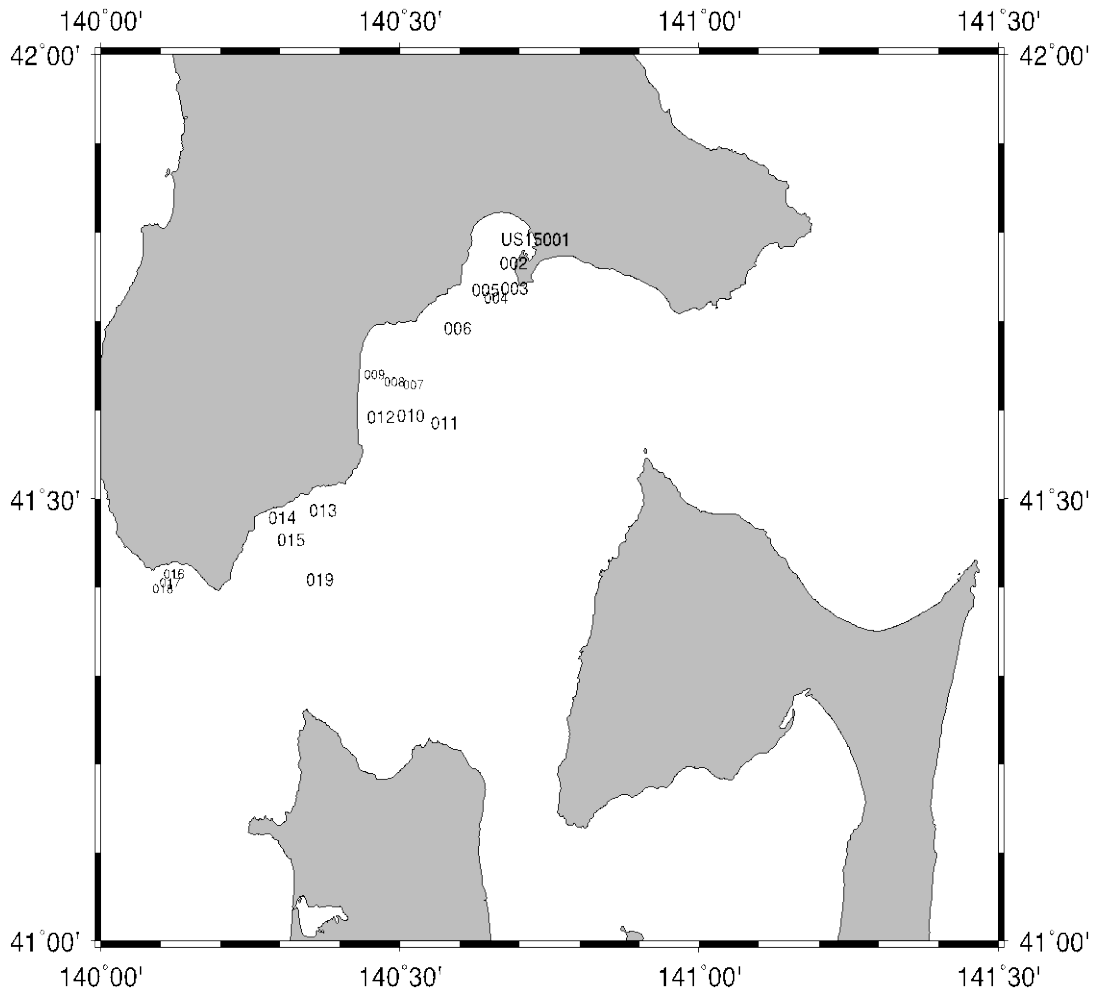


Figure 1. Oceanographic stations (Cruise 324)

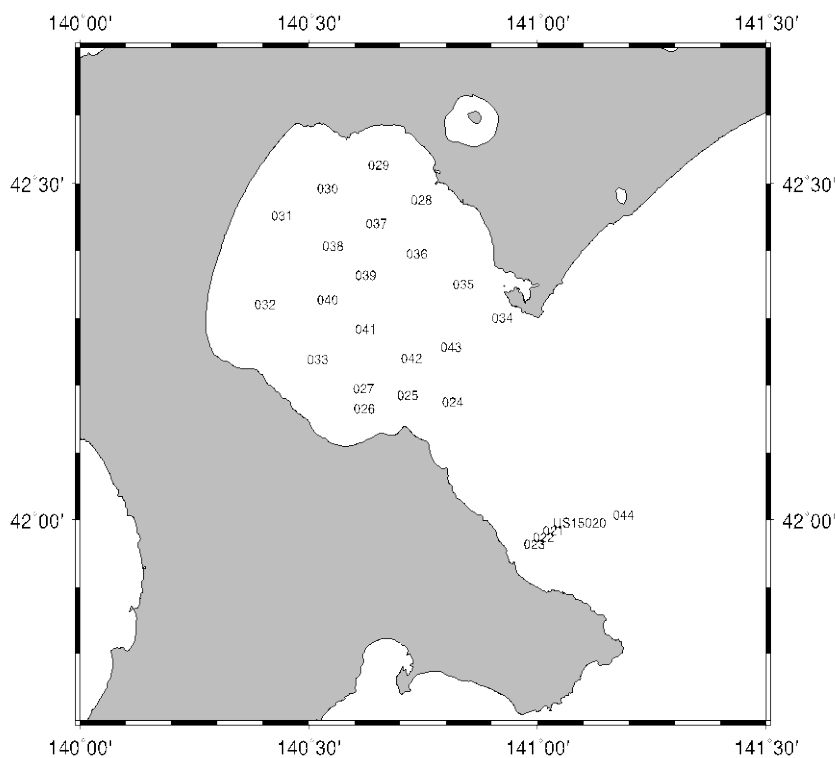


Figure 2. Oceanographic stations (Cruise 325)

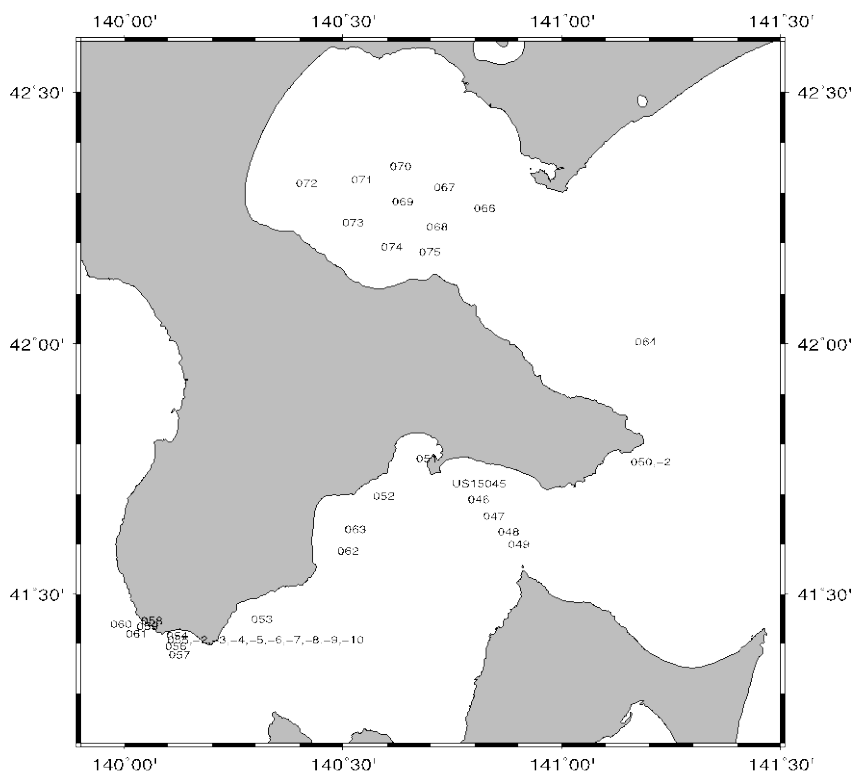


Figure 3. Oceanographic stations (Cruise 326)

Table 1. List of Oceanographic Station

Cruise 324												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15001	41-47.1	140-40.1	1/9	0721-0723	20	NNW-1	SSE-1	NNW-3	2.1	6.6	c	1009.3
US15002	41-45.5	140-40.0	1/9	0743-0746	39	NNW-1	SSE-1	NNW-2	2.2	9.6	c	1009.1
US15003	41-43.8	140-40.1	1/9	0819-0823	63	WNW-1	SSE-1	WNW-3	2.4	9.5	c	1009.0
US15004	41-43.6	140-38.1	1/9	0855-0859	55	WNW-1	SSE-1	WNW-3	2.5	9.9	c	1009.3
US15005	41-43.7	140-37.2	1/9	0908-0912	48	WNW-1	South-1	WNW-3	2.3	9.9	bc	1009.3
US15006	41-41.1	140-34.4	1/9	0953-0957	42	West-1	SSE-1	West-3	2.7	9.9	bc	1009.3
US15007	41-37.4	140-30.3	1/9	1044-1048	32	West-1	SW-1	West-3	2.5	10.3	c	1009.0
US15008	41-37.6	140-28.4	1/9	1112-1114	23	West-1	SW-1	West-4	2.8	10.1	c	1009.3
US15009	41-38.1	140-26.4	1/9	1127-1129	13	West-1	South-1	West-3	2.2	9.1	s	1009.0
US15010	41-35.2	140-29.7	1/9	1229-1232	42	West-1	SSE-1	West-4	1.3	10.3	s	1008.8
US15011	41-34.7	140-33.1	1/9	1310-1314	64	WNW-1	SSE-1	WNW-5	1.8	10.5	s	1008.5
US15012	41-35.1	140-26.7	1/9	1406-1410	11	NW-1	SSE-1	NW-3	1.2	9.3	c	1008.8
US15013	41-28.8	140-20.9	1/13	0809-0813	63	WNW-3	SSW-1	WNW-3	2.5	9.9	o	1027.0
US15014	41-28.3	140-16.8	1/13	0837-0840	31	West-3	SSW-1	West-5	2.4	9.8	o	1028.0
US15015	41-26.8	140-17.7	1/13	0909-0914	63	WNW-3	SSW-1	WNW-5	2.2	10.0	o	1027.4
US15016	41-24.6	140-06.3	1/13	1021-1026	49	WNW-3	SW-1	WNW-5	2.6	9.9	o	1027.9
US15017	41-24.0	140-05.9	1/13	1040-1045	75	WNW-4	SW-2	WNW-6	2.9	9.9	o	1027.5
US15018	41-23.6	140-05.2	1/13	1100-1104	101	WNW-4	SW-2	WNW-6	2.6	9.9	o	1027.6
US15019	41-24.1	140-20.6	1/13	1238-1244	95	West-3	SW-1	West-4	2.5	10.1	c	1027.0

Cruise 325												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15020	41-59.3	141-02.0	1/21	1530-1535	101	Calm	NW-1	Calm	2.6	7.0	c	1028.0
US15021	41-58.6	141-00.7	1/21	1545-1549	94	Calm	NW-1	Calm	2.7	6.9	c	1027.8
US15022	41-58.0	140-59.4	1/21	1558-1602	86	West-1	NW-1	West-3	2.7	6.9	c	1027.7
US15023	41-57.4	140-58.2	1/21	1611-1615	77	NW-2	NW-1	NW-3	2.6	6.8	c	1027.7
US15024	42-10.1	140-47.5	1/22	0759-0803	94	East-3	ENE-1	East-5	3.1	5.4	c	1022.0
US15025	42-10.7	140-41.6	1/22	0843-0848	87	East-3	ENE-1	East-5	2.4	5.0	s	1021.6
US15026	42-09.5	140-35.9	1/22	0828-0832	71	East-3	ENE-1	East-4	2.6	4.4	o	1021.9
US15027	42-11.3	140-35.8	1/22	0956-1000	81	East-4	ENE-1	East-5	2.6	4.9	o	1020.9
US15028	42-28.1	140-43.4	1/24	1222-1224	59	West-3	West-1	West-5	1.5	5.4	c	1020.5
US15029	42-31.2	140-37.8	1/24	1307-1311	60	West-3	West-1	West-5	1.5	5.4	s	1020.1
US15030	42-29.1	140-31.1	1/24	1355-1359	73	WNW-2	West-1	WNW-4	0.4	4.8	s	1021.1
US15031	42-26.7	140-25.1	1/24	1439-1442	60	NW-2	WNW-1	NW-4	0.5	4.5	s	1021.6
US15032	42-18.8	140-22.9	1/24	1548-1550	52	West-3	WNW-1	West-5	1.8	4.6	c	1022.9
US15033	42-13.9	140-29.8	1/24	1648-1652	76	West-3	WNW-1	West-5	1.5	5.0	c	1023.2
US15034	42-17.6	140-54.0	1/25	0703-0706	56	NNW-1	West-1	NNW-3	1.1	6.6	bc	1029.5
US15035	42-20.6	140-48.9	1/25	0746-0749	51	North-1	West-1	North-2	1.4	6.5	bc	1029.5
US15036	42-23.3	140-42.8	1/25	0830-0834	61	North-1	West-1	North-2	1.6	5.9	bc	1029.9
US15037	42-26.0	140-37.5	1/25	0912-0916	83	NW-1	SW-1	NW-2	2.8	5.1	bc	1030.0
US15038	42-24.0	140-31.8	1/25	0957-1002	95	SW-1	SW-1	SW-2	2.1	5.0	c	1030.7
US15039	42-21.4	140-36.1	1/25	1038-1043	88	SW-1	SW-1	SW-2	2.2	5.3	c	1030.8
US15040	42-19.2	140-31.1	1/25	1122-1127	93	Calm	ESE-1	Calm	3.8	5.1	c	1030.1
US15041	42-16.6	140-36.1	1/25	1224-1229	82	SSW-1	ESE-1	SSW-1	3.0	5.2	c	1029.9
US15042	42-14.0	140-42.1	1/25	1319-1324	85	Calm	ESE-1	Calm	3.0	5.2	c	1029.7
US15043	42-15.0	140-47.3	1/25	1406-1410	72	North-1	ESE-1	North-2	3.7	6.6	bc	1029.7
US15044	42-00.0	141-09.9	1/25	1812-1816	133	Calm	ESE-1	Calm	3.0	6.2	bc	1030.8

Cruise 326

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15045	41-42.8	140-44.9	2/3	1342-1352	85	NNW-3	NNW-1	NNW-5	1.7	8.9	bc	1023.9
US15046	41-40.9	140-47.1	2/3	1413-1431	218	NNW-4	NNW-1	NNW-6	0.9	8.9	bc	1024.1
US15047	41-38.9	140-49.2	2/3	1451-1516	349	NNW-4	NNW-1	NNW-5	1.5	9.2	bc	1024.2
US15048	41-37.0	140-51.2	2/3	1540-1550	97	NW-3	NW-1	NW-5	0.9	9.2	bc	1024.1
US15049	41-35.5	140-52.6	2/3	1604-1609	39	NW-3	NW-1	NW-5	0.8	9.3	c	1024.1
US15050	41-45.4	141-09.0	2/4	0147-0156	104	NNE-3	NNE-1	NNE-4	-2.3	3.0	c	1023.8
US15050-2	41-45.4	141-08.9	2/4	0206-0215	101	NNE-3	NNE-1	NNE-4	-2.6	3.2	c	1023.8
US15051	41-45.8	140-42.0	2/4	1355-1359	31	NE-1	NW-1	NE-2	2.6	8.1	bc	1021.6
US15052	41-41.3	140-34.1	2/4	1500-1503	39	SSE-1	SE-1	SSE-2	1.7	8.8	bc	1021.6
US15053	41-26.5	140-17.4	2/5	0700-0703	64	NE-3	NE-1	NE-4	0.8	8.0	c	1019.8
US15054	41-24.5	140-05.8	2/5	0810-0814	53	ENE-2	East-1	ENE-3	0.6	7.6	c	1019.5
US15055	41-24.0	140-05.9	2/5	0828-0833	78	NE-1	ENE-1	NE-3	1.0	7.5	c	1019.6
US15056	41-23.7	140-05.6	2/5	0846-0852	97	East-2	ENE-1	East-4	1.4	7.9	c	1019.6
US15057	41-22.2	140-06.1	2/5	0928-0933	118	NE-3	ENE-1	NE-5	1.0	8.8	c	1019.5
US15058	41-26.3	140-02.3	2/5	1012-1015	33	ESE-1	ESE-1	ESE-3	1.6	7.7	c	1019.2
US15059	41-26.1	140-01.7	2/5	1032-1036	52	ESE-1	ESE-1	ESE-3	1.4	7.6	c	1019.1
US15060	41-25.9	140-01.1	2/5	1054-1100	88	ESE-1	ESE-1	ESE-3	2.1	7.5	c	1019.1
US15061	41-25.2	140-00.2	2/5	1117-1123	105	ESE-1	ESE-1	ESE-3	2.3	7.9	c	1018.6
US15055-2	41-24.2	140-05.4	2/5	1224-1228	67	NE-2	ENE-1	NE-4	2.3	7.7	c	1018.1
US15055-3	41-24.5	140-05.5	2/5	1505-1508	45	ENE-3	ENE-1	ENE-4	2.3	9.0	c	1016.3
US15055-4	41-25.9	140-01.1	2/5	1822-1827	85	ENE-2	ENE-1	NNE-3	1.6	8.1	bc	1016.2
US15055-5	41-25.8	140-01.1	2/5	2109-2113	87	ENE-1	ENE-1	ENE-3	1.2	8.1	bc	1016.1
US15055-6	41-25.5	140-02.0	2/6	0016-0021	81	East-3	ENE-1	East-5	1.2	8.6	c	1015.6
US15055-7	41-25.3	140-02.3	2/6	0305-0309	81	NE-1	ENE-1	NE-3	-0.8	8.1	s	1015.8
US15055-8	41-25.6	140-01.9	2/6	0609-0613	75	NE-3	SE-1	NE-3	0.5	8.1	o	1015.7
US15055-9	41-25.3	140-02.0	2/6	0923-0927	90	NNW-1	East-1	NNW-2	1.8	8.0	bc	1017.2
US15055-10	41-25.4	140-10.5	2/6	1205-1210	97	NNW-2	East-1	NNW-4	2.0	7.8	c	1017.7
US15062	41-34.7	140-29.2	2/6	1500-1504	34	NW-1	East-1	NW-3	2.8	8.4	c	1018.0
US15063	41-37.3	140-30.2	2/6	1553-1556	32	NW-2	SE-1	NW-4	3.0	8.5	c	1018.0
US15064	41-59.8	141-10.0	2/6	2055-2102	139	NW-3	NW-1	NW-4	1.1	1.8	bc	1020.5
US15065	42-17.6	140-54.1	2/7	0627-0631	57	NW-3	West-1	NW-2	1.1	1.9	o	1022.0
US15066	42-15.7	140-47.9	2/7	0719-0722	71	West-1	West-1	West-1	1.0	3.0	o	1022.0
US15067	42-18.2	140-42.4	2/7	0802-0806	63	West-1	West-1	West-2	1.6	3.0	s	1022.1
US15068	42-13.5	140-41.4	2/7	0849-0853	88	West-1	West-1	West-3	0.6	3.3	s	1022.2
US15069	42-16.5	140-36.7	2/7	0941-0945	90	WSW-1	West-1	WSW-2	2.3	4.3	bc	1022.5
US15070	42-20.7	140-36.4	2/7	1032-1037	87	West-1	West-1	West-2	2.8	3.4	bc	1022.3
US15071	42-19.1	140-31.1	2/7	1115-1119	94	West-1	NE-1	West-2	2.9	3.7	bc	1022.1
US15072	42-18.7	140-23.5	2/7	1216-1220	55	NNW-1	NE-1	NNW-2	2.3	5.0	bc	1021.9
US15073	42-14.0	140-29.9	2/7	1320-1324	76	ENE-2	ENE-1	ENE-3	2.9	4.8	c	1021.4
US15074	42-11.1	140-35.2	2/7	1412-1416	80	East-3	East-1	East-4	2.4	4.3	bc	1021.0
US15075	42-10.5	140-40.4	2/7	1511-1516	86	East-3	East-1	East-4	2.4	4.0	bc	1021.7

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION		US15001	
LATITUDE		41-47.1	N
LONGITUDE		140-40.1	E
DEPTH (m)		20	
Press.	Temp.	Salinity	Sigma-T
5	9.155	33.754	26.118
10	9.886	33.022	26.208

STATION		US15002	
LATITUDE		41-45.5	N
LONGITUDE		140-40.0	E
DEPTH (m)		39	
Press.	Temp.	Salinity	Sigma-T
5	9.961	34.015	26.189
10	9.965	34.013	26.187
20	9.965	34.013	26.187
30	9.970	34.012	26.186

STATION		US15003	
LATITUDE		41-43.8	N
LONGITUDE		140-40.1	E
DEPTH (m)		63	
Press.	Temp.	Salinity	Sigma-T
5	9.839	33.985	26.187
10	9.853	33.986	26.185
20	9.839	33.982	26.184
30	9.827	33.978	26.183
40	9.832	33.984	26.187
50	9.868	33.998	26.192

STATION		US15004	
LATITUDE		41-43.6	N
LONGITUDE		140-38.4	E
DEPTH (m)		55	
Press.	Temp.	Salinity	Sigma-T
5	10.206	34.048	26.174
10	10.209	34.048	26.173
20	10.193	34.049	26.177
30	10.213	34.048	26.173
40	10.213	34.048	26.173
50	10.202	34.047	26.173

STATION		US15005	
LATITUDE		41-43.7	N
LONGITUDE		140-37.2	E
DEPTH (m)		48	
Press.	Temp.	Salinity	Sigma-T
5	10.269	34.055	26.168
10	10.256	34.054	26.197
20	10.270	34.054	26.167
30	10.272	34.054	26.167
40	10.272	34.054	26.167

STATION		US15006	
LATITUDE		41-41.1	N
LONGITUDE		140-34.4	E
DEPTH (m)		42	
Press.	Temp.	Salinity	Sigma-T
5	10.012	34.034	26.195
10	10.015	34.033	26.195
20	10.020	34.032	26.193
30	10.021	34.032	26.193
40	10.021	334.032	26.192

STATION		US15007	
LATITUDE		41-37.4	N
LONGITUDE		140-30.3	E
DEPTH (m)		32	
Press.	Temp.	Salinity	Sigma-T
5	10.593	34.059	26.115
10	10.594	34.059	26.115
20	10.606	34.058	26.112
30	10.606	34.058	26.112

STATION		US15008	
LATITUDE		41-37.6	N
LONGITUDE		140-28.4	E
DEPTH (m)		23	
Press.	Temp.	Salinity	Sigma-T
5	10.242	34.032	26.155
10	10.250	34.032	26.155
20	10.161	34.024	26.163

STATION		US15009	
LATITUDE		41-38.1	N
LONGITUDE		140-26.4	E
DEPTH (m)		13	
Press.	Temp.	Salinity	Sigma-T
5	9.001	33.846	26.215
10	8.856	33.820	26.212

STATION		US15010	
LATITUDE		41-35.2	N
LONGITUDE		140-29.7	E
DEPTH (m)		42	
Press.	Temp.	Salinity	Sigma-T
5	10.599	34.064	26.118
10	10.626	34.060	26.110
20	10.615	34.055	26.108
30	10.609	34.058	26.111
40	10.580	34.064	26.121

STATION		US15011	
LATITUDE		41-34.7	N
LONGITUDE		140-33.1	E
DEPTH (m)		64	
Press.	Temp.	Salinity	Sigma-T
5	10.783	34.060	26.082
10	10.796	34.059	26.079
20	10.797	34.059	26.079
30	10.744	34.059	26.088
40	10.654	34.062	26.106
50	10.501	34.064	26.135

STATION		US15012	
LATITUDE		41-35.1	N
LONGITUDE		140-26.7	E
DEPTH (m)		11	
Press.	Temp.	Salinity	Sigma-T
5	10.353	34.014	26.121

STATION US15013			
LATITUDE	41-28.8	N	
LONGITUDE	140-20.9	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	10.217	34.079	26.196
10	10.216	34.079	26.196
20	10.228	34.079	26.194
30	10.228	34.078	26.193
40	10.223	34.078	26.194
50	10.216	34.076	26.194

STATION US15016			
LATITUDE	41-24.6	N	
LONGITUDE	140-06.3	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	10.236	34.072	26.187
10	10.237	34.072	26.187
20	10.082	34.077	26.218
30	9.981	34.082	26.238
40	9.918	34.082	26.249

STATION US15019			
LATITUDE	41-24.1	N	
LONGITUDE	140-20.6	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	10.347	34.076	26.171
10	10.352	34.075	26.169
20	10.015	34.076	26.228
30	9.969	34.078	26.237
40	9.910	34.081	26.250
50	9.827	34.082	26.264
75	9.028	34.085	26.397

STATION US15022			
LATITUDE	41-58.0	N	
LONGITUDE	140-59.4	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	7.220	33.681	26.350
10	7.177	33.678	26.353
20	7.124	33.674	26.357
30	7.074	33.669	26.360
40	7.050	33.668	26.363
50	6.640	33.669	26.379
75	6.532	33.742	26.490

STATION US15014			
LATITUDE	41-28.3	N	
LONGITUDE	140-16.8	E	
DEPTH (m)	31		
Press.	Temp.	Salinity	Sigma-T
5	10.097	34.053	26.196
10	10.098	34.052	26.195
20	10.103	34.051	26.194
30	10.108	34.053	26.194

STATION US15017			
LATITUDE	41-24.0	N	
LONGITUDE	140-05.9	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	10.137	34.077	26.208
10	10.141	34.074	26.205
20	9.790	34.085	26.273
30	9.689	34.088	26.292
40	9.634	34.089	26.302
50	9.370	34.089	26.346
75	9.357	34.097	26.354

STATION US15020			
LATITUDE	41-59.3	N	
LONGITUDE	141-02.0	E	
DEPTH (m)	101		
Press.	Temp.	Salinity	Sigma-T
5	7.199	33.679	26.351
10	7.199	33.672	26.351
20	7.181	33.677	26.352
30	7.178	33.677	26.352
40	7.176	33.676	26.352
50	7.176	33.677	26.352
75	7.101	33.667	26.355

STATION US15023			
LATITUDE	41-57.4	N	
LONGITUDE	140-58.2	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	7.061	33.672	26.364
10	7.017	33.664	26.364
20	6.955	33.667	26.375
30	6.772	33.660	26.394
40	6.657	33.653	26.404
50	6.575	33.648	26.411

STATION US15015			
LATITUDE	41-26.8	N	
LONGITUDE	140-17.7	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	10.303	34.075	26.178
10	10.302	34.074	26.177
20	10.306	34.074	26.176
30	10.274	34.073	26.181
40	10.163	34.074	26.201
50	10.156	34.075	26.203

STATION US15018			
LATITUDE	41-23.6	N	
LONGITUDE	140-05.2	E	
DEPTH (m)	101		
Press.	Temp.	Salinity	Sigma-T
5	10.142	34.078	26.208
10	10.141	34.079	26.209
20	10.156	34.078	26.205
30	10.149	34.077	26.206
40	10.076	34.076	26.218
50	10.052	34.079	26.224
75	9.476	34.084	26.324
95	9.076	34.092	26.395

STATION US15021			
LATITUDE	41-58.6	N	
LONGITUDE	141-00.7	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	7.180	33.675	26.351
10	7.153	33.673	26.352
20	7.132	33.673	26.355
30	7.127	33.673	26.356
40	7.123	33.673	26.356
50	7.116	33.672	26.357
75	6.987	33.666	26.370
90	5.976	33.799	26.606

STATION US15024			
LATITUDE	41-10.1	N	
LONGITUDE	140-47.5	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	5.753	33.596	26.474
10	5.748	33.596	26.474
20	5.608	33.634	26.521
30	5.669	33.726	26.587
40	5.691	33.771	26.620
50	5.837	33.826	26.645
75	5.673	33.822	26.662
90	5.664	33.823	26.664

STATION US15025			
LATITUDE		42-10.7	N
LONGITUDE		140-41.6	E
DEPTH (m)		87	
Press.	Temp.	Salinity	Sigma-T
5	5.306	33.906	25.971
10	5.306	33.905	25.968
20	5.284	33.899	25.975
30	5.212	33.906	25.987
40	5.152	33.907	25.999
50	5.161	33.923	26.046
75	5.169	33.815	26.717

STATION US15026			
LATITUDE		42-09.5	N
LONGITUDE		140-35.9	E
DEPTH (m)		71	
Press.	Temp.	Salinity	Sigma-T
5	4.814	33.749	26.704
10	4.809	33.749	26.705
20	4.747	33.755	26.716
30	4.876	33.779	26.721
40	4.947	33.789	26.721
50	4.952	33.788	26.721

STATION US15027			
LATITUDE		42-11.3	N
LONGITUDE		140-35.8	E
DEPTH (m)		81	
Press.	Temp.	Salinity	Sigma-T
5	5.263	33.825	26.713
10	5.263	33.825	26.713
20	5.263	33.825	26.713
30	5.270	33.824	26.712
40	5.263	33.825	26.713
50	5.275	33.825	26.712
75	5.224	33.819	26.714

STATION US15028			
LATITUDE		42-28.1	N
LONGITUDE		140-43.4	E
DEPTH (m)		59	
Press.	Temp.	Salinity	Sigma-T
5	5.819	33.731	26.572
10	5.829	33.739	26.577
20	5.831	33.751	26.587
30	5.834	33.762	26.595
40	5.580	33.802	26.657
50	5.494	33.808	26.673
55	5.488	33.809	26.674

STATION US15029			
LATITUDE		42-31.2	N
LONGITUDE		140-37.8	E
DEPTH (m)		60	
Press.	Temp.	Salinity	Sigma-T
5	5.576	33.705	26.581
10	5.580	33.706	26.582
20	5.412	33.790	26.668
30	5.402	33.807	26.683
40	5.384	33.813	26.683
50	5.389	33.815	26.691

STATION US15030			
LATITUDE		42-29.1	N
LONGITUDE		140-31.1	E
DEPTH (m)		73	
Press.	Temp.	Salinity	Sigma-T
5	5.179	33.805	26.707
10	5.196	33.807	26.707
20	5.218	33.809	26.706
30	5.234	33.812	26.707
40	5.250	33.815	26.707
50	5.253	33.815	26.707

STATION US15031			
LATITUDE		42-26.7	N
LONGITUDE		140-25.1	E
DEPTH (m)		60	
Press.	Temp.	Salinity	Sigma-T
5	4.916	33.751	26.695
10	4.979	33.769	26.702
20	5.048	33.785	26.706
30	5.043	33.784	26.706
40	4.981	33.775	26.706
50	5.013	33.784	26.710

STATION US15032			
LATITUDE		42-18.8	N
LONGITUDE		140-22.9	E
DEPTH (m)		52	
Press.	Temp.	Salinity	Sigma-T
5	4.787	33.560	26.558
10	4.827	33.732	26.689
20	4.865	33.779	26.723
30	4.864	33.803	26.742
40	4.869	33.803	26.741
50	4.822	33.798	26.743

STATION US15033			
LATITUDE		42-13.9	N
LONGITUDE		140-29.8	E
DEPTH (m)		76	
Press.	Temp.	Salinity	Sigma-T
5	5.284	33.835	26.719
10	5.292	33.834	26.717
20	5.296	33.836	26.716
30	5.294	33.833	26.716
40	5.296	33.833	26.716
50	5.295	33.833	26.716

STATION US15034			
LATITUDE		42-17.6	N
LONGITUDE		140-54.0	E
DEPTH (m)		56	
Press.	Temp.	Salinity	Sigma-T
5	7.123	33.537	26.250
10	7.148	33.682	26.360
20	7.032	33.630	26.335
30	7.021	33.635	26.341
40	6.999	33.618	26.331
50	6.501	33.574	26.362

STATION US15035			
LATITUDE		42-20.6	N
LONGITUDE		140-48.9	E
DEPTH (m)		51	
Press.	Temp.	Salinity	Sigma-T
5	6.877	33.619	26.348
10	6.877	33.619	26.348
20	6.884	33.612	26.347
30	6.878	33.619	26.348
40	6.610	33.621	26.385

STATION US15036			
LATITUDE		42-23.3	N
LONGITUDE		140-42.8	E
DEPTH (m)		61	
Press.	Temp.	Salinity	Sigma-T
5	6.070	33.618	26.452
10	6.065	33.619	26.453
20	5.715	33.665	26.533
30	5.713	33.753	26.605
40	5.696	33.759	26.610
50	5.712	33.775	26.620

STATION		US15037	
LATITUDE		42-26.0	N
LONGITUDE		140-37.5	E
DEPTH (m)		83	
Press.	Temp.	Salinity	Sigma-T
5	5.492	33.811	26.684
10	5.419	33.812	26.684
20	5.413	33.812	26.685
30	5.408	33.812	26.686
40	5.381	33.818	26.694
50	5.364	33.818	26.696
75	5.371	33.829	26.704

STATION		US15038	
LATITUDE		42-24.0	N
LONGITUDE		140-31.8	E
DEPTH (m)		95	
Press.	Temp.	Salinity	Sigma-T
5	5.258	33.823	26.712
10	5.256	33.823	26.713
20	5.256	33.824	26.713
30	5.256	33.824	26.713
40	5.256	33.824	26.713
50	5.256	33.824	26.713
75	5.258	33.824	26.713

STATION		US15039	
LATITUDE		42-21.4	N
LONGITUDE		140-36.1	E
DEPTH (m)		88	
Press.	Temp.	Salinity	Sigma-T
5	5.579	33.769	26.631
10	5.572	33.770	26.633
20	5.426	33.796	26.671
30	5.364	33.807	26.688
40	5.367	33.815	26.693
50	5.365	33.822	26.699
75	5.308	33.821	26.705

STATION		US15040	
LATITUDE		42-19.2	N
LONGITUDE		140-31.1	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	5.416	33.819	26.690
10	5.404	33.820	26.693
20	5.400	33.821	26.694
30	5.398	33.822	26.695
40	5.398	33.822	26.695
50	5.397	33.823	26.696
75	5.361	33.824	26.702
90	5.273	33.820	26.708

STATION		US15041	
LATITUDE		42-16.6	N
LONGITUDE		140-36.1	E
DEPTH (m)		82	
Press.	Temp.	Salinity	Sigma-T
5	5.440	33.722	26.611
10	5.419	33.724	26.614
20	5.404	33.727	26.619
30	5.504	33.831	26.689
40	5.439	33.829	26.696
50	5.413	33.831	26.700
75	5.202	33.816	26.714

STATION		US15042	
LATITUDE		42-14.0	N
LONGITUDE		140-42.1	E
DEPTH (m)		85	
Press.	Temp.	Salinity	Sigma-T
5	5.439	33.707	26.599
10	5.413	33.707	26.602
20	5.372	33.739	26.632
30	5.284	33.822	26.709
40	5.285	33.825	26.711
50	5.274	33.825	26.712
75	5.222	33.821	26.715

STATION		US15043	
LATITUDE		42-15.0	N
LONGITUDE		140-47.3	E
DEPTH (m)		72	
Press.	Temp.	Salinity	Sigma-T
5	6.855	33.626	26.356
10	6.756	33.624	26.367
20	6.291	33.602	26.411
30	5.827	33.642	26.501
40	5.225	33.794	26.694
50	5.195	33.813	26.712

STATION		US15044	
LATITUDE		42-00.0	N
LONGITUDE		141-09.9	E
DEPTH (m)		133	
Press.	Temp.	Salinity	Sigma-T
5	6.598	33.563	26.340
10	6.730	33.548	26.311
20	6.812	33.536	26.291
30	6.882	33.543	26.287
40	6.914	33.551	26.289
50	6.370	33.458	26.287
75	6.769	33.551	26.309
100	7.765	33.757	26.332
125	6.594	33.564	26.342
130	6.561	33.565	26.347

STATION		US15045	
LATITUDE		41-42.8	N
LONGITUDE		140-44.9	E
DEPTH (m)		85	
Press.	Temp.	Salinity	Sigma-T
5	9.225	34.074	26.358
10	9.219	34.074	26.358
20	9.211	34.074	26.359
30	9.002	34.068	26.388
40	8.774	34.074	26.429
50	8.772	34.076	26.431
75	8.761	34.077	26.433

STATION		US15046	
LATITUDE		41-40.8	N
LONGITUDE		140-47.1	E
DEPTH (m)		219	
Press.	Temp.	Salinity	Sigma-T
5	9.513	34.061	26.300
10	9.506	34.061	26.301
20	9.495	34.061	26.303
30	9.399	34.065	26.322
40	9.391	34.066	26.324
50	9.383	34.067	26.326
75	9.289	34.070	26.344
100	9.067	34.071	26.381
125	8.988	34.070	26.392
150	8.651	34.075	26.449
175	8.595	34.076	26.458
200	8.536	34.078	26.469

STATION		US15047	
LATITUDE		41-38.9	N
LONGITUDE		140-49.2	E
DEPTH (m)		349	
Press.	Temp.	Salinity	Sigma-T
5	9.561	34.062	26.293
10	9.555	34.062	26.294
20	9.563	34.061	26.292
30	9.547	34.060	26.293
40	9.429	34.054	26.308
50	9.342	34.059	26.326
75	9.204	34.067	26.355
100	9.158	34.069	26.364
125	9.085	34.071	26.377
150	9.052	34.072	26.383
175	8.995	34.073	26.393
200	8.701	34.077	26.443
250	8.670	34.078	26.448
300	8.624	34.078	26.456
310	8.582	34.079	26.462

STATION		US15048	
LATITUDE		41-37.0	N
LONGITUDE		140-51.2	E
DEPTH (m)		97	
Press.	Temp.	Salinity	Sigma-T
5	9.573	34.066	26.294
10	9.579	34.063	26.291
20	9.584	34.062	26.289
30	9.560	34.060	26.291
40	9.542	34.060	26.295
50	9.564	34.062	26.292
75	9.507	34.060	26.300

STATION		US15049	
LATITUDE		41-35.5	N
LONGITUDE		140-52.6	E
DEPTH (m)		39	
Press.	Temp.	Salinity	Sigma-T
5	9.502	34.063	26.303
10	9.516	34.062	26.301
20	9.518	34.062	26.300
30	9.516	34.062	26.300

STATION		US15050	
LATITUDE		41-45.4	N
LONGITUDE		141-09.4	E
DEPTH (m)		104	
Press.	Temp.	Salinity	Sigma-T
5	3.459	33.036	26.276
10	3.460	33.036	26.276
20	3.466	33.036	26.275
30	3.310	33.041	26.275
40	3.510	33.041	26.275
50	3.513	33.042	26.276
75	3.588	33.053	26.278

STATION		US14050-2	
LATITUDE		41-45.4	N
LONGITUDE		141-08.9	E
DEPTH (m)		101	
Press.	Temp.	Salinity	Sigma-T
5	3.441	33.036	26.278
10	3.448	33.035	26.276
20	3.455	33.034	26.275
30	3.458	33.034	26.275
40	3.462	33.035	26.275
50	3.463	33.035	26.275
75	3.577	33.051	26.277
90	3.566	33.051	26.278

STATION		US15051	
LATITUDE		41-45.8	N
LONGITUDE		140-40.4	E
DEPTH (m)		31	
Press.	Temp.	Salinity	Sigma-T
5	8.515	33.998	26.409
10	8.560	34.014	26.415
20	8.625	34.036	26.423
30	8.738	34.071	26.432

STATION		US15052	
LATITUDE		41-41.3	N
LONGITUDE		140-34.1	E
DEPTH (m)		39	
Press.	Temp.	Salinity	Sigma-T
5	9.054	34.082	26.391
10	9.022	34.080	26.394
20	8.995	34.080	26.398
30	8.918	34.078	26.409

STATION		US15053	
LATITUDE		41-26.4	N
LONGITUDE		140-17.4	E
DEPTH (m)		64	
Press.	Temp.	Salinity	Sigma-T
5	8.326	34.063	26.489
10	8.331	34.062	26.488
20	8.312	34.058	26.488
30	8.200	34.056	26.502
40	8.101	34.060	26.519
50	7.997	34.066	26.541

STATION US15054			
LATITUDE	41-24.5	N	
LONGITUDE	140-05.8	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	7.757	34.083	26.589
10	7.648	34.074	26.598
20	7.503	34.079	26.622
30	7.058	34.061	26.671
40	6.320	34.066	26.774
50	5.891	34.050	26.815

STATION US15055			
LATITUDE	41-24.0	N	
LONGITUDE	140-05.9	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	8.206	34.092	26.530
10	7.899	34.071	26.559
20	7.510	34.063	26.609
30	7.463	34.068	26.620
40	7.213	34.063	26.651
50	6.759	34.062	26.713

STATION US15055-2			
LATITUDE	41-24.2	N	
LONGITUDE	140-05.4	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	8.013	34.090	26.558
10	8.020	34.090	26.556
20	7.889	34.083	26.570
30	7.616	34.073	26.602
40	6.916	34.057	26.687
50	6.679	34.065	26.726

STATION US15055-3			
LATITUDE	41-24.5	N	
LONGITUDE	140-05.5	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	8.003	34.096	26.564
10	8.909	34.115	26.439
20	7.959	34.061	26.542
30	7.779	34.078	26.582
40	7.491	34.073	26.620

STATION US15055-4			
LATITUDE	41-25.9	N	
LONGITUDE	140-01.1	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	8.303	34.097	26.519
10	8.295	34.096	26.522
20	8.203	34.091	26.530
30	8.177	34.090	26.533
40	8.143	34.090	26.538
50	8.110	34.089	26.542
75	6.118	34.044	26.782

STATION US15055-5			
LATITUDE	41-25.8	N	
LONGITUDE	140-01.1	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	8.540	34.099	26.484
10	8.443	34.091	26.493
20	8.414	34.093	26.499
30	8.403	34.093	26.501
40	8.417	34.094	26.499
50	8.415	34.093	26.499
75	7.746	34.066	26.577
85	6.843	34.056	26.697

STATION US15055-6			
LATITUDE	41-25.5	N	
LONGITUDE	140-02.0	E	
DEPTH (m)	81		
Press.	Temp.	Salinity	Sigma-T
5	8.754	34.104	26.455
10	8.707	34.100	26.460
20	8.542	34.096	26.482
30	8.430	34.092	26.496
40	8.331	34.090	26.510
50	8.238	34.089	26.523
75	7.956	34.082	26.559

STATION US15055-7			
LATITUDE	41-25.3	N	
LONGITUDE	140-02.3	E	
DEPTH (m)	81		
Press.	Temp.	Salinity	Sigma-T
5	8.269	34.092	26.521
10	8.270	34.094	26.521
20	8.214	34.090	26.527
30	8.213	34.091	26.528
40	8.214	34.091	26.528
50	8.187	34.088	26.530
75	7.809	34.082	26.581

STATION US15055-8			
LATITUDE	41-25.6	N	
LONGITUDE	140-01.9	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	8.423	34.101	26.504
10	8.428	34.101	26.503
20	8.307	34.091	26.514
30	8.206	34.090	26.528
40	8.224	34.092	26.527
50	8.107	34.088	26.541

STATION US15055-9			
LATITUDE	41-25.3	N	
LONGITUDE	140-02.0	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	8.274	34.086	26.515
10	8.271	34.088	26.517
20	8.286	34.087	26.514
30	8.325	34.090	26.510
40	8.325	34.089	26.509
50	8.312	34.088	26.511
75	7.144	34.050	26.651

STATION JS15055-10			
LATITUDE	41-25.4	N	
LONGITUDE	140-01.5	E	
DEPTH (m)	97		
Press.	Temp.	Salinity	Sigma-T
5	8.104	34.092	26.545
10	7.954	34.080	26.558
20	7.869	34.086	26.575
30	7.341	34.074	26.642
40	7.199	34.076	26.664
50	7.095	34.077	26.679
75	7.138	34.079	26.674

STATION US15056			
LATITUDE	41-23.7	N	
LONGITUDE	140-05.6	E	
DEPTH (m)	97		
Press.	Temp.	Salinity	Sigma-T
5	8.105	34.088	26.542
10	8.035	34.086	26.551
20	8.048	34.088	26.550
30	7.590	34.060	26.595
40	7.058	34.062	26.672
50	6.674	34.062	26.724
75	5.527	34.056	26.865
95	5.376	34.061	26.887

STATION		US15057	
LATITUDE		41-22.2	N
LONGITUDE		140-06.1	E
DEPTH (m)		118	
Press.	Temp.	Salinity	Sigma-T
5	9.205	34.102	26.382
10	9.157	34.098	26.387
20	8.877	34.094	26.428
30	8.674	34.092	26.459
40	8.334	34.086	26.506
50	8.291	34.089	26.515
75	7.276	34.060	26.640
100	5.685	34.058	26.847

STATION		US15058	
LATITUDE		41-26.3	N
LONGITUDE		140-02.3	E
DEPTH (m)		33	
Press.	Temp.	Salinity	Sigma-T
5	7.805	34.073	26.575
10	7.807	34.073	26.574
20	7.754	34.074	26.583
30	7.674	34.073	26.594

STATION		US15059	
LATITUDE		42-26.1	N
LONGITUDE		140-01.7	E
DEPTH (m)		52	
Press.	Temp.	Salinity	Sigma-T
5	7.980	34.089	26.561
10	7.979	34.088	26.560
20	7.908	34.085	26.569
30	7.839	34.081	26.576
40	7.759	34.080	26.587
50	7.709	34.080	26.594

STATION		US15060	
LATITUDE		41-25.9	N
LONGITUDE		140-01.1	E
DEPTH (m)		88	
Press.	Temp.	Salinity	Sigma-T
5	8.051	34.087	26.549
10	8.037	34.086	26.551
20	8.010	34.085	26.553
30	7.980	34.084	26.558
40	7.985	34.086	26.558
50	7.772	34.079	26.584
75	6.057	34.047	26.792
85	5.862	34.062	26.829

STATION		US15061	
LATITUDE		41-25.2	N
LONGITUDE		140-00.2	E
DEPTH (m)		105	
Press.	Temp.	Salinity	Sigma-T
5	8.176	34.094	26.536
10	8.148	34.090	26.537
20	8.059	34.083	26.545
30	8.052	34.083	26.546
40	7.934	34.083	26.563
50	7.892	34.083	26.570
75	7.096	34.066	26.670
100	4.855	34.052	26.940

STATION		US15062	
LATITUDE		41-34.7	N
LONGITUDE		140-29.2	E
DEPTH (m)		34	
Press.	Temp.	Salinity	Sigma-T
5	8.703	34.086	26.449
10	8.693	34.085	26.450
20	8.525	34.083	26.474
30	8.355	34.087	26.503

STATION		US15063	
LATITUDE		41-37.3	N
LONGITUDE		140-30.2	E
DEPTH (m)		32	
Press.	Temp.	Salinity	Sigma-T
5	8.763	34.090	26.442
10	8.771	34.090	26.441
20	8.750	34.086	26.442
30	8.738	34.087	26.444

STATION		US15064	
LATITUDE		41-59.8	N
LONGITUDE		141-10.1	E
DEPTH (m)		139	
Press.	Temp.	Salinity	Sigma-T
5	2.155	32.780	26.182
10	2.154	32.782	26.183
20	2.148	32.785	26.186
30	2.145	32.791	26.186
40	2.147	32.795	26.191
50	2.160	32.840	26.194
75	2.388	33.008	26.212
100	3.290	33.005	26.269
125	3.311	33.007	26.265

STATION		US15065	
LATITUDE		42-17.6	N
LONGITUDE		140-54.1	E
DEPTH (m)		57	
Press.	Temp.	Salinity	Sigma-T
5	2.273	32.811	26.197
10	2.266	32.811	26.198
20	2.215	32.802	26.195
30	2.184	32.805	26.200
40	2.404	32.866	26.231
50	2.679	32.907	26.241

STATION US15066			
LATITUDE 42-15.7 N			
LONGITUDE 140-47.9 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	3.389	33.043	26.298
10	3.098	33.007	26.286
20	3.326	33.050	26.300
30	3.329	33.048	26.298
40	4.878	33.363	26.391
50	4.976	33.780	26.711

STATION US15067			
LATITUDE 42-18.2 N			
LONGITUDE 140-42.4 E			
DEPTH (m) 63			
Press.	Temp.	Salinity	Sigma-T
5	3.369	33.175	26.395
10	3.460	33.194	26.402
20	5.056	33.756	26.683
30	4.868	33.756	26.704
40	4.962	33.798	26.727
50	4.896	33.804	26.739

STATION US15068			
LATITUDE 42-13.5 N			
LONGITUDE 140-41.4 E			
DEPTH (m) 88			
Press.	Temp.	Salinity	Sigma-T
5	3.733	33.260	26.429
10	3.901	33.338	26.474
20	4.397	33.514	26.563
30	4.979	33.730	26.671
40	4.942	33.788	26.721
50	4.933	33.803	26.734
75	4.970	33.811	26.736

STATION US15069			
LATITUDE 42-16.5 N			
LONGITUDE 140-36.7 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	4.941	33.707	26.657
10	4.929	33.706	26.657
20	4.887	33.701	26.658
30	4.888	33.704	26.661
40	4.951	33.759	26.697
50	5.000	33.794	26.719
75	5.036	33.814	26.731

STATION US15070			
LATITUDE 42-20.7 N			
LONGITUDE 140-36.4 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	3.695	33.246	26.421
10	4.598	33.577	26.591
20	4.859	33.054	26.628
30	5.179	33.658	26.718
40	5.168	33.822	26.722
50	5.158	33.826	26.726
75	4.897	33.798	26.734
85	4.915	33.807	26.739

STATION US15071			
LATITUDE 42-19.1 N			
LONGITUDE 140-31.1 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	5.021	33.646	26.600
10	4.974	33.646	26.605
20	5.098	33.669	26.609
30	5.124	33.677	26.612
40	4.936	33.770	26.708
50	5.210	33.828	26.722
75	5.150	33.823	26.725
90	5.068	33.813	26.727

STATION US15072			
LATITUDE 42-18.7 N			
LONGITUDE 140-23.5 E			
DEPTH (m) 55			
Press.	Temp.	Salinity	Sigma-T
5	5.116	33.701	26.632
10	5.118	33.700	26.631
20	5.017	33.711	26.652
30	4.981	33.719	26.662
40	4.911	33.721	26.671
50	4.940	33.739	26.681

STATION US15073			
LATITUDE 42-14.0 N			
LONGITUDE 140-29.9 E			
DEPTH (m) 76			
Press.	Temp.	Salinity	Sigma-T
5	5.064	33.685	26.625
10	5.034	33.687	26.630
20	5.009	33.686	26.633
30	4.989	33.689	26.637
40	5.000	33.714	26.656
50	5.028	33.741	26.674

STATION US15074			
LATITUDE 42-11.1 N			
LONGITUDE 140-35.2 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	4.501	33.520	26.557
10	4.427	33.518	26.563
20	4.413	33.564	26.601
30	4.602	33.655	26.653
40	4.728	33.684	26.663
50	4.922	33.740	26.685
75	4.976	33.773	26.705

STATION US15075			
LATITUDE 42-10.5 N			
LONGITUDE 140-40.4 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	4.273	33.472	26.543
10	4.221	33.474	26.550
20	4.403	33.584	26.618
30	4.841	33.738	26.692
40	4.970	33.772	26.705
50	4.959	33.776	26.709
75	4.968	33.806	26.732

THE " USHIO MARU "

CRUISE 327

CRUISE 328

CRUISE 329

IN FEBRUARY 2015

IN MARCH 2015

1.Cruise Itinerary

Cruise 327

Departure from Hakodate	Feb.	24, 2015
Start hydrographic research (US15076)		25
Retrieval mooring ADCP system		25
Set mooring ADCP system		26
Finish hydrographic research (US15097)		26
Return to Hakodate		26
Total coverage 280.1 miles		

Cruise 328

Departure from Hakodate	Mar.	5, 2015
Start hydrographic research (US15098)		6
Finish hydrographic research (US15111)		6
Return to Hakodate		7
Total coverage 194.3 miles		

Cruise 329

Departure from Hakodate	Mar.	15, 2015
Start hydrographic research (US15112)		15
Finish hydrographic research (US15130)		16
Arrival at Usujiri		16
Total coverage 30.7 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

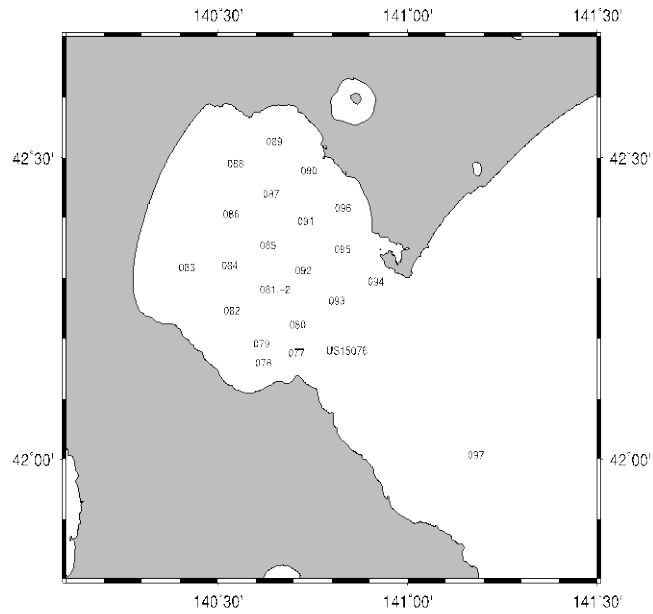


Figure 1. Oceanographic stations (Cruise 327)

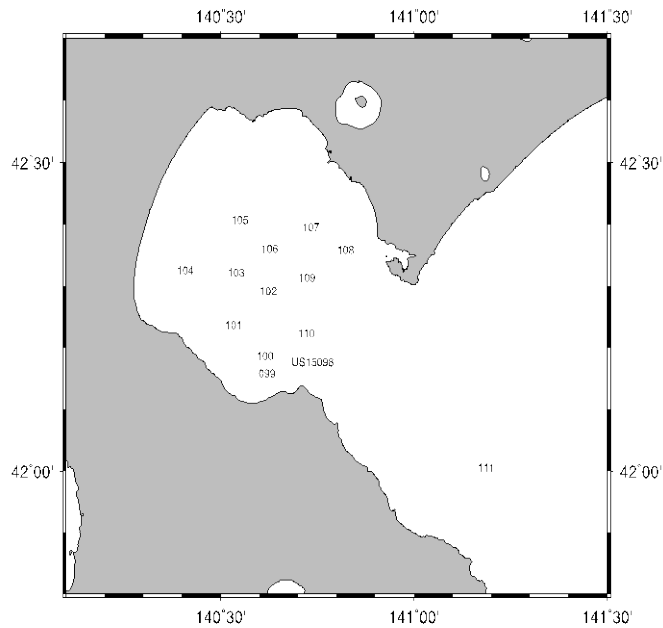


Figure 2. Oceanographic stations (Cruise 328)

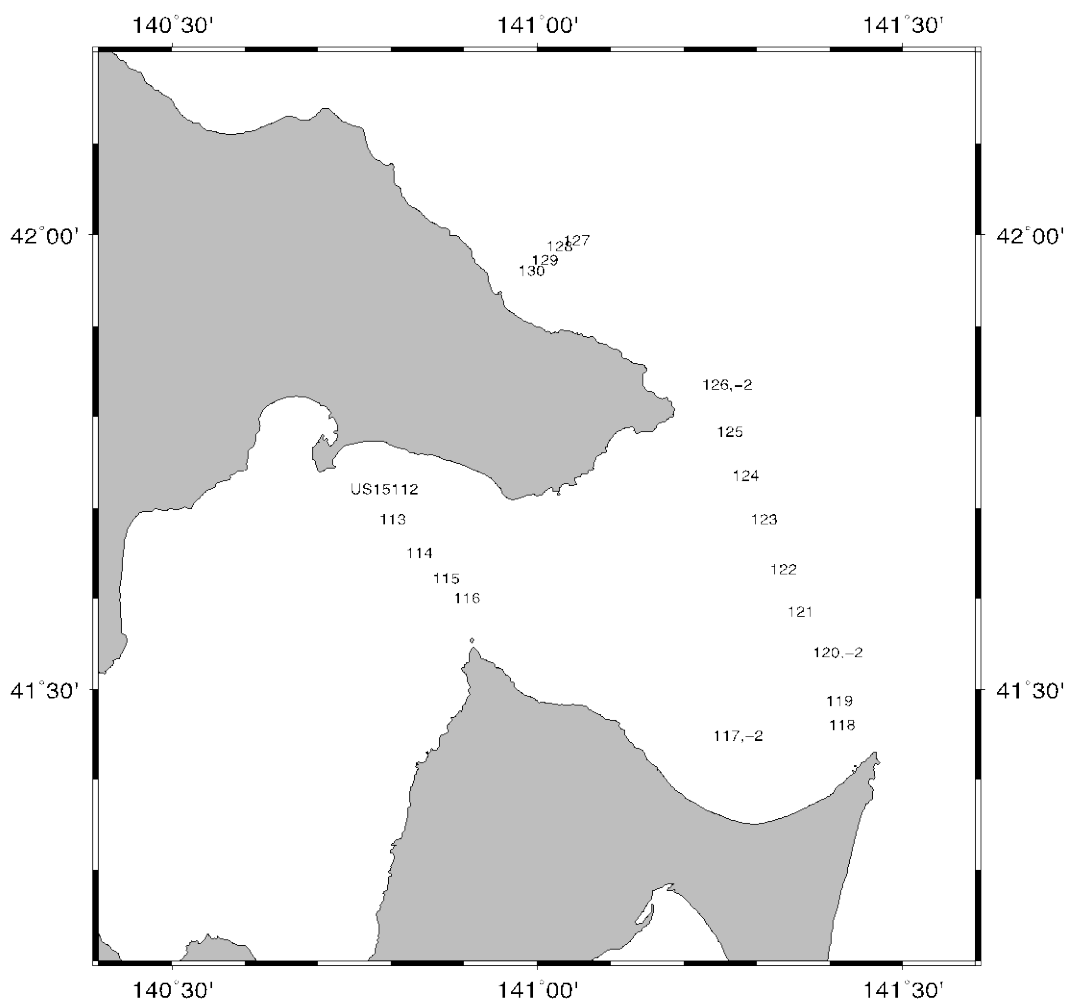


Figure 3. Oceanographic stations (Cruise 329)

Table 1. List of Oceanographic Station

Cruise 327												
Station	Lat. (N) [°]	Long. (E) [°]	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15076	42-10.4	140-47.1	2/25	0437-0442	93	West-4	West-1	West-4	0.9	2.7	bc	1018.0
US15077	42-10.2	140-41.1	2/25	0516-0521	86	West-3	West-1	West-3	0.9	2.7	bc	1018.1
US15078	42-09.2	140-35.9	2/25	0611-0615	70	WNW-3	West-1	WNW-3	0.7	2.6	bc	1018.1
US15079	42-11.1	140-35.6	2/25	0636-0640	81	West-3	West-1	West-3	0.7	2.5	bc	1018.5
US15080	42-13.0	140-41.3	2/25	0740-0744	90	WNW-2	East-1	WNW-3	1.6	2.6	bc	1019.2
US15081	42-16.5	140-36.6	2/25	0842-0849	91	WNW-2	East-1	WNW-3	1.1	2.5	bc	1019.5
US15081-2	同上		2/25	0855-0859								
US15082	42-14.4	140-30.9	2/25	1031-1036	84	WNW-2	East-1	WNW-3	1.4	2.6	bc	1020.1
US15083	42-18.7	140-23.8	2/25	1132-1136	57	WSW-2	East-1	WSW-3	3.0	2.5	bc	1019.7
US15084	42-18.9	140-30.6	2/25	1238-1233	93	WSW-2	East-1	WSW-3	3.8	2.5	bc	1019.5
US15085	42-20.9	140-36.6	2/25	1315-1319	87	West-2	East-1	West-3	4.3	2.6	bc	1019.7
US15086	42-24.0	140-30.8	2/25	1407-1412	94	NNW-2	East-1	NNW-2	2.4	2.7	c	1019.7
US15087	42-26.0	140-37.1	2/25	1500-1504	83	NW-2	East-1	NW-3	1.4	2.5	s	1020.3
US15088	42-29.0	140-31.5	2/25	1543-1547	74	WSW-1	East-1	WSW-3	0.6	2.8	s	1020.5
US15089	42-31.2	140-37.6	2/25	1627-1631	61	West-2	ESE-1	West-3	1.5	2.4	bc	1020.6
US15090	42-28.3	140-43.1	2/25	1710-1712	60	West-3	ESE-1	West-4	1.1	2.2	c	1021.2
US15091	42-23.3	140-42.6	2/25	1750-1753	62	West-3	SW-1	WNW-3	1.1	1.9	c	1021.6
US15092	42-18.4	140-42.2	2/25	1837-1840	64	WSW-4	WSW-1	West-5	1.1	2.1	bc	1021.6
US15093	42-15.4	140-47.5	2/25	1912-1916	71	WSW-4	WSW-1	West-5	1.1	2.0	bc	1022.2
US15094	42-17.3	140-53.7	2/25	1949-1952	58	West-3	West-1	West-5	1.0	2.2	bc	1022.5
US15095	42-20.5	140-48.4	2/25	2028-2031	54	West-3	West-1	West-5	1.1	2.2	bc	1022.5
US15096	42-24.6	140-48.5	2/25	2059-2102	45	West-3	West-1	West-5	1.1	2.0	bc	1022.6
US15097	42-00.0	141-09.5	2/26	0850-0857	134	SSW-1	ESE-1	SSW-2	0.9	0.9	bc	1024.6

Cruise 328												
Station	Lat. (N) [°]	Long. (E) [°]	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15098	42-10.2	140-41.0	3/6	0629-0634	85	WSW-1	ESE-1	WSW-2	1.2	2.5	bc	1026.6
US15099	42-09.1	140-35.9	3/6	0714-0717	68	SW-2	ESE-1	SW-3	0.4	2.5	bc	1027.0
US15100	42-10.8	140-35.6	3/6	0739-0743	79	South-1	ESE-1	South-3	1.2	2.4	bc	1027.2
US15101	42-13.8	140-30.7	3/6	0841-0846	80	Calm	ESE-1	Calm	2.5	2.5	bc	1027.9
US15102	42-17.1	140-36.1	3/6	0936-0940	91	Calm	ESE-1	Calm	3.0	2.5	bc	1028.0
US15103	42-18.9	140-31.1	3/6	1026-1031	93	Calm	ESE-1	Calm	3.1	2.4	bc	1028.1
US15104	42-19.1	140-23.2	3/6	1127-1130	54	ESE-1	ESE-1	ESE-3	3.1	2.6	bc	1028.0
US15105	42-24.0	140-31.7	3/6	1232-1237	96	East-1	East-1	East-2	2.4	2.3	bc	1027.9
US15106	42-21.2	140-36.3	3/6	1317-1322	89	SE-2	East-1	SE-3	3.4	2.3	bc	1027.2
US15107	42-23.3	140-42.7	3/6	1404-1407	62	SE-3	East-1	SE-4	3.1	2.1	bc	1027.5
US15108	42-21.1	140-48.1	3/6	1447-1450	52	SE-3	ESE-1	SE-3	2.1	1.7	c	1027.6
US15109	42-18.4	140-42.1	3/6	1531-1534	67	SE-3	ESE-1	SE-3	3.1	2.6	c	1027.7
US15110	42-13.0	140-42.0	3/6	1628-1632	90	SE-2	ESE-1	SE-4	1.5	2.3	s	1027.3
US15111	41-59.9	141-09.9	3/6	1910-1915	137	ESE-3	ESE-1	ESE-4	2.0	1.4	bc	1027.7

Cruise 329

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15112	41-42.9	140-44.6	3/15	0913-0924	84	SW -3	SW -1	SW -5	4.6	8.6	bc	1026.1
US15113	41-40.9	140-47.0	3/15	0943-0957	218	SW -3	SW -1	SW -5	4.8	8.4	c	1025.1
US15114	41-38.7	140-49.2	3/15	1016-1034	354	WSW -4	SW -1	WSW -6	4.9	8.6	c	1025.1
US15115	41-37.0	140-51.4	3/15	1110-1121	99	WSW -4	SW -1	WSW -6	4.6	8.7	c	1025.0
US15116	41-35.7	140-53.1	3/15	1134-1142	53	WSW -4	SW -1	WSW -6	5.0	8.6	c	1025.1
US15117	41-26.6	141-14.4	3/15	1327-1336	81	West -3	West -1	West -5	4.9	8.6	c	1024.1
US15117-2	41-26.7	141-14.4	3/15	1355-1404	81							
US15118	41-27.3	141-23.9	3/15	1447-1453	50	West -3	West -1	West -5	6.5	8.6	bc	1024.2
US15119	41-28.9	141-23.7	3/15	1507-1517	85	West -3	West -1	West -5	6.2	8.6	bc	1023.7
US15120-2	41-32.0	141-22.2	3/15	1540-1551	253							
US15120	41-32.1	141-22.6	3/15	1607-1623	245	West -3	West -1	West -5	6.2	8.6	bc	1023.7
US15121	41-34.8	141-20.5	3/15	1646-1706	322	WSW -2	West -1	WSW -4	6.0	8.3	bc	1023.7
US15122	41-37.6	141-19.1	3/15	1729-1744	217	SW -3	WSW -1	SW -4	6.0	8.4	bc	1023.6
US15123	41-40.9	141-17.5	3/15	1809-1825	231	WSW -3	WSW -1	WSW -5	5.8	7.5	bc	1023.6
US15124	41-43.9	141-16.0	3/15	1849-1906	229	SW -3	WSW -1	SW -5	6.1	8.5	bc	1024.0
US15125	41-46.7	141-14.7	3/15	1930-1942	202	WSW -3	WSW -1	WSW -5	6.2	8.0	c	1023.6
US15126-2	41-49.5	141-13.3	3/15	2003-2012	179							
US15126	41-49.8	141-13.5	3/15	2030-2042	193	WSW -2	WSW -1	WSW -3	5.6	6.0	o	1023.7
US15127	41-59.3	141-02.1	3/16	0600-0606	102	Calm	ESE -1	Calm	5.8	7.9	o	1023.6
US15128	41-58.9	141-00.7	3/16	0620-0625	94	SSE -1	ESE -1	SSE -3	5.5	2.7	c	1023.6
US15129	41-58.0	140-59.5	3/16	0635-0639	86	SSE -1	ESE -1	SSE -3	4.5	2.5	bc	1023.6
US15130	41-57.3	140-58.4	3/16	0648-0652	79	South -2	ESE -1	South -4	5.0	1.8	bc	1023.6

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION		US15076	
LATITUDE		42-10.4	N
LONGITUDE		140-47.1	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	2.994	33.107	26.375
10	3.000	33.108	26.375
20	3.004	33.109	26.375
30	3.067	33.128	26.385
40	3.071	33.133	26.389
50	3.223	33.212	26.438
75	4.705	33.674	26.657

STATION		US15079	
LATITUDE		42-11.1	N
LONGITUDE		140-35.6	E
DEPTH (m)		81	
Press.	Temp.	Salinity	Sigma-T
5	2.803	33.015	26.318
10	2.834	33.026	26.324
20	2.860	33.036	26.330
30	2.981	33.071	26.347
40	3.341	33.210	26.425
50	3.851	33.398	26.527
75	4.842	33.712	26.672

STATION		US15081-2	
LATITUDE		42-16.5	N
LONGITUDE		140-36.6	E
DEPTH (m)		91	
Press.	Temp.	Salinity	Sigma-T
5	2.920	33.086	26.365
10	2.908	33.086	26.365
20	2.919	33.092	26.369
30	3.104	33.164	26.411
40	3.211	33.196	26.426
50	3.605	33.364	26.524
75	5.068	33.799	26.715

STATION		US15084	
LATITUDE		42-18.9	N
LONGITUDE		140-30.6	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	2.930	32.930	26.239
10	2.766	32.969	26.284
20	2.757	32.987	26.299
30	2.923	33.049	26.334
40	3.129	33.153	26.400
50	4.033	33.451	26.550
75	4.997	33.809	26.731

STATION		US15077	
LATITUDE		42-10.2	N
LONGITUDE		140-41.1	E
DEPTH (m)		86	
Press.	Temp.	Salinity	Sigma-T
5	3.047	32.460	25.959
10	3.057	32.468	25.970
20	3.080	32.490	25.985
30	3.097	32.525	25.999
40	3.125	32.575	26.032
50	3.173	32.652	26.068
75	4.516	32.955	26.234

STATION		US15080	
LATITUDE		42-12.3	N
LONGITUDE		140-41.3	E
DEPTH (m)		90	
Press.	Temp.	Salinity	Sigma-T
5	2.979	33.120	26.387
10	2.981	33.121	26.387
20	3.009	33.129	26.391
30	3.175	33.183	26.419
40	3.249	33.211	26.435
50	3.731	33.401	26.541
75	4.828	33.696	26.661

STATION		US15082	
LATITUDE		42-14.4	N
LONGITUDE		140-30.9	E
DEPTH (m)		84	
Press.	Temp.	Salinity	Sigma-T
5	2.981	33.061	26.339
10	2.938	33.059	26.342
20	2.921	33.062	26.345
30	3.121	33.145	26.394
40	3.851	33.381	26.513
50	4.364	33.558	26.601
75	4.978	33.787	26.716

STATION		US15085	
LATITUDE		42-20.9	N
LONGITUDE		140-36.6	E
DEPTH (m)		87	
Press.	Temp.	Salinity	Sigma-T
5	2.720	32.891	26.226
10	2.673	32.946	26.274
20	2.777	32.977	26.289
30	2.993	33.072	26.347
40	3.028	33.141	26.399
50	4.572	33.625	26.632
75	5.031	33.810	26.729
85	5.026	33.809	26.728

STATION		US15078	
LATITUDE		42-09.2	N
LONGITUDE		140-35.9	E
DEPTH (m)		70	
Press.	Temp.	Salinity	Sigma-T
5	2.918	33.058	26.342
10	2.955	33.071	26.350
20	2.995	33.083	26.355
30	3.032	33.090	26.358
40	3.130	33.120	26.373
50	3.208	33.147	26.388

STATION		US15081	
LATITUDE		42-16.5	N
LONGITUDE		141-36.6	E
DEPTH (m)		91	
Press.	Temp.	Salinity	Sigma-T
5	2.909	33.079	26.360
10	2.909	33.086	26.365
20	2.992	33.123	26.388
30	3.141	33.173	26.414
40	3.212	33.196	26.426
50	3.969	33.485	26.584
75	5.083	33.804	26.717

STATION		US15083	
LATITUDE		42-18.7	N
LONGITUDE		140-23.8	E
DEPTH (m)		57	
Press.	Temp.	Salinity	Sigma-T
5	3.031	32.642	26.062
10	2.877	32.643	26.063
20	2.868	32.661	26.073
30	2.869	32.691	26.091
40	2.864	32.765	26.133
50	2.935	32.875	26.207

STATION		US15086	
LATITUDE		42-24.0	N
LONGITUDE		140-30.8	E
DEPTH (m)		94	
Press.	Temp.	Salinity	Sigma-T
5	3.114	33.030	26.303
10	2.895	33.032	26.323
20	2.917	33.058	26.343
30	2.984	33.085	26.358
40	3.658	33.332	26.493
50	4.795	33.706	26.672
75	4.919	33.770	26.710

STATION US15087			
LATITUDE 42-26.0 N			
LONGITUDE 140-37.1 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	2.790	32.636	26.084
10	2.592	32.644	26.089
20	2.566	33.555	26.634
30	2.549	33.753	26.698
40	2.577	33.658	26.666
50	3.044	33.923	26.875
75	5.015	33.974	26.958
80	5.027	33.808	26.727

STATION US15090			
LATITUDE 42-28.3 N			
LONGITUDE 140-43.1 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	2.505	32.747	26.128
10	2.229	32.797	26.189
20	2.799	33.010	26.314
30	2.949	33.078	26.355
40	3.016	33.094	26.363
50	3.354	33.240	26.449

STATION US15093			
LATITUDE 42-15.4 N			
LONGITUDE 140-47.5 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	2.400	32.865	26.231
10	2.400	32.864	26.230
20	2.369	32.863	26.232
30	2.976	33.080	26.355
40	4.713	33.709	26.684
50	4.810	33.703	26.669

STATION US15096			
LATITUDE 42-24.6 N			
LONGITUDE 140-48.5 E			
DEPTH (m) 45			
Press.	Temp.	Salinity	Sigma-T
5	2.311	32.803	26.188
10	2.315	32.803	26.188
20	2.316	32.803	26.188
30	2.303	32.810	26.194
40	2.367	32.848	26.220

STATION US15088			
LATITUDE 42-29.0 N			
LONGITUDE 140-31.5 E			
DEPTH (m) 74			
Press.	Temp.	Salinity	Sigma-T
5	3.121	33.094	26.353
10	3.040	33.107	26.371
20	3.009	33.105	26.372
30	2.994	33.106	26.374
40	3.084	33.151	26.401
50	3.206	33.198	26.428

STATION US15091			
LATITUDE 42-23.3 N			
LONGITUDE 140-42.6 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	2.338	32.789	26.175
10	2.258	32.785	26.178
20	2.312	32.820	26.202
30	2.528	32.893	26.243
40	2.889	32.991	26.291
50	4.418	33.621	26.646

STATION US15094			
LATITUDE 42-17.3 N			
LONGITUDE 140-53.7 E			
DEPTH (m) 58			
Press.	Temp.	Salinity	Sigma-T
5	2.705	32.848	26.192
10	2.682	32.852	26.198
20	2.519	32.855	26.213
30	2.534	32.879	26.231
40	2.877	33.051	26.340
50	4.555	33.726	26.714

STATION US15097			
LATITUDE 42-00.0 N			
LONGITUDE 140-09.5 E			
DEPTH (m) 134			
Press.	Temp.	Salinity	Sigma-T
5	1.302	32.618	26.112
10	1.279	32.618	26.113
20	1.301	32.626	26.118
30	1.425	32.665	26.142
40	1.432	32.667	26.142
50	1.432	32.669	26.144
75	1.471	32.684	26.153
100	1.697	32.755	26.195
125	2.122	32.856	26.245

STATION US15089			
LATITUDE 42-31.2 N			
LONGITUDE 140-37.6 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	2.431	32.819	26.195
10	2.594	32.929	26.266
20	2.712	32.974	26.292
30	2.781	33.004	26.310
40	2.968	33.080	26.355
50	3.152	33.158	26.402

STATION US15092			
LATITUDE 42-18.4 N			
LONGITUDE 140-42.2 E			
DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T
5	2.715	32.942	26.266
10	2.722	32.949	26.272
20	3.086	33.151	26.402
30	3.209	33.196	26.427
40	3.494	33.330	26.507
50	4.252	33.556	26.612

STATION US15095			
LATITUDE 42-20.5 N			
LONGITUDE 140-48.4 E			
DEPTH (m) 54			
Press.	Temp.	Salinity	Sigma-T
5	2.544	32.853	26.209
10	2.550	32.853	26.210
20	2.550	32.865	26.219
30	2.632	32.899	26.239
40	3.077	33.017	26.296
50	4.621	33.700	26.687

STATION US15098			
LATITUDE 42-10.2 N			
LONGITUDE 140-41.0 E			
DEPTH (m) 85			
Press.	Temp.	Salinity	Sigma-T
5	2.805	32.915	26.238
10	2.803	32.934	26.253
20	2.853	32.955	26.265
30	2.867	32.961	26.269
40	2.834	32.980	26.287
50	2.835	32.998	26.300
75	4.684	33.702	26.681

STATION		US15099	
LATITUDE		42-09.1	N
LONGITUDE		140-35.9	E
DEPTH (m)		68	
Press.	Temp.	Salinity	Sigma-T
5	2.975	32.921	26.228
10	3.012	32.923	26.226
20	3.011	32.924	26.227
30	2.921	32.982	26.282
40	2.898	33.009	26.305
50	2.934	33.038	26.325

STATION		US15100	
LATITUDE		42-10.8	N
LONGITUDE		140-35.6	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	2.833	32.971	26.280
10	2.828	32.970	26.279
20	2.830	32.970	26.279
30	2.831	32.970	26.279
40	2.827	32.970	26.279
50	2.869	33.008	26.306
75	3.355	33.235	26.445

STATION		US15101	
LATITUDE		42-13.8	N
LONGITUDE		140-30.7	E
DEPTH (m)		80	
Press.	Temp.	Salinity	Sigma-T
5	2.860	32.963	26.272
10	2.812	32.961	26.274
20	2.816	32.964	26.276
30	2.853	32.973	26.280
40	2.816	32.994	26.300
50	3.010	33.097	26.365
75	3.661	33.319	26.482

STATION		US15102	
LATITUDE		42-17.1	N
LONGITUDE		140-36.1	E
DEPTH (m)		91	
Press.	Temp.	Salinity	Sigma-T
5	2.708	32.897	26.231
10	2.684	32.900	26.236
20	2.678	32.904	26.239
30	2.726	32.948	26.271
40	2.852	33.015	26.314
50	3.319	33.204	26.423
75	4.936	33.767	26.705

STATION		US15103	
LATITUDE		42-18.9	N
LONGITUDE		140-31.1	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	2.623	32.845	26.197
10	2.663	32.885	26.226
20	2.678	32.908	26.243
30	2.673	32.915	26.248
40	2.716	32.949	26.272
50	2.810	32.997	26.302
75	4.142	33.520	26.595

STATION		US15104	
LATITUDE		42-19.1	N
LONGITUDE		140-23.2	E
DEPTH (m)		54	
Press.	Temp.	Salinity	Sigma-T
5	2.862	32.820	26.157
10	2.708	32.842	26.187
20	2.717	32.868	26.208
30	2.693	32.900	26.235
40	2.686	32.914	26.247
50	2.719	32.932	26.258

STATION		US15105	
LATITUDE		42-24.0	N
LONGITUDE		140-31.7	E
DEPTH (m)		96	
Press.	Temp.	Salinity	Sigma-T
5	2.378	32.777	26.162
10	2.402	32.850	26.219
20	2.574	32.923	26.263
30	2.744	32.993	26.305
40	2.983	33.085	26.358
50	3.758	33.377	26.512
75	4.964	33.788	26.718

STATION		US15106	
LATITUDE		42-21.2	N
LONGITUDE		140-36.3	E
DEPTH (m)		89	
Press.	Temp.	Salinity	Sigma-T
5	2.604	32.789	26.153
10	2.420	32.776	26.158
20	2.659	32.887	26.227
30	2.707	32.938	26.264
40	2.875	33.025	26.320
50	3.348	33.219	26.432
75	4.920	33.765	26.705

STATION		US15107	
LATITUDE		42-23.3	N
LONGITUDE		140-42.7	E
DEPTH (m)		62	
Press.	Temp.	Salinity	Sigma-T
5	3.180	32.979	26.256
10	3.011	32.969	26.263
20	2.849	32.976	26.282
30	2.837	32.982	26.289
40	2.972	33.055	26.335
50	3.351	33.215	26.429

STATION		US15108	
LATITUDE		42-21.1	N
LONGITUDE		140-48.1	E
DEPTH (m)		52	
Press.	Temp.	Salinity	Sigma-T
5	1.987	32.630	26.074
10	1.895	32.630	26.081
20	1.827	32.659	26.109
30	2.044	32.749	26.165
40	2.434	32.893	26.250

STATION		US15109	
LATITUDE		42-18.4	N
LONGITUDE		140-42.1	E
DEPTH (m)		67	
Press.	Temp.	Salinity	Sigma-T
5	2.970	32.950	26.252
10	2.974	32.948	26.250
20	2.841	32.957	26.268
30	2.863	32.995	26.297
40	2.954	33.048	26.331
50	3.148	33.129	26.379

STATION		US15110	
LATITUDE		42-13.0	N
LONGITUDE		140-42.0	E
DEPTH (m)		90	
Press.	Temp.	Salinity	Sigma-T
5	2.726	32.876	26.213
10	2.696	32.871	26.212
20	2.655	32.909	26.245
30	2.670	32.918	26.251
40	2.705	32.942	26.267
50	2.939	33.050	26.334
75	5.039	33.813	26.730

STATION US15111			
LATITUDE 41-59.9 N			
LONGITUDE 141-09.9 E			
DEPTH (m) 137			
Press.	Temp.	Salinity	Sigma-T
5	1.748	32.626	26.088
10	1.699	32.625	26.091
20	1.588	32.629	26.101
30	1.581	32.632	26.104
40	1.579	32.634	26.106
50	1.648	32.689	26.145
75	2.171	32.864	26.248
100	2.362	32.934	26.289
125	3.455	33.176	26.388

STATION US15112			
LATITUDE 41-42.9 N			
LONGITUDE 140-44.6 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	8.705	34.023	26.400
10	8.708	34.025	26.401
20	8.717	34.029	26.402
30	8.720	34.030	26.402
40	8.741	34.042	26.409
50	8.737	34.039	26.407
75	8.761	34.046	26.409

STATION US15113			
LATITUDE 41-40.9 N			
LONGITUDE 140-47.0 E			
DEPTH (m) 218			
Press.	Temp.	Salinity	Sigma-T
5	8.748	33.734	26.166
10	8.757	33.796	26.213
20	8.813	33.903	26.289
30	8.816	33.913	26.296
40	8.847	33.937	26.310
50	8.876	33.972	26.333
75	8.934	34.017	26.359
100	8.913	34.043	26.383
125	8.880	34.055	26.397
150	8.823	34.062	26.412
175	8.801	34.068	26.420
200	8.785	34.080	26.432

STATION US15114			
LATITUDE 41-38.7 N			
LONGITUDE 140-49.2 E			
DEPTH (m) 354			
Press.	Temp.	Salinity	Sigma-T
5	8.961	33.960	26.310
10	8.963	33.959	26.309
20	8.964	33.959	26.309
30	8.966	33.958	26.308
40	8.967	33.967	26.315
50	8.968	33.968	26.315
75	8.965	33.973	26.319
100	8.938	34.013	26.355
125	8.889	34.077	26.413
150	8.893	34.079	26.414
175	8.892	34.083	26.417
200	8.895	34.083	26.417
250	8.858	34.093	26.431
300	8.870	34.093	26.428

STATION US15115			
LATITUDE 41-37.0 N			
LONGITUDE 140-51.4 E			
DEPTH (m) 99			
Press.	Temp.	Salinity	Sigma-T
5	8.912	33.900	26.271
10	8.915	33.901	26.271
20	8.913	33.900	26.271
30	8.955	33.918	26.278
40	8.958	33.925	26.282
50	8.955	33.937	26.293
75	8.957	33.946	26.300

STATION US15116			
LATITUDE 41-35.7 N			
LONGITUDE 140-53.1 E			
DEPTH (m) 53			
Press.	Temp.	Salinity	Sigma-T
5	8.910	33.905	26.275
10	8.916	33.908	26.276
20	8.914	33.906	26.275
30	8.920	33.910	26.277
40	8.925	33.913	26.279

STATION US15117			
LATITUDE 41-26.6 N			
LONGITUDE 141-14.4 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	8.971	33.927	26.283
10	8.968	33.927	26.283
20	8.957	33.931	26.288
30	8.949	33.932	26.290
40	8.912	33.938	26.300
50	8.879	33.942	26.309

STATION US15117-2			
LATITUDE 41-26.7 N			
LONGITUDE 141-14.4 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	8.971	33.927	26.283
10	8.969	33.927	26.283
20	8.962	33.929	26.285
30	8.937	33.934	26.293
40	8.888	33.941	26.306
50	8.846	33.944	26.316

STATION US15118			
LATITUDE 41-27.3 N			
LONGITUDE 141-23.9 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	8.981	33.958	26.305
10	8.979	33.958	26.306
20	8.946	33.967	26.318
30	8.922	33.978	26.330
40	8.912	33.983	26.336

STATION		US15119	
LATITUDE		41-28.9	N
LONGITUDE		141-23.7	E
DEPTH (m)		85	
Press.	Temp.	Salinity	Sigma-T
5	8.916	33.977	26.330
10	8.908	33.978	26.333
20	8.880	33.984	26.341
30	8.863	33.988	26.347
40	8.862	33.988	26.348
50	8.857	33.990	26.350
75	8.818	34.001	26.365

STATION		US15120-2	
LATITUDE		41-32.0	N
LONGITUDE		141-22.2	E
DEPTH (m)		253	
Press.	Temp.	Salinity	Sigma-T
5	8.925	33.960	26.316
10	8.926	33.961	26.316
20	8.888	33.969	26.329
30	8.851	33.976	26.340
40	8.847	33.977	26.341
50	8.800	33.977	26.349
75	8.701	33.977	26.364
100	8.782	33.996	26.366

STATION		US151120	
LATITUDE		41-32.1	N
LONGITUDE		141-22.6	E
DEPTH (m)		245	
Press.	Temp.	Salinity	Sigma-T
5	8.936	33.956	26.311
10	8.938	33.956	26.311
20	8.939	33.957	26.311
30	8.842	33.976	26.341
40	8.821	33.977	26.345
50	8.820	33.977	26.346
75	8.782	33.977	26.351
100	8.734	33.975	26.357
125	8.670	33.968	26.362
150	8.615	33.959	26.363
175	8.397	33.923	26.368
200	8.495	33.945	26.370

STATION		US15121	
LATITUDE		41-34.8	N
LONGITUDE		141-20.5	E
DEPTH (m)		322	
Press.	Temp.	Salinity	Sigma-T
5	8.328	33.944	26.395
10	8.327	33.943	26.395
20	8.207	33.933	26.405
30	8.208	33.936	26.407
40	8.194	33.934	26.408
50	8.200	33.936	26.405
75	8.177	33.937	26.413
100	8.142	33.938	26.418
125	7.916	33.922	26.439
150	6.960	33.833	26.505
175	6.116	33.782	26.576
200	5.880	33.788	26.610
250	4.652	33.811	26.771
300	3.853	33.880	26.910

STATION		US15122	
LATITUDE		41-37.6	N
LONGITUDE		141-19.1	E
DEPTH (m)		217	
Press.	Temp.	Salinity	Sigma-T
5	8.837	33.999	26.360
10	8.839	33.999	26.360
20	8.847	34.000	26.359
30	8.853	34.001	26.359
40	8.802	34.022	26.384
50	8.773	34.029	26.393
75	8.768	34.035	26.399
100	8.759	34.048	26.410
125	8.735	34.048	26.415
150	7.901	33.947	26.462
175	5.999	33.717	26.539
200	3.696	33.819	26.877

STATION		US15123	
LATITUDE		41-40.9	N
LONGITUDE		141-17.5	E
DEPTH (m)		231	
Press.	Temp.	Salinity	Sigma-T
5	8.597	33.939	26.355
10	8.577	33.939	26.353
20	8.572	33.939	26.354
30	8.559	33.938	26.356
40	8.513	33.936	26.361
50	8.477	33.931	26.362
75	8.318	33.905	26.366
100	7.928	33.864	26.393
125	7.578	33.852	26.434
150	5.366	33.712	26.611
175	3.999	33.713	26.762
200	3.161	33.721	26.850

STATION		US15124	
LATITUDE		41-43.9	N
LONGITUDE		141-16.0	E
DEPTH (m)		229	
Press.	Temp.	Salinity	Sigma-T
5	8.656	33.966	26.362
10	8.666	33.967	26.361
20	8.666	33.965	26.360
30	8.673	33.966	26.360
40	8.674	33.966	26.360
50	8.673	33.966	26.359
75	8.565	33.944	26.359
100	7.812	33.826	26.380
125	7.510	33.832	26.427
150	5.390	33.656	26.564
175	3.063	33.559	26.729
200	3.002	33.628	26.790

STATION		US15125	
LATITUDE		41-46.7	N
LONGITUDE		141-14.7	E
DEPTH (m)		202	
Press.	Temp.	Salinity	Sigma-T
5	8.042	33.850	26.364
10	8.042	33.850	26.364
20	8.054	33.851	26.364
30	8.051	33.851	26.364
40	8.044	33.850	26.365
50	8.047	33.851	26.364
75	8.128	33.877	26.373
100	7.519	33.811	26.410
125	7.052	33.787	26.456
150	6.221	33.768	26.551
175	4.747	33.616	26.606

STATION		US15126-2	
LATITUDE		41-49.5	N
LONGITUDE		141-13.3	E
DEPTH (m)		179	
Press.	Temp.	Salinity	Sigma-T
5	6.827	33.681	26.404
10	6.870	33.676	26.393
20	6.917	33.677	26.388
30	7.363	33.777	26.405
40	7.428	33.774	26.394
50	7.508	33.786	26.392
75	7.451	33.819	26.426
100	7.538	33.850	26.437

STATION		US15126	
LATITUDE		41-49.8	N
LONGITUDE		141-13.5	E
DEPTH (m)		193	
Press.	Temp.	Salinity	Sigma-T
5	6.907	33.680	26.391
10	7.094	33.717	26.395
20	7.134	33.715	26.388
30	7.126	33.712	26.387
40	7.212	33.728	26.388
50	7.315	33.748	26.390
75	7.274	33.751	26.397
100	7.580	33.843	26.426
125	7.239	33.820	26.456
150	3.354	33.458	26.606
175	3.047	33.488	26.674
185	3.075	33.496	26.678

STATION		US15129	
LATITUDE		41-58.0	N
LONGITUDE		140-59.5	E
DEPTH (m)		86	
Press.	Temp.	Salinity	Sigma-T
5	2.446	32.796	26.172
10	2.981	33.019	26.306
20	3.915	33.332	26.468
30	5.067	33.563	26.528

STATION		US15127	
LATITUDE		41-59.3	N
LONGITUDE		141-02.1	E
DEPTH (m)		102	
Press.	Temp.	Salinity	Sigma-T
5	8.248	33.909	26.380
10	8.247	33.909	26.380
20	8.243	33.908	26.380
30	8.091	33.863	26.367
40	7.347	33.735	26.374
50	7.435	33.798	26.412
75	5.161	33.513	26.478

STATION		US15130	
LATITUDE		41-57.3	N
LONGITUDE		140-58.4	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	2.274	32.658	26.075
10	2.367	32.701	26.102
20	3.813	33.153	26.336
30	6.133	33.709	26.516
40	5.196	33.548	26.502
50	5.572	33.660	26.546
75	4.122	33.494	26.576

STATION		US15128	
LATITUDE		41-58.9	N
LONGITUDE		141-00.7	E
DEPTH (m)		94	
Press.	Temp.	Salinity	Sigma-T
5	4.597	33.263	26.343
10	4.763	33.271	26.330
20	5.897	33.530	26.404
30	6.773	33.721	26.442
40	6.551	33.748	26.493
50	5.864	33.654	26.506
75	4.178	33.477	26.556

THE " USHIO MARU "

CRUISE 330

CRUISE 331

CRUISE 332

IN MARCH 2015

IN APRIL 2015

1.Cruise Itinerary

Cruise 330

Departure from Usujiri	Mar.	16, 2015
Start hydrographic research (US15131)		16
Arrival at Usujiri		17
Departure from Usujiri		18
Arrival at Muroran		18
Departure from Muroran		19
Finish hydrographic research (US15154)		19
Return to Hakodate		20
Total coverage 281.6 miles		

Cruise 331

Departure from Hakodate	Apr.	9, 2015
Start hydrographic research (US15155) and frame trawl net sampling		9
Arrival at Usujiri		10
Departure from Usujiri		11
Operate underwater camera observation		12
Finish frame trawl net sampling		12
Finish hydrographic research (US15162)		13
Return to Hakodate		13
Total coverage 253.0 miles		

Cruise 332

Departure from Hakodate	Apr.	17, 2015
Start hydrographic research (US15163) and frame trawl net sampling		18
Finish frame trawl net sampling		18
Set mooring current meter		19
Arrival at Usujiri		19
Departure from Usujiri		22
Set mooring current meter		22
Finish hydrographic research (US15183)		23
Return to Hakodate		23
Total coverage 385.4 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

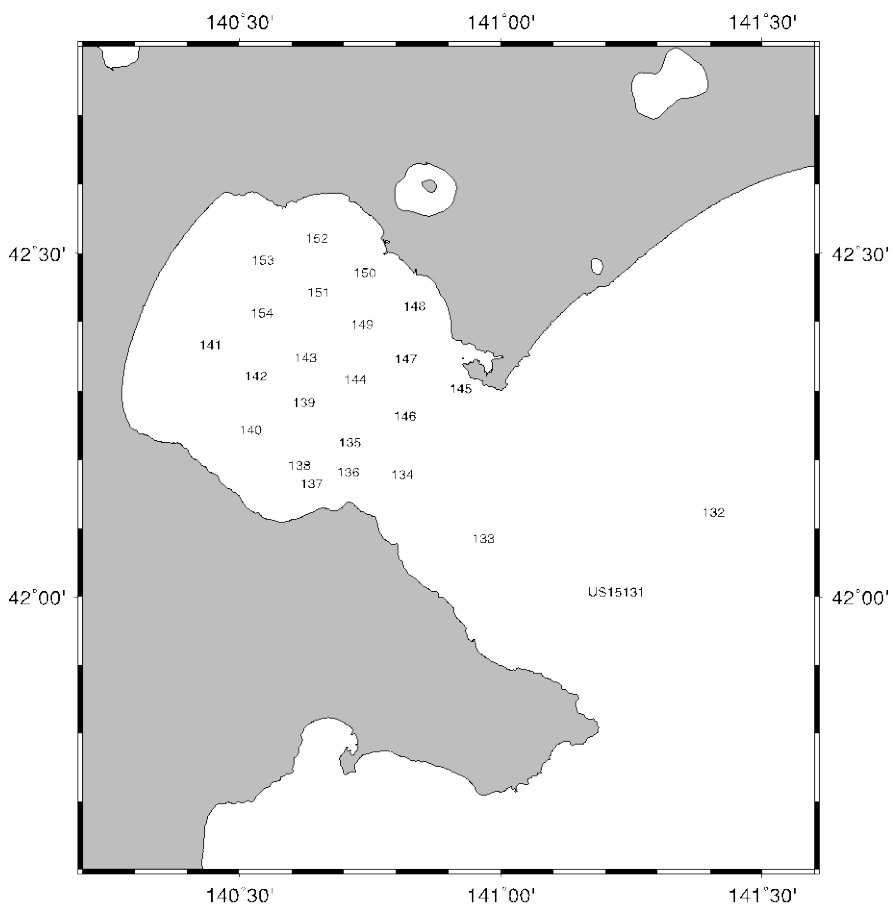


Figure 1. Oceanographic stations (Cruise 330)

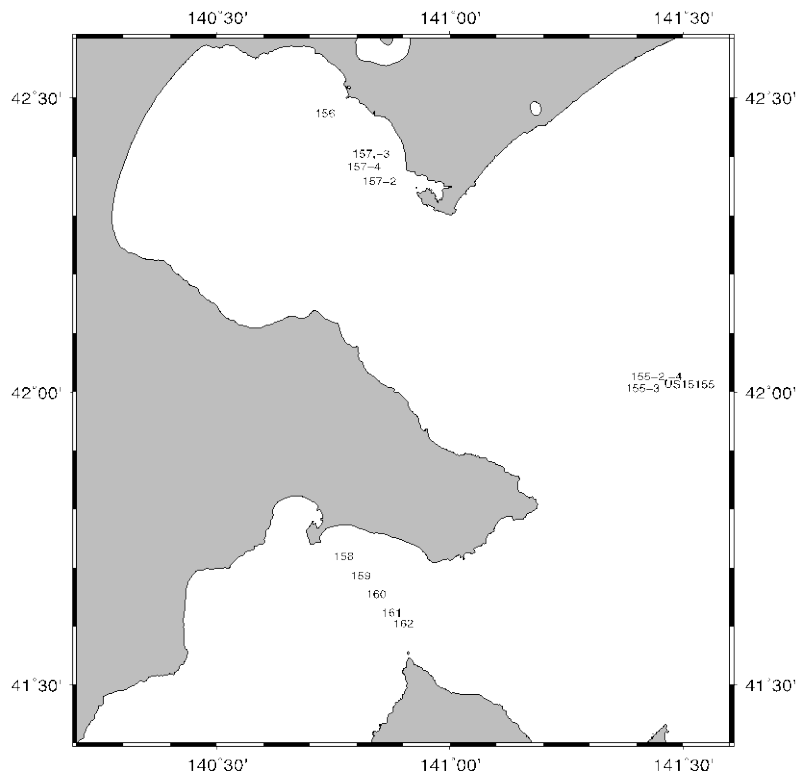


Figure 2. Oceanographic stations (Cruise 331)

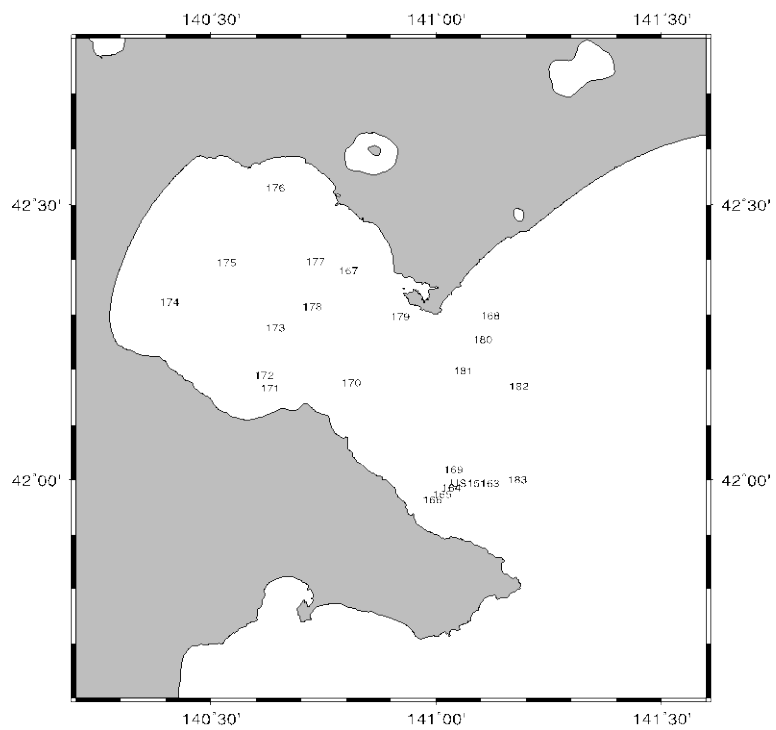


Figure 3. Oceanographic stations (Cruise 332)

Table 1. List of Oceanographic Station

Cruise 330												
Station	Lat. (N) [*]	Long. (E) [*]	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15131	42-00.0	141-10.0	3/16	1223-1230	136	ENE-1	ENE-2	ENE-2	6.8	6.9	c	1024.0
US15132	42-07.0	141-23.1	3/16	1414-1429	399	SE-1	ESE-1	SE-3	5.1	2.3	bc	1023.2
US15133	42-04.7	140-56.7	3/18	0559-0603	84	WNW-3	ESE-1	WNW-3	4.2	2.1	bc	1021.0
US15134	42-10.3	140-47.4	3/18	0713-0717	92	West-3	ESE-1	West-4	4.1	2.2	b	1021.4
US15135	42-13.1	140-41.4	3/18	0803-0807	89	WNW-2	ESE-1	WNW-4	4.5	1.8	bc	1021.7
US15136	42-10.5	140-41.2	3/18	0840-0845	87	West-3	ESE-1	West-3	3.8	2.5	bc	1022.6
US15137	42-09.5	140-37.0	3/18	0918-0922	74	NW-2	ESE-1	NW-3	4.0	2.6	bc	1022.5
US15138	42-11.1	140-35.6	3/18	0945-0949	80	NW-1	ESE-1	NW-2	4.8	2.4	bc	1022.7
US15139	42-16.6	140-36.1	3/18	1126-1130	90	Calm	ESE-1	Calm	6.6	3.3	bc	1022.7
US15140	42-14.2	140-30.0	3/18	1226-1230	80	Calm	ESE-1	Calm	8.4	3.5	bc	1022.2
US15141	42-21.6	140-25.4	3/18	1340-1344	73	NE-1	ESE-1	NE-2	7.3	3.1	bc	1021.4
US15142	42-18.9	140-30.6	3/18	1433-1439	94	NE-1	ESE-1	NE-2	6.6	3.2	bc	1021.2
US15143	42-20.5	140-36.3	3/18	1523-1527	89	Calm	ESE-1	Calm	7.8	3.1	bc	1021.2
US15144	42-18.6	140-42.0	3/18	1607-1611	70	Calm	ESE-1	SSE-2	5.4	4.1	bc	1020.4
US15145	42-17.8	140-54.1	3/19	0638-0641	56	East-3	ESE-1	East-4	3.9	2.2	o	1017.3
US15146	42-15.5	140-47.7	3/19	0724-0728	71	East-3	ESE-1	East-4	3.7	1.8	o	1016.7
US15147	42-20.4	140-47.8	3/19	0808-0812	56	East-2	ESE-1	East-4	4.2	2.7	o	1017.1
US15148	42-25.0	140-48.8	3/19	0847-0850	43	North-2	SE-1	North-3	4.9	3.1	c	1016.6
US15149	42-23.4	140-42.8	3/19	0926-0929	61	NNW-1	SE-1	NNW-3	3.7	2.6	o	1016.9
US15150	42-27.9	140-43.1	3/19	1006-1009	61	NW-2	SE-1	NW-3	4.3	2.9	o	1016.6
US15151	42-26.2	140-37.8	3/19	1045-1049	82	NW-1	East-1	NW-3	4.2	3.5	c	1016.2
US15152	42-30.9	140-37.6	3/19	1126-1130	63	West-2	SE-1	West-3	5.3	3.1	c	1016.2
US15153	42-29.0	140-31.4	3/19	1210-1215	75	WSW-2	SE-1	WSW-3	5.2	3.1	bc	1015.8
US15154	42-24.4	140-31.3	3/19	1253-1258	95	SSE-2	SE-1	SSE-3	5.2	4.0	bc	1015.1

Cruise 331												
Station	Lat. (N) [*]	Long. (E) [*]	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15155	42-00.4	141-27.5	4/9	1839-1849	390	SE-3	ESE-1	SE-4	3.2	3.3	b	1031.7
US15155-2	42-01.2	141-23.2	4/9	2110-2126	351	SE-3	SE-1	SE-5	3.0	3.1	b	1032.6
US15155-3	42-00.0	141-27.0	4/10	0643-0652	378	ESE-3	ESE-1	ESE-4	4.1	3.4	c	1030.5
US15155-4	42-01.3	141-23.1	4/10	1020-1033	350	East-3	East-1	East-4	4.2	3.3	r	1030.2
US15156	42-28.0	140-42.6	4/11	1510-1514	62	Calm	SE-1	Calm	6.4	3.8	0	1026.1
US15157	42-23.9	140-47.4	4/12	1230-1235	47	Calm	SE-1	Calm	9.0	4.0	b	1031.6
US15157-2	42-21.1	140-48.7	4/12	1445-1448	52	WSW-1	SW-1	WSW-3	8.5	4.6	bc	1031.6
US15157-3	42-23.7	140-47.4	4/12	1857-1900	47	West-4	West-1	West-5	5.6	4.0	bc	1032.2
US15157-4	42-22.6	140-46.7	4/12	2118-2122	51	WNW-3	West-1	WNW-4	5.4	3.8	bc	1033.5
US15158	41-42.8	140-45.0	4/13	0422-0425	83	NNE-1	East-1	NNE-2	4.3	8.4	bc	1033.0
US15159	41-40.8	140-47.2	4/13	0444-0450	223	NNE-2	East-1	NNE-3	4.8	8.8	c	1032.8
US15160	41-38.9	140-49.2	4/13	0508-0518	349	NE-1	East-1	NE-3	5.5	9.4	bc	1032.7
US15161	41-37.0	140-51.2	4/13	0535-0540	97	ENE-2	East-1	ENE-3	6.3	9.2	c	1032.7
US15162	41-35.9	140-52.7	4/13	0553-0557	43	East-3	East-1	East-4	5.9	9.1	c	1032.7

Cruise 332

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15163	41-59.2	141-01.9	4/18	0722-0726	101	NNE-2	East-1	NNE-3	5.6	3.6	bc	1011.9
US15164	41-58.7	141-00.7	4/18	0735-0739	94	NNE-2	East-1	NNE-3	5.5	3.6	bc	1011.8
US15165	41-58.0	140-59.5	4/18	0749-0753	86	NE-1	East-1	NE-3	6.5	3.6	bc	1011.7
US15166	41-57.4	140-58.2	4/18	0802-0806	78	North-1	East-1	North-2	7.1	3.6	bc	1011.8
US15167	42-22.4	140-47.0	4/18	1927-1930	50	West-3	West-1	West-5	6.2	4.2	bc	1011.2
US15168	42-17.5	141-05.9	4/19	1054-1100	69	WSW-3	WSW-1	WSW-5	7.3	4.4	bc	1017.1
US15169	42-00.7	141-01.0	4/22	0553-0559	93	South-2	East-1	South-4	7.7	3.9	bc	1015.6
US15170	42-10.2	140-47.4	4/22	0747-0751	95	North-2	East-1	North-4	7.4	4.2	m	1016.0
US15171	42-09.6	140-36.6	4/22	0905-0912	73	West-3	WSW-1	West-5	11.0	4.7	bc	1015.6
US15172	42-11.0	140-35.8	4/22	0935-0939	80	NE-3	SW-1	NE-4	10.6	4.3	bc	1016.1
US15173	42-16.2	140-37.3	4/22	1120-1129	89	SW-2	SSW-1	SW-3	10.3	4.6	bc	1016.1
US15174	42-19.0	140-23.2	4/22	1310-1313	54	SW-3	SW-1	SW-5	10.5	4.8	bc	1015.7
US15175	42-23.3	140-30.8	4/22	1414-1419	95	SW-3	SW-1	SW-5	11.2	5.1	bc	1016.1
US15176	42-31.4	140-37.7	4/22	1538-1546	60	SW-2	SW-1	SW-3	11.0	4.7	bc	1016.1
US15177	42-23.4	140-42.6	4/22	1657-1702	62	SW-2	SW-1	SW-4	8.7	5.1	bc	1016.6
US15178	42-18.5	140-42.2	4/23	0550-0555	65	West-1	East-1	West-2	5.6	4.4	bc	1020.7
US15179	42-17.4	140-53.9	4/23	0707-0712	57	calm	East-1	calm	6.1	5.0	b	1021.1
US15180	42-14.9	141-04.9	4/23	0817-0821	79	calm	East-1	calm	7.3	4.6	b	1021.6
US15181	42-11.5	141-02.3	4/23	0912-0916	81	calm	East-1	calm	7.2	4.9	b	1021.8
US15182	42-09.8	141-09.7	4/23	1007-1012	121	East-1	SE-1	East-1	7.8	5.6	b	1022.5
US15183	41-59.6	141-09.5	4/23	1207-1214	132	ESE-2	SE-1	ESE-4	8.7	5.6	bc	1022.1

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION	US15131		
LATITUDE	42-00.0	N	
LONGITUDE	141-10.0	E	
DEPTH (m)	136		
Press.	Temp.	Salinity	Sigma-T
5	2.669	32.877	26.219
10	6.998	33.771	26.451
20	7.474	33.788	26.398
30	7.549	33.795	26.393
40	7.605	33.797	26.387
50	7.631	33.801	26.386
75	7.754	33.826	26.388
100	7.912	33.866	26.396
125	5.913	33.576	26.438

STATION	US15132		
LATITUDE	42-07.0	N	
LONGITUDE	141-23.1	E	
DEPTH (m)	399		
Press.	Temp.	Salinity	Sigma-T
5	2.411	32.752	26.139
10	2.373	32.815	26.193
20	2.495	32.878	26.233
30	2.626	32.957	26.286
40	2.653	32.990	26.311
50	2.662	32.999	26.317
75	3.064	33.072	26.340
100	3.389	33.126	26.354
125	4.426	33.352	26.431
150	5.142	33.493	26.464
175	4.312	33.423	26.502
200	4.810	33.523	26.525
250	3.492	33.500	26.639
300	2.661	33.484	26.704
365	3.507	33.883	26.946

STATION	US15133		
LATITUDE	42-04.7	N	
LONGITUDE	140-56.7	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	2.466	32.497	25.932
10	2.360	32.700	26.102
20	2.411	32.730	26.122
30	2.665	32.834	26.185
40	5.557	33.473	26.400
50	7.183	33.803	26.451
75	6.123	33.682	26.496

STATION	US15134		
LATITUDE	42-10.3	N	
LONGITUDE	140-47.4	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	2.325	32.607	26.030
10	2.331	32.610	26.032
20	2.380	32.732	26.126
30	2.683	32.876	26.216
40	3.080	33.091	26.354
50	3.375	33.181	26.399
75	4.930	33.778	26.714

STATION	US15135		
LATITUDE	42-13.1	N	
LONGITUDE	140-41.4	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	2.497	32.528	25.954
10	2.338	32.557	25.989
20	2.134	32.672	26.097
30	2.562	32.809	26.173
40	2.686	32.896	26.233
50	3.277	33.144	26.379
75	4.468	33.621	26.640

STATION	US15136		
LATITUDE	42-10.5	N	
LONGITUDE	140-41.2	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	2.841	32.485	25.891
10	2.352	32.475	25.923
20	2.484	32.583	25.999
30	2.314	32.640	26.057
40	2.526	32.771	26.146
50	2.911	32.965	26.268
75	4.970	33.786	26.716

STATION	US15137		
LATITUDE	42-09.5	N	
LONGITUDE	140-37.0	E	
DEPTH (m)	74		
Press.	Temp.	Salinity	Sigma-T
5	3.042	32.532	25.910
10	2.839	32.549	25.942
20	2.401	32.512	25.949
30	2.349	32.654	26.066
40	2.496	32.748	26.130
50	2.675	32.871	26.213
70	4.499	33.696	26.697

STATION	US15138		
LATITUDE	42-11.1	N	
LONGITUDE	140-35.6	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	2.757	32.470	25.887
10	2.608	32.472	25.900
20	2.584	32.612	26.014
30	2.405	32.646	26.055
40	2.420	32.758	26.144
50	2.742	32.881	26.216
75	4.873	33.772	26.716

STATION	US15139		
LATITUDE	42-16.6	N	
LONGITUDE	140-36.1	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	3.091	32.519	25.897
10	2.836	32.543	25.938
20	2.291	32.601	26.028
30	2.329	32.657	26.070
40	2.372	32.687	26.091
50	2.571	32.797	26.163
75	4.238	33.535	26.597

STATION US15140			
LATITUDE 42-14.2 N			
LONGITUDE 140-30.0 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	3.020	32.413	25.819
10	2.766	32.540	25.942
20	2.423	32.601	26.018
30	2.236	32.624	26.050
40	2.302	32.691	26.099
50	2.384	32.741	26.133
75	4.800	33.740	26.698

STATION US15143			
LATITUDE 42-20.5 N			
LONGITUDE 140-36.3 E			
DEPTH (m) 89			
Press.	Temp.	Salinity	Sigma-T
5	2.756	32.514	25.922
10	2.724	32.519	25.928
20	2.334	32.628	26.046
30	2.335	32.666	26.076
40	2.286	32.676	26.088
50	2.337	32.704	26.107
75	4.770	33.740	26.702

STATION US15146			
LATITUDE 42-15.4 N			
LONGITUDE 140-47.7 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	2.798	32.455	25.871
10	2.580	32.535	25.953
20	2.554	32.786	26.155

STATION US15149			
LATITUDE 42-23.4 N			
LONGITUDE 140-42.8 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	2.705	32.403	25.837
10	2.665	32.408	25.844
20	2.375	32.634	26.048
30	2.512	32.748	26.128
40	2.620	32.809	26.169
50	3.046	33.020	26.301

STATION US15141			
LATITUDE 42-21.6 N			
LONGITUDE 140-25.4 E			
DEPTH (m) 73			
Press.	Temp.	Salinity	Sigma-T
5	3.117	32.388	25.790
10	2.171	32.528	25.979
20	2.287	32.687	26.097
30	2.629	32.857	26.206
40	2.677	32.883	26.222
50	2.724	32.908	26.239

STATION US15144			
LATITUDE 42-18.6 N			
LONGITUDE 140-42.0 E			
DEPTH (m) 70			
Press.	Temp.	Salinity	Sigma-T
5	2.842	32.571	25.960
10	2.774	32.648	26.027
20	2.403	32.735	26.127
30	2.513	32.793	26.164
40	2.588	32.844	26.199
50	3.008	33.097	26.344

STATION US15147			
LATITUDE 42-20.4 N			
LONGITUDE 140-47.8 E			
DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T
5	3.131	32.182	25.625
10	2.961	32.506	25.898
20	2.425	32.732	26.123
30	2.509	32.803	26.172
40	2.572	32.832	26.191
50	3.470	33.236	26.434

STATION US15150			
LATITUDE 42-27.9 N			
LONGITUDE 140-43.1 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	2.816	32.440	25.857
10	2.638	32.525	25.940
20	2.417	32.654	26.060
30	2.659	32.831	26.182
40	2.985	33.010	26.298
50	3.294	33.149	26.381

STATION US15142			
LATITUDE 42-18.9 N			
LONGITUDE 140-30.6 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	2.998	32.478	25.873
10	2.677	32.493	25.911
20	2.319	32.661	26.074
30	2.358	32.686	26.091
40	2.345	32.704	26.107
50	2.471	32.750	26.133
75	4.759	33.721	26.688

STATION US15145			
LATITUDE 42-17.8 N			
LONGITUDE 140-54.1 E			
DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T
5	2.350	32.412	25.872
10	2.340	32.446	25.900
20	2.478	32.703	26.095
30	2.566	32.820	26.182
40	2.602	32.861	26.211
50	2.780	32.989	26.299

STATION US15148			
LATITUDE 42-25.0 N			
LONGITUDE 140-48.8 E			
DEPTH (m) 43			
Press.	Temp.	Salinity	Sigma-T
5	2.892	32.530	4.961
10	2.403	32.589	9.922

STATION US15151			
LATITUDE 42-26.2 N			
LONGITUDE 140-37.8 E			
DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T
5	3.205	32.357	25.758
10	2.344	32.405	25.867

STATION US15152			
LATITUDE	42-30.9	N	
LONGITUDE	140-37.6	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	3.246	32.324	25.728
10	2.893	32.436	25.848
20	2.651	32.795	26.154
30	2.623	32.860	26.209
40	2.722	32.905	26.236
50	3.337	33.187	26.407
60	3.703	33.326	26.484

STATION US15155			
LATITUDE	42-00.4	N	
LONGITUDE	141-27.5	E	
DEPTH (m)	390		
Press.	Temp.	Salinity	Sigma-T
5	3.801	32.825	26.076
10	3.791	32.829	26.080
20	3.514	32.885	26.150
30	3.052	32.854	26.168
40	3.231	32.954	26.231
50	3.209	33.003	26.273
75	3.991	33.243	26.390
100	5.333	33.464	26.419
125	4.859	33.401	26.424
150	5.353	33.519	26.461
175	4.864	33.448	26.460
200	4.707	33.444	26.474
250	3.802	33.406	26.538
300	3.323	33.512	26.668

STATION US15155-4			
LATITUDE	42-01.3	N	
LONGITUDE	141-23.1	E	
DEPTH (m)	350		
Press.	Temp.	Salinity	Sigma-T
5	3.634	32.827	26.093
10	3.613	32.826	26.095
20	3.225	32.866	26.162
30	2.825	32.847	26.181
40	5.288	33.359	26.342
50	5.617	33.354	26.298
75	5.012	33.424	26.425
100	5.337	33.502	26.449
125	5.074	33.471	26.455
150	4.741	33.436	26.464
175	6.172	33.728	26.526
200	5.176	33.587	26.535
250	3.635	33.579	26.692
300	2.834	33.567	26.755

STATION US15153			
LATITUDE	42-29.0	N	
LONGITUDE	140-31.4	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	2.836	32.406	25.828
10	2.130	32.592	26.033
20	2.465	32.774	26.153
30	2.590	32.836	26.193
40	2.776	32.926	26.249
50	3.118	33.097	26.356

STATION US15155-2			
LATITUDE	42-01.2	N	
LONGITUDE	141-23.2	E	
DEPTH (m)	351		
Press.	Temp.	Salinity	Sigma-T
5	3.471	32.739	26.038
10	3.471	32.739	26.038
20	3.968	32.999	26.198
30	4.388	33.107	26.241
40	4.526	33.141	26.253
50	4.587	33.151	26.255
75	4.848	33.326	26.365
100	6.042	33.601	26.442
125	6.107	33.633	26.459
150	6.181	33.671	26.480
175	6.674	33.802	26.519
200	6.753	33.859	26.554
250	4.445	33.592	26.620
300	2.886	33.544	26.733

STATION US15156			
LATITUDE	42-28.0	N	
LONGITUDE	140-42.6	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	4.164	32.278	25.605
10	4.049	32.281	25.619
20	3.906	32.307	25.653
30	3.315	32.511	25.871
40	2.852	32.719	26.077
50	2.717	32.804	26.156
55	2.640	32.916	26.252

STATION US15154			
LATITUDE	42-24.4	N	
LONGITUDE	140-31.3	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	3.605	32.517	25.849
10	2.875	32.695	26.056
20	2.548	32.804	26.170
30	2.612	32.843	26.196
40	2.670	32.882	26.223
50	3.661	33.310	26.475
75	4.977	33.784	26.714

STATION US15155-3			
LATITUDE	42-00.0	N	
LONGITUDE	141-27.0	E	
DEPTH (m)	378		
Press.	Temp.	Salinity	Sigma-T
5	3.748	32.850	26.101
10	3.745	32.851	26.102
20	3.581	32.849	26.116
30	3.794	32.950	26.175
40	5.275	33.288	26.286
50	7.088	33.689	26.374
75	3.791	33.161	26.344
100	4.994	33.458	26.454
125	5.544	33.572	26.480
150	5.396	33.534	26.467
175	5.148	33.528	26.491
200	3.891	33.397	26.522
250	3.237	33.388	26.577
300	3.233	33.513	26.677

STATION US15157			
LATITUDE	42-23.9	N	
LONGITUDE	140-47.4	E	
DEPTH (m)	47		
Press.	Temp.	Salinity	Sigma-T
5	4.266	32.339	25.644
10	4.002	32.339	25.670
20	3.983	32.439	25.751
30	3.746	32.491	25.815
40	2.829	32.842	26.177

STATION US15157-2
LATITUDE 42-21.1 N
LONGITUDE 140-48.7 E
DEPTH (m) 52

Press.	Temp.	Salinity	Sigma-T
5	4.830	32.246	25.511
10	4.047	32.270	25.611
20	3.702	32.352	25.708
30	3.513	32.382	25.750
40	3.118	32.573	25.938
45	2.913	32.736	26.086

STATION US15158
LATITUDE 41-42.8 N
LONGITUDE 140-45.0 E
DEPTH (m) 83

Press.	Temp.	Salinity	Sigma-T
5	9.118	33.885	26.226
10	9.213	33.913	26.233
20	9.194	33.987	26.294
30	9.153	33.992	26.305
40	9.124	33.994	26.311
50	8.979	34.016	26.351
75	8.585	34.069	26.454

STATION US15161
LATITUDE 41-37.0 N
LONGITUDE 140-51.2 E
DEPTH (m) 97

Press.	Temp.	Salinity	Sigma-T
5	9.487	33.938	26.208
10	9.477	34.015	26.270
20	9.453	34.035	26.289
30	9.451	34.036	26.291
40	9.440	34.041	26.296
50	9.416	34.054	26.310
75	9.418	34.055	26.311

STATION US15157-3
LATITUDE 42-23.7 N
LONGITUDE 140-47.4 E
DEPTH (m) 47

Press.	Temp.	Salinity	Sigma-T
5	4.411	32.372	25.655
10	4.399	32.374	25.658
20	3.975	32.406	25.726
30	3.855	32.422	25.750
40	3.091	32.701	26.042

STATION US15159
LATITUDE 41-40.8 N
LONGITUDE 140-47.2 E
DEPTH (m) 223

Press.	Temp.	Salinity	Sigma-T
5	9.468	33.984	26.247
10	9.465	33.984	26.248
20	9.304	34.006	26.291
30	9.252	34.014	26.305
40	9.188	34.025	26.325
50	9.078	34.034	26.349
75	9.002	34.033	26.361
100	8.888	34.025	26.372
125	8.780	34.032	26.394
150	8.679	34.049	26.424
175	8.580	34.068	26.454
200	8.512	34.100	26.490

STATION US15162
LATITUDE 41-35.9 N
LONGITUDE 140-52.7 E
DEPTH (m) 43

Press.	Temp.	Salinity	Sigma-T
5	9.494	33.922	26.195
10	9.491	34.016	26.269
20	9.479	34.023	26.276
30	9.466	34.027	26.281

STATION US15157-4
LATITUDE 42-22.6 N
LONGITUDE 140-46.7 E
DEPTH (m) 51

Press.	Temp.	Salinity	Sigma-T
5	4.160	32.405	25.706
10	4.131	32.402	25.707
20	3.973	32.407	25.726
30	3.879	32.422	25.747
40	3.550	32.571	25.898
45	2.896	32.894	26.213

STATION US15160
LATITUDE 41-38.9 N
LONGITUDE 140-49.2 E
DEPTH (m) 349

Press.	Temp.	Salinity	Sigma-T
5	9.710	33.988	26.210
10	9.498	33.981	26.240
20	9.417	33.992	26.262
30	9.468	34.022	26.277
40	9.462	34.038	26.290
50	9.412	34.050	26.308
75	9.337	34.077	26.341
100	9.276	34.086	26.358
125	9.257	34.088	26.363
150	9.134	34.090	26.384
175	9.139	34.091	26.384
200	9.174	34.092	26.379
250	8.976	34.098	26.415
300	8.817	34.106	26.447

STATION US15163
LATITUDE 41-59.2 N
LONGITUDE 141-01.9 E
DEPTH (m) 101

Press.	Temp.	Salinity	Sigma-T
5	3.946	32.289	25.635
10	3.915	32.289	25.639
20	3.824	32.335	25.684
30	3.364	32.591	25.930
40	2.903	32.711	26.066
50	2.637	32.761	26.128
75	2.975	33.039	26.322
95	4.341	33.525	26.578

STATION		US15164	
LATITUDE		41-58.7	N
LONGITUDE		141-00.7	E
DEPTH (m)		94	
Press.	Temp.	Salinity	Sigma-T
5	3.956	32.283	25.630
10	3.860	32.331	25.677
20	3.709	32.540	25.857
30	2.487	32.720	26.108
40	2.290	32.812	26.197
50	2.378	32.885	26.249
75	3.740	33.280	26.443
90	4.416	33.551	26.590

STATION		US15167	
LATITUDE		42-22.4	N
LONGITUDE		140-47.0	E
DEPTH (m)		50	
Press.	Temp.	Salinity	Sigma-T
5	4.539	32.255	25.549
10	4.506	32.255	25.552
20	4.270	32.287	25.601
30	4.009	32.347	25.676
40	2.791	32.795	26.143

STATION		US15170	
LATITUDE		42-10.2	N
LONGITUDE		140-47.4	E
DEPTH (m)		95	
Press.	Temp.	Salinity	Sigma-T
5	4.596	32.008	25.347
10	4.555	32.024	25.363
20	4.434	32.121	25.453
30	4.009	32.363	25.688
40	3.758	32.420	25.757
50	2.913	32.741	26.089
75	3.511	33.203	26.404

STATION		US15173	
LATITUDE		42-16.2	N
LONGITUDE		140-37.3	E
DEPTH (m)		89	
Press.	Temp.	Salinity	Sigma-T
5	4.787	32.261	25.528
10	4.708	32.271	25.544
20	4.630	32.280	25.559
30	4.449	32.285	25.582
40	3.745	32.442	25.776
50	2.906	32.761	26.106
75	4.398	33.549	26.591

STATION		US15165	
LATITUDE		41-58.0	N
LONGITUDE		140-59.5	E
DEPTH (m)		86	
Press.	Temp.	Salinity	Sigma-T
5	3.947	32.282	25.629
10	3.878	32.308	25.657
20	3.058	32.648	26.003
30	2.844	32.757	26.106
40	2.295	32.821	26.204
50	2.365	32.888	26.252
75	3.826	33.318	26.465

STATION		US15168	
LATITUDE		42-17.5	N
LONGITUDE		141-05.9	E
DEPTH (m)		69	
Press.	Temp.	Salinity	Sigma-T
5	4.590	32.162	25.477
10	3.876	32.644	25.924
20	3.627	32.685	25.981
30	3.234	32.777	26.090
40	3.294	32.869	26.158
50	4.040	33.066	26.244

STATION		US15171	
LATITUDE		42-09.6	N
LONGITUDE		140-36.6	E
DEPTH (m)		73	
Press.	Temp.	Salinity	Sigma-T
5	5.127	31.667	25.020
10	4.941	31.822	25.163
20	4.538	32.124	25.445
30	3.840	32.353	25.696
40	3.205	32.619	25.967
50	2.760	32.802	26.151
65	3.038	33.010	26.294

STATION		US15174	
LATITUDE		42-19.0	N
LONGITUDE		140-23.2	E
DEPTH (m)		54	
Press.	Temp.	Salinity	Sigma-T
5	5.157	31.536	24.913
10	5.053	31.628	24.997
20	4.691	32.174	25.469
30	3.341	32.542	25.893
40	2.969	32.728	26.075

STATION		US15166	
LATITUDE		41-57.4	N
LONGITUDE		140-58.2	E
DEPTH (m)		78	
Press.	Temp.	Salinity	Sigma-T
5	4.050	32.253	25.597
10	4.031	32.253	25.599
20	3.220	32.620	25.966
30	2.500	32.709	26.098
40	2.404	32.807	26.184
50	3.121	33.054	26.321

STATION		US15169	
LATITUDE		42-00.7	N
LONGITUDE		141-01.0	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	4.333	32.740	25.955
10	4.334	32.741	25.955
20	4.333	32.742	25.957
30	4.279	32.751	25.970
40	3.541	32.836	26.109
50	4.193	33.115	26.267
75	3.651	33.331	26.493

STATION		US15172	
LATITUDE		42-11.0	N
LONGITUDE		140-35.8	E
DEPTH (m)		80	
Press.	Temp.	Salinity	Sigma-T
5	4.518	32.281	25.571
10	4.514	32.282	25.573
20	4.481	32.282	25.576
30	4.203	32.272	25.597
40	3.026	32.601	25.968
50	2.653	32.798	26.157
75	4.073	33.433	26.532

STATION		US15175	
LATITUDE		42-23.3	N
LONGITUDE		140-30.8	E
DEPTH (m)		95	
Press.	Temp.	Salinity	Sigma-T
5	5.359	32.066	25.310
10	5.283	32.092	25.339
20	4.804	32.143	25.432
30	3.900	32.361	25.697
40	3.525	32.503	25.846
50	2.928	32.795	26.131
75	3.743	33.273	26.438

STATION US15176			
LATITUDE 42-31.4 N			
LONGITUDE 140-37.7 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	5.077	32.204	25.451
10	5.050	32.204	25.454
20	4.922	32.208	25.471
30	4.769	32.221	25.497
40	4.230	32.325	25.636
50	3.638	32.458	25.799
55	3.165	32.618	25.970

STATION US15179			
LATITUDE 42-17.4 N			
LONGITUDE 140-53.9 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	5.195	32.043	25.310
10	5.027	32.065	25.346
20	4.648	32.116	25.427
30	4.002	32.296	25.635
40	3.641	32.550	25.872
50	2.797	32.693	26.061

STATION US15182			
LATITUDE 42-09.8 N			
LONGITUDE 141-09.7 E			
DEPTH (m) 121			
Press.	Temp.	Salinity	Sigma-T
5	5.151	32.541	25.709
10	4.923	32.682	25.847
20	4.857	32.893	26.021
30	4.601	32.959	26.100
40	3.783	33.082	26.282
50	4.758	33.244	26.310
75	6.124	33.565	26.403
100	5.510	33.472	26.405

STATION US15177			
LATITUDE 42-23.4 N			
LONGITUDE 140-42.6 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	5.294	32.131	25.369
10	4.977	32.142	25.412
20	4.443	32.279	25.578
30	4.375	32.294	25.597
40	3.557	32.484	25.827
50	2.921	32.839	26.167

STATION US15180			
LATITUDE 42-14.9 N			
LONGITUDE 141-04.9 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	4.705	31.689	25.083
10	4.130	32.039	25.419
20	3.590	32.345	25.713
30	3.711	32.537	25.855
40	2.968	32.503	25.895
50	2.923	32.739	26.087
75	3.586	33.051	26.276

STATION US15183			
LATITUDE 41-59.6 N			
LONGITUDE 141-09.5 E			
DEPTH (m) 132			
Press.	Temp.	Salinity	Sigma-T
5	5.359	32.704	25.815
10	5.202	32.689	25.819
20	4.403	32.726	25.937
30	4.413	32.802	25.996
40	5.288	33.320	26.311
50	5.627	33.389	26.325
75	5.379	33.450	26.403
100	5.548	33.531	26.447
125	5.517	33.529	26.449

STATION US15178			
LATITUDE 42-11.0 N			
LONGITUDE 140-35.8 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	4.750	32.290	25.554
10	4.751	32.291	25.555
20	4.498	32.294	25.584
30	4.235	32.332	25.641
40	3.617	32.489	25.826
50	2.849	32.715	26.074

STATION US15181			
LATITUDE 42-11.5 N			
LONGITUDE 141-02.3 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	5.002	31.719	25.074
10	4.683	32.004	25.334
20	3.538	32.517	25.855
30	2.836	32.571	25.960
40	2.825	32.741	26.097
50	3.233	32.828	26.131
75	3.809	33.094	26.289

THE " USHIO MARU "

CRUISE 333

CRUISE 334

CRUISE 335

IN MAY 2015

IN JUNE 2015

1.Cruise Itinerary

Cruise 333

Departure from Hakodate	May.	8, 2015
Arrival at Usujiri		8
Departure from Usujiri		9
Start hydrographic research (US15184) and frame trawl net sampling		9
Finish frame trawl net sampling		11
Arrival at Usujiri		12
Departure from Usujiri		13
Arrival at Usujiri		14
Departure from and Arrival at Usujiri		16
Departure from Usujiri		17
Sampling by bottom long line		17
Arrival at Usujiri		17
Departure from Usujiri		18
Arrival at and Departure from Usujiri		18
Arrive at Hakodate		18
Departure from Hakodate		20
Finish hydrographic research (US15235)		21
Return to Hakodate		21
Total coverage 761.0 miles		

Cruise 334

Departure from Hakodate	May.	26, 2015
Start frame trawl net sampling and hydrographic research (US15236)		26
Finish hydrographic research (US15244) and frame trawl sampling		27
Return to Hakodate		28
Total coverage 271.5 miles		

Cruise 335

Departure from Hakodate	Jun.	1, 2015
Start trawl net sampling and hydrographic research (US15245)		1
Arrival at Aomori		1
Departure from Aomori		2
Finish trawl net sampling		2
Arrival at Noheji		2
Departure from Noheji		3
Finish hydrographic research (US15268)		3
Return to Hakodate		3
Total coverage 201.5 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

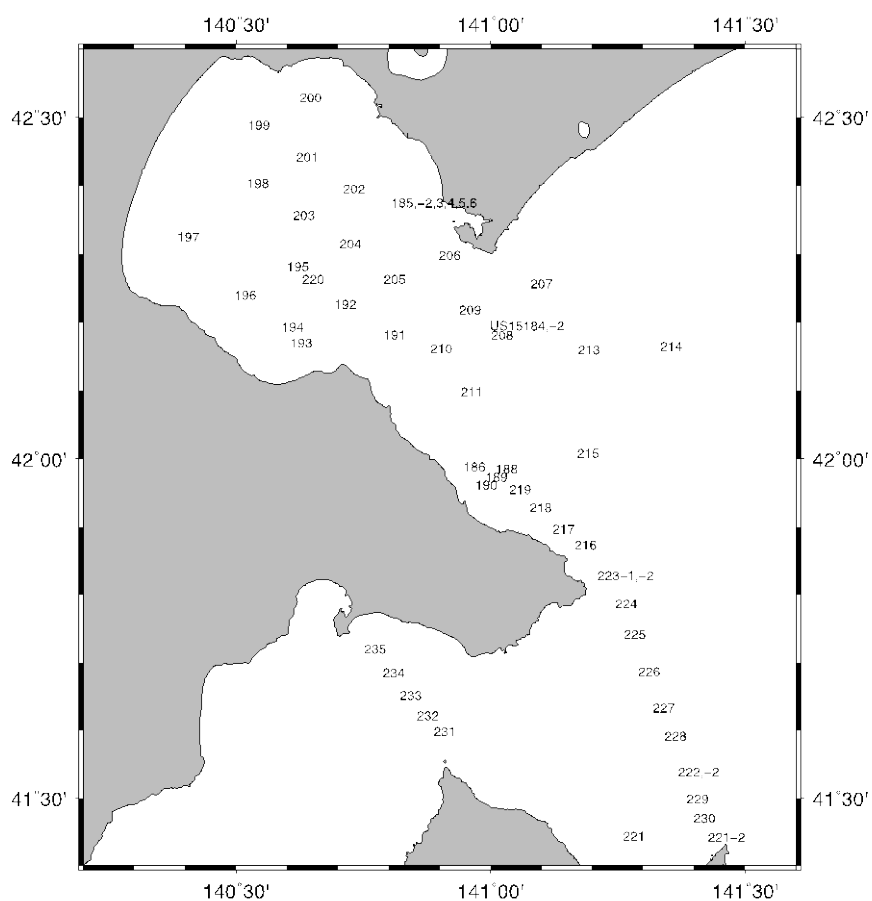


Figure 1. Oceanographic stations (Cruise 333)

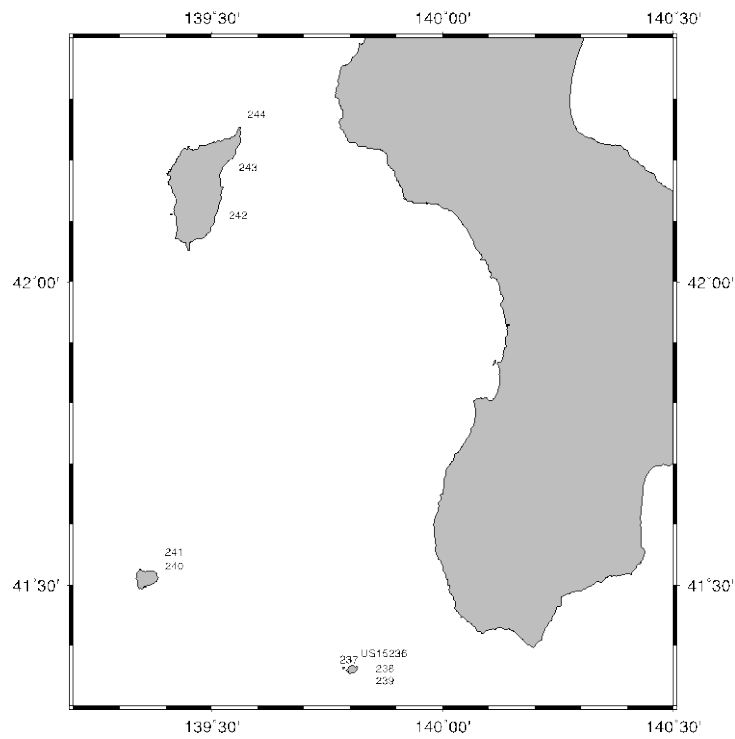


Figure 2. Oceanographic stations (Cruise 334)

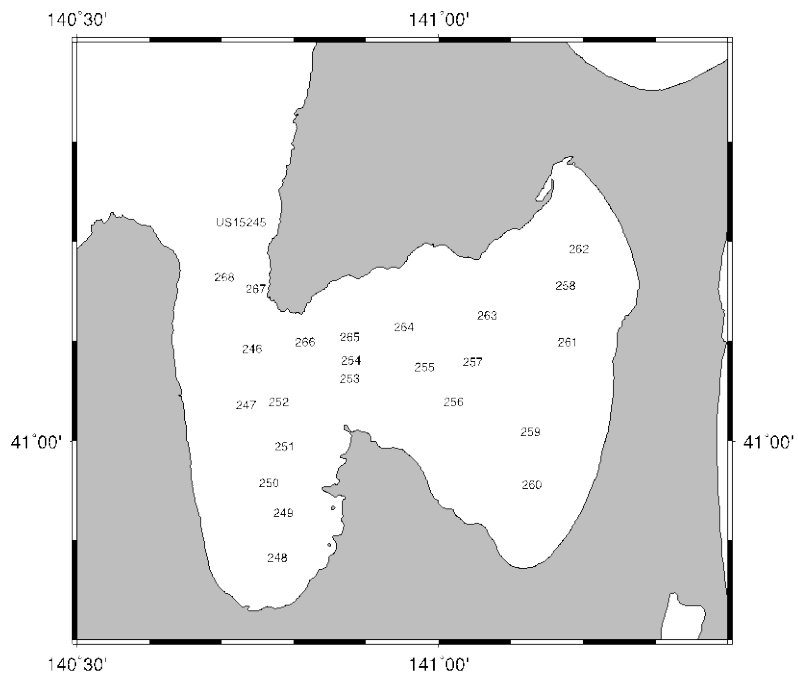


Figure 3. Oceanographic stations (Cruise 335)

Table 1. List of Oceanographic Station

Cruise 333												
Station	Lat. (N)	Long. (E)	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15184	42-11.3	140-59.9	5/9	1336-1339	78	SW-3	NW-1	SW-3	10.6	7.7	bc	1013.1
US15185	42-22.1	140-48.3	5/9	1950-1953	51	calm	NW-1	calm	9.9	9.4	c	1011.8
US15185-2	42-22.7	140-47.2	5/9	2158-2202	49	NW-1	NW-1	NW-3	9.7	8.8	bc	1011.6
US15185-3	42-21.5	140-48.6	5/10	0658-0702	52	West-3	West-1	West-4	8.4	8.8	c	1011.2
US15185-4	42-23.1	140-46.7	5/10	1150-1154	48	WNW-3	WNW-1	WNW-4	10.9	8.9	bc	1011.6
US15185-5	42-21.4	140-48.7	5/10	1947-1951	52	West-3	NW-1	West-5	9.7	8.5	bc	1015.8
US15185-6	42-22.4	140-47.5	5/10	2150-2153	49	West-2	WNW-1	West-4	9.4	8.6	bc	1016.6
US15184-2	42-11.3	141-01.6	5/11	1410-1414	80	West-4	West-1	West-5	12.9	7.5	bc	1018.5
US15186	41-58.9	140-56.8	5/11	1955-1919	73	West-1	NW-1	West-3	13.8	9.0	bc	1019.1
US15187	41-59.4	141-01.8	5/12	0452-0458	101	calm	East-1	calm	8.6	8.3	c	1015.6
US15188	41-58.7	141-00.6	5/12	0508-0513	94	calm	East-1	calm	8.8	8.4	c	1015.5
US15189	41-58.0	140-59.4	5/12	0522-0526	80	calm	East-1	calm	8.9	8.4	c	1015.5
US15190	41-57.3	140-58.2	5/12	0535-0540	77	calm	East-1	calm	8.9	8.6	c	1015.1
US15191	42-10.5	140-47.4	5/13	0653-0658	92	calm	East-1	calm	9.9	8.8	bc	999.5
US15192	42-13.2	140-41.6	5/13	0802-0806	90	West-1	East-1	West-2	10.7	8.5	bc	999.5
US15193	42-09.8	140-36.4	5/13	0838-0844	71	calm	East-1	calm	12.2	8.7	bc	999.6
US15194	42-11.2	140-35.4	5/13	0901-0905	81	calm	East-1	calm	13.6	9.1	bc	1000.0
US15195	42-16.5	140-36.0	5/13	1033-1041	31	SW-2	ESE-1	SW-3	14.7	8.7	bc	1000.1
US15196	42-14.0	140-29.8	5/13	1153-1158	77	NE-1	East-1	NE-1	13.5	9.0	bc	999.8
US15197	42-19.1	140-23.1	5/13	1241-1245	54	SW-1	East-1	SW-2	12.5	8.9	r	999.1
US15198	42-23.8	140-31.3	5/13	1353-1358	96	SW-1	SW-1	SW-3	13.0	9.6	bc	999.6
US15199	42-28.9	140-31.4	5/13	1445-1450	75	calm	SE-1	calm	16.1	8.9	bc	999.6
US15200	42-31.3	140-37.5	5/13	1537-1544	60	South-1	SE-1	South-1	12.5	9.4	bc	1000.1
US15201	42-26.1	140-37.1	5/13	1638-1643	83	SW-3	SW-1	SW-5	12.4	8.7	c	1000.1
US15202	42-23.3	140-42.6	5/13	1712-1716	61	SW-2	SW-1	SW-3	12.9	9.5	c	1000.6
US15203	42-21.0	140-36.7	5/13	1807-1812	87	SW-2	SW-1	SW-3	12.8	9.6	o	1001.0
US15204	42-18.5	140-42.2	5/14	0604-0609	66	West-4	East-1	West-5	10.2	9.3	bc	1005.0
US15205	42-15.4	140-47.4	5/14	0704-0708	72	WNW-4	ESE-1	WNW-5	10.5	8.9	bc	1006.1
US15206	42-17.5	140-53.9	5/14	0808-0811	56	West-3	ESE-1	West-5	11.4	9.0	bc	1006.6
US15207	42-15.0	141-04.7	5/14	0918-0922	79	WNW-3	ESE-1	WNW-4	10.9	7.0	bc	1007.6
US15208	42-11.3	141-02.7	5/14	1002-1006	83	WNW-3	WNW-1	WNW-4	9.8	7.2	bc	1008.6
US15209	42-12.7	140-56.3	5/14	1059-1103	70	WNW-4	ESE-1	WNW-5	10.5	7.2	bc	1009.4
US15210	42-09.3	140-52.9	5/14	1202-1206	78	WNW-4	ESE-1	WNW-5	10.3	7.4	bc	1009.7
US15211	42-05.5	140-56.5	5/14	1302-1307	84	WNW-4	ESE-1	WNW-4	10.2	7.5	bc	1010.1
US15212	42-00.7	141-00.8	5/14	1357-1403	91	NW-3	ESE-1	NW-4	11.6	8.3	bc	1010.5
US15213	42-09.2	141-10.3	5/16	0821-0826	126	West-2	ESE-1	West-3	8.8	6.9	o	1004.5
US15214	42-09.5	141-20.0	5/16	0949-1002	366	West-3	ESE-1	West-5	9.0	7.2	bc	1003.9
US15215	42-00.1	141-10.2	5/16	1331-1338	137	WNW-2	ESE-1	WNW-4	10.7	7.9	bc	1002.6
US15216	41-52.0	141-09.9	5/17	0746-0753	110	West-3	ESE-1	West-6	11.2	8.2	bc	1004.3
US15217	41-53.4	141-07.3	5/17	0813-0820	93	SW-3	ESE-1	SW-5	11.9	8.1	bc	1004.2
US15218	41-55.3	141-04.6	5/17	0953-1000	110	West-3	ESE-1	West-5	12.2	7.8	bc	1005.3
US15219	41-56.9	141-02.2	5/17	1017-1020	104	West-3	ESE-1	West-5	12.8	7.7	bc	1005.3
US15220	42-15.4	140-37.8	5/18	0815-0832	88	NE-1	ESE-1	NE-3	9.4	8.7	bc	1013.6
US15221	41-26.2	141-15.6	5/20	1132-1139	77	North-2	East-1	North-3	14.5	11.2	bc	1003.0
US15221-2	41-26.1	141-25.6	5/20	1157-1204	76	North-2	East-1	North-3	14.5	11.2	bc	1003.0
US15222	41-31.9	141-22.1	5/20	1251-1309	253	ENE-2	East-1	ENE-4	12.6	11.5	bc	1002.1
US15222-2	41-32.1	141-22.3	5/20	1344-1402	253	ENE-4	East-1	ENE-4	11.6	11.4	bc	1001.6
US15223-1	41-49.3	141-12.6	5/20	1556-1610	132	calm	East-1	calm	11.0	7.9	r	1000.9
US15223-2	41-49.0	141-14.0	5/20	1637-1653	158	calm	East-1	calm	11.0	7.9	r	1000.9

Cruise 333 (continued)

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15224	41-46.8	141-14.7	5/20	1711-1731	206	NW-3	ESE-1	NW-3	9.2	8.0	r	1002.0
US15225	41-44.1	141-15.7	5/20	1749-1808	228	NE-3	ESE-1	NNE-4	9.0	7.8	o	1001.2
US15226	41-40.8	141-17.4	5/20	1833-1852	231	NE-3	ESE-1	NE-4	8.9	7.7	c	1000.8
US15227	41-37.6	141-19.1	5/20	1917-1933	216	ENE-3	ESE-1	ENE-3	9.4	7.0	bc	1001.1
US15228	41-35.1	141-20.5	5/20	1954-2015	313	East-2	ESE-1	East-3	9.3	8.3	bc	1001.0
US15229	41-29.5	141-23.1	5/20	2049-2057	129	East-2	ESE-1	East-3	11.2	9.3	bc	1001.1
US15230	41-27.8	141-23.9	5/20	2113-2117	57	East-2	East-1	East-3	11.2	11.0	bc	1001.6
US15231	41-35.5	140-53.3	5/21	0403-0406	50	WNW-3	ESE-1	WNW-4	11.1	12.0	bc	1001.3
US15232	41-36.9	140-51.3	5/21	0423-0432	94	West-3	ESE-1	West-4	11.3	11.8	bc	1001.7
US15233	41-38.7	140-49.3	5/21	0452-0516	348	West-3	ESE-1	West-4	11.4	11.5	bc	1001.2
US15234	41-40.7	140-47.3	5/21	0549-0608	232	West-2	ESE-1	West-4	11.1	11.6	c	1001.8
US15235	41-42.8	140-45.1	5/21	0628-0636	85	SW-2	ESE-1	SW-3	11.1	11.7	c	1002.2

Cruise 334

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15236	41-22.8	139-49.3	5/26	1403-1413	520	West-1	East-1	West-2	16.7	13.8	bc	1009.0
US15237	41-22.2	139-46.6	5/26	1445-1454	148	WNW-3	North-1	WNW-5	14.4	12.2	c	1009.6
US15238	41-21.3	139-51.3	5/26	1635-1543	647	NW-2	West-1	NW-5	12.3	12.5	c	1009.6
US15239	41-20.1	139-51.3	5/26	1652-1700	208	WNW-2	North-1	WNW-3	14.8	13.6	bc	1009.1
US15240	41-31.5	139-23.9	5/27	0521-0529	560	WNW-2	NW-1	WNW-4	11.5	13.0	c	1012.7
US15241	41-32.9	139-23.9	5/27	0555-0604	992	North-2	NW-1	North-3	11.3	12.9	c	1013.1
US15242	42-06.2	139-32.2	5/27	0936-0945	213	NNE-2	NW-1	NNE-4	13.1	12.2	c	1013.5
US15243	42-10.9	139-33.5	5/27	1036-1042	303	NNE-1	North-1	NNE-3	13.6	12.3	bc	1013.6
US15244	42-16.1	139-34.6	5/27	1134-1142	118	NNE-2	North-1	NNE-3	14.7	12.5	bc	1013.5

Cruise 335

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15245	41-12.9	140-41.5	6/1	1226-1230	81	NNW-1	West-1	NNW-4	17.6	15.2	bc	1011.9
US15246	41-05.3	140-43.7	6/1	1327-1330	61	North-3	North-1	North-5	17.6	14.5	bc	1011.6
US15247	41-01.9	140-43.2	6/1	1427-1430	57	North-3	North-1	North-5	17.1	14.3	bc	1011.7
US15248	40-52.7	140-45.8	6/1	1533-1536	32	NE-1	NNW-1	NE-3	19.9	15.7	bc	1011.2
US15249	40-55.4	140-46.3	6/2	0657-0701	41	SW-1	South-1	SW-3	19.2	15.5	bc	1011.0
US15250	40-57.2	140-45.1	6/2	0744-0748	47	NW-1	WNW-1	NW-3	19.8	14.9	bc	1011.1
US15251	40-59.4	140-46.4	6/2	0806-0810	52	NW-1	WNW-1	NW-3	20.0	15.3	bc	1011.0
US15252	41-02.1	140-45.9	6/2	0908-0910	51	NW-1	East-1	NW-2	24.0	14.6	bc	1011.1
US15253	41-03.5	140-51.8	6/2	0944-0947	43	West-1	East-1	West-3	22.7	15.4	bc	1010.8
US15254	41-04.6	140-51.9	6/2	0959-1002	50	WNW-1	SE-1	WNW-4	21.5	15.3	bc	1010.7
US15255	41-04.2	140-58.0	6/2	1118-1120	49	NW-1	West-1	NW-3	23.9	16.0	bc	1010.2
US15256	41-02.1	141-00.4	6/2	1138-1142	48	calm	west-1	calm	21.4	16.8	bc	1010.1
US15257	41-04.5	141-02.0	6/2	1209-1213	47	WNW-3	WNW-1	WNW-5	20.8	15.5	bc	1009.6
US15258	41-09.1	141-09.7	6/2	1330-1331	34	West-2	WNW-1	West-4	20.1	14.8	bc	1009.4
US15259	41-00.3	141-06.8	6/2	1517-1520	43	West-2	WNW-1	West-3	19.4	15.1	bc	1009.8
US15260	40-57.1	141-06.9	6/2	1543-1545	36	NNW-1	West-1	NNW-3	20.6	15.6	c	1009.7
US15261	41-05.7	141-09.9	6/3	0713-0716	38	calm	SSW-1	calm	17.2	15.0	c	1004.8
US15262	41-11.3	141-10.8	6/3	0756-0758	29	NE-1	SW-1	NE-2	17.2	15.1	c	1004.1
US15263	41-07.3	141-03.2	6/3	0843-0845	41	NE-1	SW-1	NE-3	18.9	14.7	c	1003.5
US15264	41-06.6	140-56.3	6/3	0922-0925	45	ESE-1	NNE-1	ESE-3	17.2	14.7	c	1002.8
US15265	41-06.0	140-51.8	6/3	0947-0950	50	East-1	NE-1	East-3	18.9	14.9	c	1002.5
US15266	41-05.7	140-48.1	6/3	1016-1019	57	East-1	NE-1	East-4	18.4	15.2	c	1001.8
US15267	41-08.9	140-44.0	6/3	1046-1051	60	ESE-2	East-1	ESE-4	17.1	14.9	c	1000.2
US15268	41-09.6	140-41.4	6/3	1115-1119	52	ESE-2	East-1	ESE-4	18.6	14.7	c	1000.4

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATIONUS15184 LATITUDE42-11.3N LONGITUDE140-59.9E DEPTH (m)78				STATIONUS15185 LATITUDE42-22.1N LONGITUDE140-48.3E DEPTH (m)51				STATIONUS15185-2 LATITUDE41-08.6N LONGITUDE140-44.1E DEPTH (m)59			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	7.070	32.026	25.067	5	9.219	31.730	24.525	5	8.753	31.763	24.622
10	6.739	32.100	25.169	10	8.303	31.757	24.684	10	8.523	31.776	24.667
20	4.767	32.554	25.762	20	5.302	32.112	25.353	20	5.309	32.076	25.324
30	3.813	32.720	25.991	30	4.335	32.315	25.617	30	4.532	32.270	25.561
40	3.549	32.763	26.050	40	3.640	32.506	25.837				
50	3.292	32.881	26.168								
STATIONUS15185-3 LATITUDE41-05.9N LONGITUDE140-42.7E DEPTH (m)53				STATIONUS15185-4 LATITUDE42-23.1N LONGITUDE140-46.7E DEPTH (m)48				STATIONUS15185-5 LATITUDE42-21.4N LONGITUDE140-48.7E DEPTH (m)52			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
No Data				5	9.153	31.701	24.512	5	8.754	31.779	24.634
				10	8.519	31.748	24.645	10	6.230	31.909	25.083
				20	5.819	32.012	25.214	20	4.557	32.255	25.547
				30	4.504	32.270	25.564	30	3.863	32.455	25.776
				40	3.564	32.548	25.878	40	3.326	32.644	25.976
STATIONUS15185-6 LATITUDE42-22.4N LONGITUDE140-47.5E DEPTH (m)49				STATIONUS15186 LATITUDE41-58.9N LONGITUDE140-56.8E DEPTH (m)73				STATIONUS15187 LATITUDE41-59.4N LONGITUDE141-01.8E DEPTH (m)101			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	8.922	31.684	24.535	5	9.460	31.760	24.511	5	8.663	31.851	24.704
10	7.976	31.757	24.731	10	8.874	31.762	24.603	10	8.522	31.861	24.733
20	4.573	32.216	25.514	20	6.319	31.912	25.074	20	5.178	32.116	25.370
30	3.869	32.436	25.760	30	3.732	32.499	25.823	30	3.606	32.498	25.834
40	3.409	32.620	25.946	40	3.943	32.700	25.962	40	3.901	32.662	25.936
				50	3.522	32.794	26.077	50	3.402	32.719	26.029
								75	3.685	33.120	26.321
STATIONUS15188 LATITUDE41-58.7N LONGITUDE141-00.6E DEPTH (m)94				STATIONUS15189 LATITUDE41-58.0N LONGITUDE140-59.4E DEPTH (m)80				STATIONUS15190 LATITUDE41-00.2N LONGITUDE140-46.3E DEPTH (m)52			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	8.784	31.835	24.674	5	8.771	31.843	24.682	5	8.967	31.828	24.641
10	8.778	31.842	24.680	10	8.766	31.842	24.682	10	8.957	31.828	24.642
20	5.518	32.004	25.243	20	7.682	31.845	24.841	20	8.668	31.792	24.658
30	3.741	32.614	25.914	30	4.093	32.343	25.664	30	4.453	32.256	25.559
40	3.665	32.702	25.990	40	3.855	32.659	25.938	40	3.944	32.694	25.957
50	3.147	32.712	26.046	50	3.837	32.798	26.050	50	3.843	32.828	26.074
75	3.422	33.108	26.337	75	4.460	33.259	26.354				

STATION US15191			
LATITUDE 42-10.5 N			
LONGITUDE 140-47.4 E			
DEPTH (m) 92			
Press.	Temp.	Salinity	Sigma-T
5	8.840	31.693	24.554
10	4.895	32.159	25.435
20	4.151	32.486	25.772
30	3.523	32.607	25.929
40	3.317	32.728	26.044
50	3.052	32.835	26.152
75	3.613	33.263	26.442

STATION US15194			
LATITUDE 42-11.2 N			
LONGITUDE 140-35.4 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	8.862	31.674	24.536
10	8.567	31.711	24.609
20	4.508	32.253	25.550
30	3.488	32.553	25.889
40	3.102	32.728	26.063
50	2.937	32.861	26.183
75	3.681	33.256	26.430

STATION US15197			
LATITUDE 42-19.1 N			
LONGITUDE 140-23.1 E			
DEPTH (m) 54			
Press.	Temp.	Salinity	Sigma-T
5	9.126	31.588	24.428
10	8.769	31.709	24.577
20	4.645	32.177	25.476
30	2.728	32.480	25.808
40	3.041	32.702	26.048
50	2.982	32.826	26.151

STATION US15200			
LATITUDE 42-31.3 N			
LONGITUDE 140-37.5 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	8.324	31.838	24.745
10	7.581	31.935	24.927
20	4.558	32.229	25.527
30	3.836	32.444	25.769
40	3.295	32.667	25.997
50	3.053	32.910	26.213

STATION US15192			
LATITUDE 42-13.2 N			
LONGITUDE 140-41.6 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	8.337	31.810	24.720
10	6.956	31.951	25.024
20	4.799	32.189	25.469
30	4.259	32.406	25.698
40	3.549	32.609	25.928
50	3.199	32.825	26.131
75	3.253	33.116	26.359

STATION US15195			
LATITUDE 42-16.5 N			
LONGITUDE 140-36.0 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	8.512	31.798	24.685
10	8.126	31.862	24.792
20	7.119	31.917	24.975
30	4.500	32.295	25.585
40	4.375	32.490	25.753
50	3.125	32.734	26.066
75	3.513	33.136	26.351
85	4.405	33.538	26.581

STATION US15198			
LATITUDE 42-23.8 N			
LONGITUDE 140-31.3 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	9.523	31.591	24.368
10	8.892	31.784	24.617
20	6.354	32.051	25.180
30	4.610	32.232	25.523
40	3.663	32.482	25.816
50	2.906	32.880	26.201
75	4.026	33.369	26.486

STATION US15201			
LATITUDE 42-26.1 N			
LONGITUDE 140-37.1 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	8.934	31.796	24.621
10	8.628	31.840	24.701
20	5.271	32.141	25.379
30	4.514	32.279	25.379
40	3.302	32.608	25.571
50	2.914	32.906	25.950
75	4.117	33.436	26.221

STATION US15193			
LATITUDE 42-09.8 N			
LONGITUDE 140-36.4 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	8.938	31.667	24.519
10	7.883	31.795	24.774
20	4.034	32.377	25.697
30	3.441	32.589	25.922
40	3.195	32.768	26.086
50	2.946	32.868	26.188

STATION US15196			
LATITUDE 42-14.0 N			
LONGITUDE 140-29.8 E			
DEPTH (m) 77			
Press.	Temp.	Salinity	Sigma-T
5	8.783	31.719	24.583
10	8.205	31.756	24.694
20	4.884	32.200	25.468
30	4.013	32.500	25.796
40	3.275	32.600	25.945
50	2.831	32.856	26.188

STATION US15199			
LATITUDE 42-28.9 N			
LONGITUDE 140-31.4 E			
DEPTH (m) 75			
Press.	Temp.	Salinity	Sigma-T
5	9.081	31.700	24.523
10	8.453	31.843	24.730
20	5.133	32.070	25.339
30	4.232	32.321	25.632
40	3.390	32.562	25.905
50	2.894	32.867	26.192

STATION US15202			
LATITUDE 42-23.3 N			
LONGITUDE 140-42.6 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	9.433	31.703	24.470
10	8.965	31.764	24.590
20	6.117	31.991	25.161
30	4.910	32.206	25.471
40	3.682	32.460	25.797
50	2.934	32.872	26.192
60	3.131	33.022	26.295

STATION US15203			
LATITUDE 42-21.0 N			
LONGITUDE 140-36.7 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	9.921	31.634	24.337
10	9.739	31.625	24.360
20	6.821	31.900	25.001
30	5.263	32.172	25.405
40	4.042	32.485	25.782
50	3.248	32.663	25.998
75	3.344	33.122	26.355

STATION US15206			
LATITUDE 42-17.5 N			
LONGITUDE 140-53.9 E			
DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T
5	9.050	31.766	24.579
10	7.710	31.791	24.795
20	4.349	32.486	25.752
30	3.377	32.623	25.954
40	3.178	32.684	26.021
50	3.003	32.826	26.150

STATION US15209			
LATITUDE 42-12.7 N			
LONGITUDE 140-56.3 E			
DEPTH (m) 70			
Press.	Temp.	Salinity	Sigma-T
5	7.554	31.966	24.955
10	7.213	31.921	24.966
20	4.149	32.589	25.854
30	3.807	32.684	25.963
40	3.597	32.735	26.024
50	3.189	32.793	26.107

STATION US15212			
LATITUDE 42-00.7 N			
LONGITUDE 141-00.8 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	8.644	31.751	24.629
10	8.220	31.804	24.733
20	4.931	32.443	25.656
30	4.125	32.740	25.977
40	3.659	32.825	26.090
50	3.048	32.925	26.225
75	5.182	33.517	26.479

STATION US15204			
LATITUDE 42-18.5 N			
LONGITUDE 140-42.2 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	9.585	31.669	24.419
10	9.338	31.684	24.470
20	7.394	31.811	24.854
30	4.997	32.163	25.427
40	4.093	32.374	25.689
50	3.419	32.610	25.941

STATION US15207			
LATITUDE 42-15.0 N			
LONGITUDE 141-04.7 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	7.282	32.020	25.034
10	5.519	32.328	25.498
20	3.548	32.627	25.942
30	3.151	32.753	26.079
40	3.111	32.897	26.197
50	3.271	32.992	26.259

STATION US15210			
LATITUDE 42-09.3 N			
LONGITUDE 140-52.9 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	7.659	31.998	24.966
10	7.463	31.998	24.992
20	4.883	32.458	25.673
30	3.835	32.649	25.933
40	3.674	32.746	26.024
50	3.297	32.820	26.119
75	4.578	33.346	26.410

STATION US15213			
LATITUDE 42-23.8 N			
LONGITUDE 140-32.0 E			
DEPTH (m) 95			
Press.	Temp.	Salinity	Sigma-T
5	7.248	32.170	25.157
10	7.243	32.237	25.210
20	4.612	32.643	25.849
30	3.884	32.846	26.085
40	3.225	32.949	26.228
50	3.259	33.022	26.283
75	4.830	33.405	26.430
100	4.715	33.393	26.433

STATION US15205			
LATITUDE 42-15.4 N			
LONGITUDE 140-47.4 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	9.216	31.741	24.534
10	9.179	31.745	24.543
20	7.307	31.793	24.852
30	3.957	32.369	25.698
40	3.404	32.633	25.960
50	3.143	32.775	26.096

STATION US15208			
LATITUDE 42-11.3 N			
LONGITUDE 141-02.7 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	7.443	31.968	24.972
10	5.215	32.233	25.459
20	3.731	32.615	25.915
30	3.022	32.799	26.127
40	3.450	33.048	26.287
50	3.535	33.099	26.319

STATION US15211			
LATITUDE 42-05.0 N			
LONGITUDE 140-56.5 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	8.015	31.896	24.835
10	7.527	31.964	24.957
20	4.962	32.392	25.612
30	3.797	32.642	25.933
40	3.560	32.774	26.058
50	3.403	32.880	26.157
75	4.808	33.443	26.462

STATION US15214			
LATITUDE 42-09.5 N			
LONGITUDE 141-20.0 E			
DEPTH (m) 366			
Press.	Temp.	Salinity	Sigma-T
5	7.609	32.432	25.313
10	7.617	32.430	25.311
20	7.385	32.691	25.548
30	5.913	33.047	26.020
40	7.815	33.843	26.392
50	8.404	33.836	26.299
75	7.382	33.755	26.385
100	6.787	33.774	26.482
125	6.084	33.672	26.493
150	6.298	33.725	26.508
175	4.316	33.467	26.535
200	3.842	33.434	26.557
250	2.960	33.451	26.652
300	2.822	33.520	26.719

STATION		US15215	
LATITUDE		42-00.1	N
LONGITUDE		141-10.2	E
DEPTH (m)		137	
Press.	Temp.	Salinity	Sigma-T
5	8.260	31.837	24.753
10	7.795	31.919	24.884
20	4.496	32.602	25.829
30	3.745	32.685	25.970
40	3.217	32.812	26.120
50	3.688	33.104	26.308
75	5.353	33.471	26.422
100	5.067	33.464	26.450
125	5.257	33.503	26.459

STATION		US15216	
LATITUDE		41-52.0	N
LONGITUDE		141-09.9	E
DEPTH (m)		110	
Press.	Temp.	Salinity	Sigma-T
5	8.300	31.880	24.781
10	5.555	32.130	25.338
20	3.900	32.694	25.962
30	3.594	32.826	26.097
40	3.344	32.879	26.162
50	2.783	32.904	26.231
75	3.708	33.135	26.331
100	4.893	33.408	26.425

STATION		US15217	
LATITUDE		41-53.4	N
LONGITUDE		141-07.3	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	8.141	31.900	24.819
10	7.213	31.914	24.960
20	3.897	32.646	25.924
30	3.764	32.718	25.994
40	3.508	32.797	26.081
50	3.337	32.945	26.215
75	3.738	33.230	26.404

STATION		US15218	
LATITUDE		41-55.3	N
LONGITUDE		141-04.6	E
DEPTH (m)		110	
Press.	Temp.	Salinity	Sigma-T
5	8.192	32.015	24.903
10	8.049	32.010	24.920
20	4.121	32.587	25.855
30	3.439	32.738	26.041
40	3.055	32.782	26.110
50	2.755	32.847	26.187
75	4.290	33.217	26.338
100	4.574	33.379	26.437

STATION		US15219	
LATITUDE		41-56.9	N
LONGITUDE		141-02.3	E
DEPTH (m)		104	
Press.	Temp.	Salinity	Sigma-T
5	8.091	32.068	24.959
10	8.065	32.069	24.963
20	4.797	32.512	25.725
30	3.534	32.711	26.011
40	3.336	32.820	26.116
50	3.363	32.954	26.219
75	4.202	33.268	26.388

STATION		US15220	
LATITUDE		42-15.4	N
LONGITUDE		140-37.8	E
DEPTH (m)		88	
Press.	Temp.	Salinity	Sigma-T
5	8.887	31.829	24.653
10	8.822	31.846	24.677
20	5.033	32.173	25.434
30	4.035	32.393	25.709
40	3.782	32.679	25.962
50	3.181	32.729	26.057
75	3.859	33.325	26.468

STATION		US15221	
LATITUDE		41-26.2	N
LONGITUDE		141-15.7	E
DEPTH (m)		77	
Press.	Temp.	Salinity	Sigma-T
5	11.274	33.743	25.747
10	10.980	33.780	25.829
20	10.535	33.878	25.984
30	10.388	33.912	26.036
40	10.193	33.978	26.121
50	10.119	34.027	26.172

STATION		US15221-2	
LATITUDE		41-26.1	N
LONGITUDE		141-15.6	E
DEPTH (m)		76	
Press.	Temp.	Salinity	Sigma-T
5	11.470	33.766	25.730
10	11.156	33.729	25.758
20	10.668	33.852	25.940
30	11.468	33.895	26.009
40	10.209	33.971	26.113
50	10.140	34.022	26.165
65	10.078	34.055	26.200

STATION		US15222	
LATITUDE		41-32.0	N
LONGITUDE		141-22.2	E
DEPTH (m)		253	
Press.	Temp.	Salinity	Sigma-T
5	11.586	33.712	25.666
10	11.368	33.703	25.699
20	10.869	33.677	25.768
30	10.900	33.909	25.944
40	10.730	33.937	25.996
50	10.452	33.967	26.068
75	10.112	34.017	26.165
100	10.041	34.041	26.196
125	9.962	34.030	26.201
150	9.218	33.925	26.242
175	8.700	33.944	26.338
200	8.097	33.916	26.409

STATION US15222-2			
LATITUDE 41-32.2 N			
LONGITUDE 141-22.4 E			
DEPTH (m) 253			
Press.	Temp.	Salinity	Sigma-T
5	11.609	33.713	25.662
10	11.369	33.714	25.707
20	11.002	33.692	25.757
30	10.806	33.816	25.888
40	10.674	33.937	26.005
50	10.402	33.972	26.080
75	10.084	34.039	26.187
100	10.979	34.043	26.192
125	10.019	34.046	26.204
150	9.032	33.925	26.271
175	7.982	33.863	26.384
200	7.678	33.863	26.428

STATION US15224			
LATITUDE 41-46.9 N			
LONGITUDE 141-14.8 E			
DEPTH (m) 206			
Press.	Temp.	Salinity	Sigma-T
5	7.853	32.158	25.064
10	6.527	32.373	25.411
20	3.645	32.723	26.009
30	3.268	32.855	26.150
40	2.811	32.934	26.252
50	2.976	32.986	26.279
75	4.779	33.351	26.393
100	5.015	33.434	26.432
125	5.068	33.465	26.451
150	4.976	33.459	26.456
175	4.532	33.446	26.495

STATION US15227			
LATITUDE 41-37.7 N			
LONGITUDE 141-19.0 E			
DEPTH (m) 216			
Press.	Temp.	Salinity	Sigma-T
5	7.190	32.459	25.392
10	7.758	32.812	25.590
20	9.795	33.617	25.906
30	9.853	33.676	25.942
40	9.880	33.819	26.050
50	9.583	33.876	26.144
75	8.907	33.911	26.280
100	8.050	33.875	26.383
125	7.238	33.801	26.442
150	6.704	33.765	26.486
175	6.163	33.725	26.524
200	5.703	33.695	26.558
205	5.664	33.696	26.563

STATION US15223			
LATITUDE 41-49.3 N			
LONGITUDE 141-12.7 E			
DEPTH (m) 132			
Press.	Temp.	Salinity	Sigma-T
5	7.917	32.105	25.013
10	7.686	32.147	25.078
20	4.676	32.581	25.793
30	3.671	32.689	25.980
40	3.236	32.873	26.167
50	3.790	33.141	26.328
75	5.333	33.479	26.431
100	6.416	33.696	26.469
120	5.579	33.567	26.472

STATION US15225			
LATITUDE 41-44.2 N			
LONGITUDE 141-15.8 E			
DEPTH (m) 228			
Press.	Temp.	Salinity	Sigma-T
5	7.925	32.224	25.105
10	7.327	32.491	25.399
20	4.281	33.044	26.202
30	2.861	32.988	26.291
40	2.840	33.020	26.318
50	2.958	33.063	26.343
75	5.115	33.451	26.435
100	5.845	33.591	26.458
125	6.200	33.680	26.485
150	6.308	33.713	26.496
175	5.102	33.576	26.535
200	3.905	33.473	26.581
215	3.766	33.471	26.593

STATION US15228			
LATITUDE 41-35.1 N			
LONGITUDE 141-20.5 E			
DEPTH (m) 313			
Press.	Temp.	Salinity	Sigma-T
5	10.768	33.643	25.760
10	10.570	33.795	25.913
20	10.308	33.923	26.059
30	10.012	34.032	26.194
40	9.926	34.039	26.214
50	9.906	34.039	26.218
75	9.917	34.039	26.216
100	9.867	34.045	26.229
125	9.434	33.994	26.261
150	9.006	33.944	26.290
175	8.077	33.865	26.371
200	8.065	33.868	26.375
250	6.019	33.696	26.520
300	5.131	33.632	26.576

STATION US15223-2			
LATITUDE 41-49.0 N			
LONGITUDE 141-14.0 E			
DEPTH (m) 158			
Press.	Temp.	Salinity	Sigma-T
5	8.065	32.075	24.968
10	7.748	32.131	25.057
20	4.489	32.579	25.811
30	3.264	32.740	26.058
40	3.290	32.937	26.213
50	4.126	33.211	26.350
75	5.251	33.460	26.426
100	5.396	33.502	26.442
125	5.209	33.531	26.487
150	5.296	33.537	26.482

STATION US15226			
LATITUDE 41-40.9 N			
LONGITUDE 141-17.4 E			
DEPTH (m) 231			
Press.	Temp.	Salinity	Sigma-T
5	8.509	32.907	25.555
10	8.903	33.200	25.724
20	9.903	33.795	26.028
30	9.620	33.864	26.130
40	9.334	33.890	26.195
50	8.967	33.911	26.291
75	8.485	33.928	26.359
100	8.208	33.909	26.386
125	7.485	33.842	26.439
150	6.349	33.750	26.520
175	5.320	33.658	26.575
200	3.558	33.488	26.627

STATION US15229			
LATITUDE 41-29.5 N			
LONGITUDE 141-23.2 E			
DEPTH (m) 129			
Press.	Temp.	Salinity	Sigma-T
5	10.930	33.962	25.980
10	10.872	33.972	25.997
20	10.817	33.980	26.014
30	10.754	33.982	26.027
40	10.619	33.985	26.053
50	10.398	34.011	26.111
75	10.379	34.018	26.120
100	10.387	34.017	26.118

STATION US15230			
LATITUDE	41-27.8	N	
LONGITUDE	141-23.9	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	10.900	33.825	25.851
10	10.846	33.820	25.867
20	10.787	33.828	25.891
30	10.777	33.836	25.907
40	10.648	33.837	25.910

STATION US15233			
LATITUDE	41-38.7	N	
LONGITUDE	140-49.3	E	
DEPTH (m)	348		
Press.	Temp.	Salinity	Sigma-T
5	11.834	33.805	25.692
10	11.824	33.814	25.701
20	11.582	33.880	25.797
30	11.489	33.902	25.832
40	11.444	33.915	25.850
50	11.378	33.931	25.875
75	10.696	34.058	26.096
100	10.307	34.115	26.208
125	10.206	34.125	26.234
150	10.219	34.121	26.228
175	10.182	34.125	26.237
200	10.035	34.134	26.270
250	9.861	34.142	26.306
300	9.635	34.151	26.350
320	9.632	34.151	26.351

STATION US15236			
LATITUDE	41-22.8	N	
LONGITUDE	139-49.3	E	
DEPTH (m)	520		
Press.	Temp.	Salinity	Sigma-T
5	13.975	34.128	25.518
10	12.880	34.016	25.654
20	11.367	34.024	25.949
30	10.616	33.980	26.049
40	9.687	34.126	26.322
50	7.717	34.101	26.609
75	6.397	34.114	26.801
100	3.946	34.063	27.046
125	3.106	34.053	27.119

STATION US15231			
LATITUDE	41-35.5	N	
LONGITUDE	140-53.3	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	12.338	33.567	25.412
10	12.304	33.592	25.438
20	11.916	33.742	25.628
30	11.365	33.883	25.840
40	10.892	33.939	25.969

STATION US15234			
LATITUDE	41-40.7	N	
LONGITUDE	140-47.3	E	
DEPTH (m)	232		
Press.	Temp.	Salinity	Sigma-T
5	11.887	33.817	25.692
10	11.843	33.819	25.701
20	11.670	33.893	25.791
30	11.349	33.895	25.852
40	11.073	33.962	25.954
50	10.900	34.034	26.041
75	10.356	34.092	26.182
100	10.026	34.107	26.250
125	9.784	34.131	26.310
150	9.560	34.144	26.357
175	9.484	34.151	26.375
200	9.447	34.152	26.382

STATION US15237			
LATITUDE	41-22.2	N	
LONGITUDE	139-46.6	E	
DEPTH (m)	148		
Press.	Temp.	Salinity	Sigma-T
5	11.844	34.029	25.865
10	11.343	34.072	25.991
20	10.544	34.053	26.119
30	10.226	34.072	26.188
40	8.591	34.107	26.483
50	7.216	34.040	26.633
75	4.826	34.049	26.941
100	2.894	34.046	27.133
125	2.635	34.047	27.157

STATION US15232			
LATITUDE	41-36.9	N	
LONGITUDE	140-51.3	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	11.985	33.678	25.566
10	11.987	33.682	25.568
20	11.925	33.701	25.594
30	11.795	33.766	25.669
40	11.671	33.818	25.733
50	11.444	33.884	25.826
75	10.825	34.037	26.057

STATION US15235			
LATITUDE	41-42.8	N	
LONGITUDE	140-45.1	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	11.270	33.860	25.839
10	11.276	33.860	25.838
20	11.328	33.916	25.872
30	10.805	33.991	26.024
40	10.463	34.032	26.116
50	10.135	34.055	26.191
75	9.771	34.133	26.313

STATION US15238			
LATITUDE	41-42.8	N	
LONGITUDE	140-45.1	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	12.472	33.985	25.711
10	10.188	33.829	26.006
20	9.637	33.922	26.171
30	8.608	33.924	26.337
40	6.690	34.011	26.682
50	6.418	34.062	26.758
75	4.762	34.028	26.931
100	3.304	34.005	27.073
125	2.499	34.021	27.147
145	2.266	34.030	27.174

STATION US15239			
LATITUDE 41-20.1 N			
LONGITUDE 139-51.3 E			
DEPTH (m) 208			
Press.	Temp.	Salinity	Sigma-T
5	14.098	34.095	25.467
10	13.608	33.976	25.477
20	10.012	33.870	26.068
30	9.920	34.131	26.287
40	8.836	34.164	26.489
50	8.136	34.133	26.573
75	5.534	34.040	26.851
100	3.145	34.004	27.077
125	2.102	34.020	27.179

STATION US15242			
LATITUDE 42-06.2 N			
LONGITUDE 139-32.2 E			
DEPTH (m) 213			
Press.	Temp.	Salinity	Sigma-T
5	12.459	34.096	25.799
10	12.436	34.096	25.804
20	12.271	34.102	25.840
30	12.178	34.107	25.861
40	11.073	34.049	26.022
50	9.538	34.086	26.315
75	7.791	34.109	26.605
100	5.573	34.065	26.867
125	4.342	34.055	26.999

STATION US15245			
LATITUDE 41-12.9 N			
LONGITUDE 140-41.5 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	15.258	33.341	24.637
10	14.891	33.413	24.772
20	14.153	33.609	25.081
30	13.560	33.582	25.182
40	12.147	33.825	25.649
50	10.413	34.183	26.243
75	10.199	34.203	26.295

STATION US15248			
LATITUDE 40-52.7 N			
LONGITUDE 140-45.8 E			
DEPTH (m) 32			
Press.	Temp.	Salinity	Sigma-T
5	15.655	33.186	24.430
10	15.094	33.243	24.597
20	12.936	33.340	25.120

STATION US15240			
LATITUDE 41-31.5 N			
LONGITUDE 139-23.9 E			
DEPTH (m) 208			
Press.	Temp.	Salinity	Sigma-T
5	13.103	34.074	25.655
10	12.497	34.020	25.732
20	10.707	34.064	26.099
30	10.259	34.194	26.278
40	9.121	34.153	26.436
50	8.763	34.148	26.488
75	6.393	34.087	26.780
100	5.242	34.079	26.917
125	4.604	34.070	26.982

STATION US15243			
LATITUDE 42-10.9 N			
LONGITUDE 139-33.5 E			
DEPTH (m) 303			
Press.	Temp.	Salinity	Sigma-T
5	12.551	34.110	25.792
10	12.368	34.083	25.807
20	11.459	34.079	25.975
30	10.945	34.109	26.092
40	10.007	34.160	26.295
50	9.623	34.144	26.347
75	7.938	34.123	26.594
100	6.245	34.062	26.780
125	5.376	34.069	26.893
150	3.311	34.022	27.076

STATION US15246			
LATITUDE 41-05.3 N			
LONGITUDE 140-43.7 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	14.747	33.238	24.668
10	14.627	33.241	24.696
20	12.768	33.336	25.150
30	11.368	33.273	25.365
40	12.055	33.769	25.623
50	10.989	33.977	25.981

STATION US15249			
LATITUDE 40-55.4 N			
LONGITUDE 140-46.3 E			
DEPTH (m) 41			
Press.	Temp.	Salinity	Sigma-T
5	15.571	33.223	24.477
10	14.253	33.202	24.746
20	12.979	33.388	25.148
30	11.980	33.478	25.411

STATION US15241			
LATITUDE 41-42.8 N			
LONGITUDE 140-45.1 E			
DEPTH (m) 85			
Press.	Temp.	Salinity	Sigma-T
5	13.094	34.108	25.683
10	11.810	34.000	25.849
20	10.344	34.156	26.234
30	9.684	34.158	26.348
40	8.851	34.079	26.420
50	7.950	34.138	26.604
75	6.390	34.078	26.774
100	5.500	34.088	26.894
125	4.526	34.053	26.977

STATION US15244			
LATITUDE 42-16.1 N			
LONGITUDE 139-34.6 E			
DEPTH (m) 118			
Press.	Temp.	Salinity	Sigma-T
5	12.839	34.116	25.740
10	12.698	34.119	25.771
20	12.622	34.123	25.788
30	11.551	34.094	25.969
40	10.496	34.095	26.165
50	9.100	34.140	26.428
75	7.125	34.066	26.666
100	6.166	34.088	26.811

STATION US15247			
LATITUDE 41-01.9 N			
LONGITUDE 140-43.2 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	14.566	33.288	24.745
10	14.457	33.277	24.760
20	13.647	33.269	24.923
30	12.134	33.377	25.304
40	11.328	33.714	25.715
50	11.098	33.925	25.922

STATION US15250			
LATITUDE 40-57.2 N			
LONGITUDE 140-45.1 E			
DEPTH (m) 47			
Press.	Temp.	Salinity	Sigma-T
5	14.905	33.262	24.653
10	14.475	33.231	24.721
20	12.921	33.371	25.146
30	12.226	33.483	25.368
40	11.205	33.569	25.624

STATION		US15251	
LATITUDE		40-59.4	N
LONGITUDE		140-46.4	E
DEPTH (m)		52	
Press.	Temp.	Salinity	Sigma-T
5	15.135	33.215	24.567
10	14.087	33.219	24.796
20	12.749	33.326	25.146
30	11.842	33.489	25.445
40	10.043	33.397	25.693

STATION		US15254	
LATITUDE		40-04.6	N
LONGITUDE		140-51.9	E
DEPTH (m)		50	
Press.	Temp.	Salinity	Sigma-T
5	14.987	33.121	24.531
10	14.549	33.153	24.645
20	12.952	33.192	25.002
30	12.047	33.454	25.379
40	11.265	33.666	25.689

STATION		US15257	
LATITUDE		40-04.5	N
LONGITUDE		141-02.0	E
DEPTH (m)		47	
Press.	Temp.	Salinity	Sigma-T
5	15.204	33.131	24.487
10	14.550	33.141	24.635
20	14.226	33.148	24.709
30	13.088	33.169	24.957
40	11.791	33.220	25.246

STATION		US15260	
LATITUDE		40-57.1	N
LONGITUDE		141-06.9	E
DEPTH (m)		36	
Press.	Temp.	Salinity	Sigma-T
5	15.342	33.089	24.424
10	14.689	33.101	24.575
20	14.064	33.118	24.720
30	11.967	33.135	25.147

STATION		US15263	
LATITUDE		41-07.3	N
LONGITUDE		141-03.2	E
DEPTH (m)		41	
Press.	Temp.	Salinity	Sigma-T
5	14.766	33.187	24.625
10	14.601	33.179	24.654
20	13.526	33.125	24.836
30	12.554	33.197	25.084

STATION		US15252	
LATITUDE		41-05.3	N
LONGITUDE		140-43.7	E
DEPTH (m)		61	
Press.	Temp.	Salinity	Sigma-T
5	14.534	33.264	24.734
10	14.363	33.289	24.789
20	13.255	33.334	25.052
30	12.022	33.444	25.377
40	10.975	33.605	25.694

STATION		US15255	
LATITUDE		40-04.2	N
LONGITUDE		140-58.0	E
DEPTH (m)		49	
Press.	Temp.	Salinity	Sigma-T
5	14.944	33.103	24.522
10	14.247	33.145	24.702
20	13.929	33.152	24.774
30	12.406	33.142	25.069
40	10.538	33.302	25.534
45	9.609	33.367	25.741

STATION		US15258	
LATITUDE		40-09.1	N
LONGITUDE		141-09.7	E
DEPTH (m)		34	
Press.	Temp.	Salinity	Sigma-T
5	14.846	33.140	24.571
10	13.946	33.155	24.773
20	13.250	33.152	24.912
30	12.638	33.244	25.103

STATION		US15261	
LATITUDE		41-05.7	N
LONGITUDE		141-09.9	E
DEPTH (m)		38	
Press.	Temp.	Salinity	Sigma-T
5	15.224	33.139	24.489
10	14.758	33.169	24.613
20	13.173	33.103	24.889
30	12.189	33.147	25.114
35	11.694	33.198	25.247

STATION		US15264	
LATITUDE		41-06.6	N
LONGITUDE		140-56.3	E
DEPTH (m)		45	
Press.	Temp.	Salinity	Sigma-T
5	14.872	33.185	24.601
10	14.832	33.184	24.609
20	13.850	33.114	24.761
30	12.686	33.170	25.058
40	10.254	33.199	25.503

STATION		US15253	
LATITUDE		40-03.5	N
LONGITUDE		140-51.8	E
DEPTH (m)		43	
Press.	Temp.	Salinity	Sigma-T
5	15.480	33.127	24.424
10	14.591	33.159	24.641
20	13.329	33.081	24.841
30	12.008	33.431	25.369
40	11.693	33.684	25.625

STATION		US15256	
LATITUDE		40-02.1	N
LONGITUDE		141-00.4	E
DEPTH (m)		48	
Press.	Temp.	Salinity	Sigma-T
5	14.788	33.132	24.577
10	14.709	33.144	24.604
20	14.356	33.163	24.694
30	12.402	33.190	25.107
40	10.694	33.406	25.588

STATION		US15259	
LATITUDE		41-00.3	N
LONGITUDE		141-06.8	E
DEPTH (m)		43	
Press.	Temp.	Salinity	Sigma-T
5	15.073	33.100	24.491
10	14.519	33.181	24.672
20	14.256	33.167	24.718
30	12.529	33.198	25.089

STATION		US15262	
LATITUDE		41-11.3	N
LONGITUDE		141-10.8	E
DEPTH (m)		29	
Press.	Temp.	Salinity	Sigma-T
5	14.403	33.117	24.648
10	14.280	33.134	24.687
20	12.985	33.153	24.965

STATION		US15265	
LATITUDE		41-06.0	N
LONGITUDE		140-51.8	E
DEPTH (m)		29	
Press.	Temp.	Salinity	Sigma-T
5	15.161	33.193	24.544
10	15.120	33.169	24.535
20	12.928	33.127	24.957
30	12.484	33.191	25.092

STATION		US15266	
LATITUDE		41-05.7	N
LONGITUDE		140-48.1	E
DEPTH (m)		57	
Press.	Temp.	Salinity	Sigma-T
5	15.409	33.127	24.439
10	15.380	33.137	24.453
20	13.276	33.290	25.014
30	12.915	33.393	25.165
40	12.144	33.372	25.298
50	10.194	33.860	26.029

STATION		US15267	
LATITUDE		41-08.9	N
LONGITUDE		140-44.0	E
DEPTH (m)		60	
Press.	Temp.	Salinity	Sigma-T
5	15.043	33.439	24.759
10	14.989	33.510	24.825
20	14.844	33.504	24.852
30	14.502	33.529	24.945
40	11.371	33.319	25.400
50	11.799	33.829	25.718

STATION		US15268	
LATITUDE		41-09.6	N
LONGITUDE		140-41.4	E
DEPTH (m)		52	
Press.	Temp.	Salinity	Sigma-T
5	14.832	33.554	24.894
10	14.722	33.591	24.946
20	14.525	33.653	25.036
30	14.369	33.699	25.104
40	13.695	33.750	25.285

THE " USHIO MARU "

CRUISE 336

CRUISE 337

CRUISE 338

IN JUNE 2015

IN JULY 2015

1.Cruise Itinerary

Cruise 336

Departure from Hakodate	Jun.	8, 2015
Start frame trawl net sampling and hydrographic research (US15269)		8
Arrival at Hakodate		10
Departure from Hakodate		11
Arrival at and departure from Usujiri		11
Arrival at Usujiri		12
Departure from Usujiri		13
Arrival at Usujiri		14
Departure from Usujiri		15
Retrieval mooring ADCP system		15
Set mooring ADCP system		16
Finish frame trawl sampling and hydrographic research (US15314)		16
Arrival at and departure from Usujiri		16
Return to Hakodate		17
Total coverage 640.1 miles		

Cruise 337

Departure from Hakodate	Jun.	20, 2015
Start hydrographic research (US15315) and echo sounding research		21
Finish hydrographic research (US15320) and echo sounding research		22
Start and finish marine mammals watching research		23
Return to Hakodate		24
Total coverage 830.1 miles		

Cruise 338

Departure from Hakodate	Jul.	29, 2015
Start hydrographic research (US15321)		29
Set Argos buoy		29
Start and finish XBT observation		29
Retrieval of Argos buoy		30
Arrival at Hakodate	Aug.	1
Departure from Hakodate		2
Start trawl net sampling		2
Start and finish squid jigging research		2
Finish trawl net sampling and hydrographic research (US15347)		3
Start and finish squid jigging research		3
Return to Hakodate		4
Total coverage 599.8 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

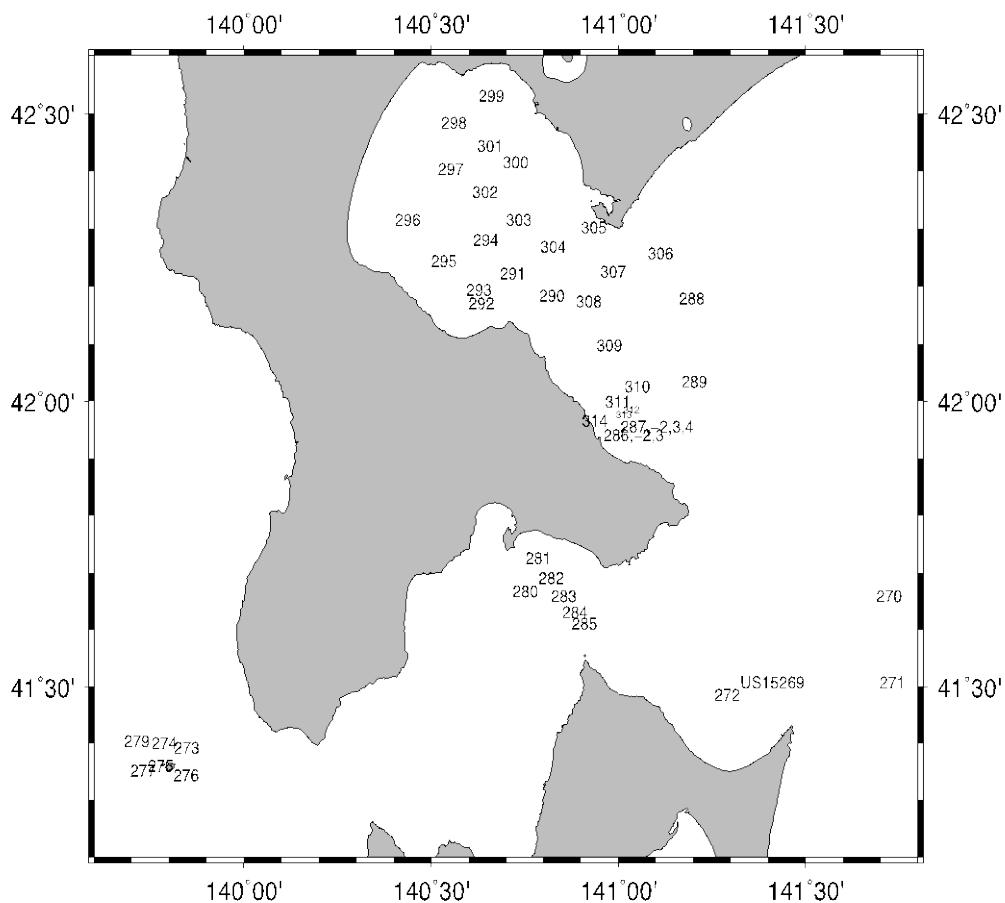


Figure 1. Oceanographic stations (Cruise 336)

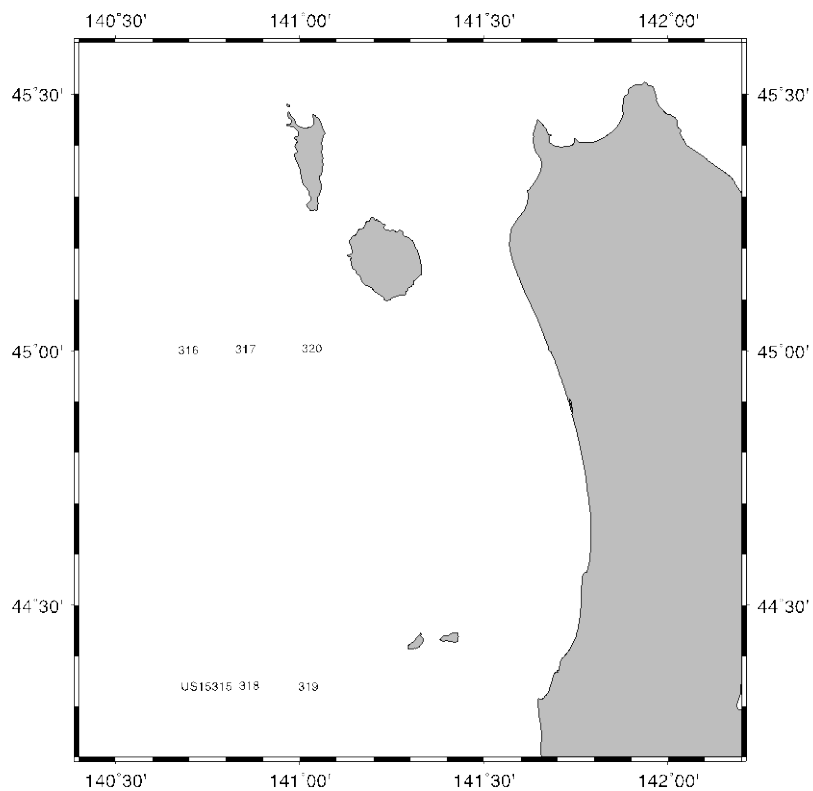


Figure 2. Oceanographic stations (Cruise 337)

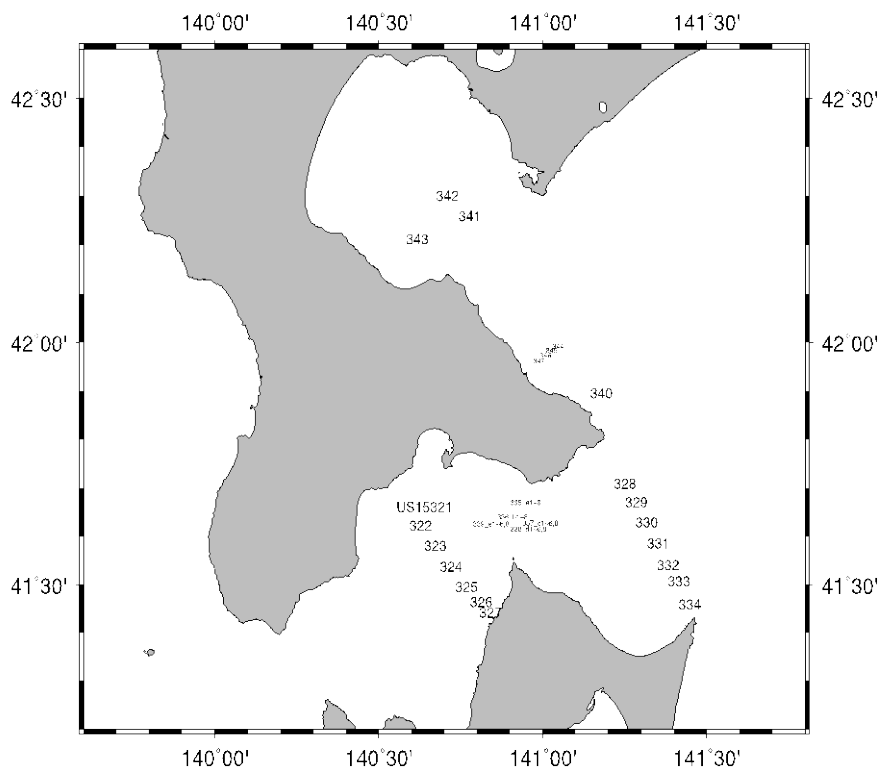


Figure 3. Oceanographic stations (Cruise 338)

Table 1. List of Oceanographic Station

Cruise 336												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15269	41-29.8	141-19.5	6/8	1211-1221	240	East-1	NE-1	East-3	14.4	10.8	c	1018.7
US15270	41-38.9	141-41.3	6/8	1402-1410	697	ESE-3	NE-2	ESE-4	12.9	12.9	f	1018.6
US15271	41-29.8	141-41.8	6/8	1548-1555	721	East-2	NE-2	East-4	13.0	12.1	f	1017.4
US15272	41-29.8	141-19.5	6/8	1808-1816	237	East-2	ESE-1	East-3	13.0	13.6	f	1017.1
US15273	41-22.9	139-48.8	6/9	0526-0534	409	East-3	East-1	East-5	16.9	16.6	o	1008.6
US15274	41-23.4	139-45.2	6/9	0631-0638	880	East-3	East-1	East-4	17.1	16.5	o	1009.1
US15275	41-21.0	139-44.6	6/9	0738-0745	460	East-3	East-1	East-5	16.9	16.2	r	1009.1
US15276	41-20.0	139-48.7	6/9	0845-0852	309	East-3	East-1	East-5	17.2	16.2	o	1008.6
US15277	41-20.5	139-41.8	6/9	0956-1002	522	East-3	East-1	East-5	16.7	16.0	o	1008.1
US15278	41-20.4	139-33.5	6/9	1115-1120	1168	East-3	East-2	East-5	16.9	16.7	o	1006.8
US15279	41-23.6	139-40.8	6/9	1820-1829	868	East-3	East-1	East-5	16.6	17.0	o	1004.5
US15280	41-40.7	140-45.1	6/10	0431-0440	167	SE-1	East-1	SE-2	14.7	14.7	o	1006.4
US15281	41-42.9	140-45.1	6/11	0730-0737	83	SSW-1	ESE-1	SSW-2	15.7	14.7	bc	1012.6
US15282	41-40.8	140-47.2	6/11	0756-0805	221	SW-2	ESE-1	SW-3	15.7	15.1	bc	1012.5
US15283	41-38.9	140-49.2	6/11	0823-0835	348	SW-2	ESE-1	SW-3	15.8	14.8	bc	1012.6
US15284	41-37.2	140-51.0	6/11	0851-0858	99	WSW-3	East-1	WSW-4	15.7	14.8	bc	1012.7
US15285	41-36.0	140-52.5	6/11	0912-0918	36	SW-3	East-1	SW-5	15.8	15.1	bc	1012.5
US15286	41-57.1	140-57.6	6/11	1436-1440	60	calm	WNW-1	calm	20.4	11.8	bc	1012.1
US15287	41-58.0	141-00.3	6/11	1959-2004	92	SE-1	East-1	SE-1	14.4	11.3	bc	1012.1
US15287-2	41-57.0	141-02.8	6/11	2207-2212	109	calm	East-1	calm	14.3	10.9	bc	1012.2
US15287-3	41-58.1	141-00.3	6/12	0556-0602	92	NNE-1	ENE-1	NNE-2	11.7	11.6	f	1011.6
US15287-4	41-56.8	141-03.2	6/12	0852-0857	112	SW-1	NE-1	SW-2	13.4	11.7	f	1011.6
US15288	42-10.1	141-09.7	6/12	1020-1025	121	NE-1	ENE-1	NE-3	13.2	11.7	c	1010.8
US15289	42-01.4	141-10.1	6/12	1146-1152	132	SE-1	East-1	SE-3	15.2	12.3	c	1010.5
US15286-2	41-57.1	140-57.7	6/13	1729-1734	61	NW-1	NE-2	NW-2	13.2	11.4	f	1008.1
US15286-3	41-57.1	140-57.6	6/14	0557-0602	61	calm	East-1	calm	13.4	11.1	b	1011.7
US15290	42-10.4	140-47.3	6/15	0651-0657	91	calm	ESE-1	calm	15.3	13.0	m	1010.1
US15291	42-12.7	140-41.0	6/15	0817-0822	90	calm	ESE-1	calm	15.9	12.6	m	1010.2
US15292	42-09.6	140-36.0	6/15	0853-0858	70	calm	East-1	calm	15.9	13.0	m	1010.1
US15293	42-11.0	140-35.6	6/15	0918-0922	79	calm	East-1	calm	16.1	12.5	m	1010.1
US15294	42-16.2	140-36.7	6/15	1036-1046	90	NNE-1	ESE-1	NNW-2	17.1	14.0	m	1010.1
US15295	42-14.0	140-30.0	6/15	1213-1218	78	calm	ESE-1	calm	18.5	13.4	m	1009.6
US15296	42-18.3	140-24.2	6/15	1256-1300	59	SE-1	ESE-1	SE-2	18.3	15.3	c	1009.6
US15297	42-23.6	140-31.1	6/15	1401-1407	96	calm	ESE-1	calm	21.3	15.5	bc	1009.3
US15298	42-28.4	140-31.6	6/15	1451-1459	79	SW-1	ESE-1	SW-3	21.2	13.3	bc	1009.1
US15299	42-31.2	140-37.6	6/15	1542-1549	61	SW-1	ESE-1	SW-2	20.3	15.2	bc	1009.0
US15300	42-24.3	140-41.5	6/15	1709-1715	69	SW-1	ESE-1	SW-2	19.1	13.9	bc	1008.6
US15301	42-26.0	140-37.4	6/15	1738-1743	83	SSW-1	ESE-1	SSW-3	18.6	15.5	bc	1008.6
US15302	42-21.2	140-36.6	6/15	1815-1820	87	West-2	ESE-1	West-4	16.9	14.6	bc	1008.6
US15303	42-18.3	140-42.0	6/16	0521-0526	65	calm	ESE-1	calm	14.8	13.7	o	1009.7
US15304	42-15.5	140-47.5	6/16	0616-0621	71	calm	ESE-1	calm	14.7	14.2	o	1010.1
US15305	42-17.5	140-54.0	6/16	0707-0712	56	SW-1	ESE-1	SW-3	16.0	14.9	o	1010.1
US15306	42-14.8	141-04.7	6/16	0837-0841	78	calm	ESE-1	calm	14.7	12.6	o	1010.6
US15307	42-12.9	140-57.1	6/16	0929-0932	69	calm	ESE-1	calm	16.7	12.4	o	1010.6
US15308	42-09.8	140-53.2	6/16	1016-1019	74	calm	ESE-1	calm	18.2	12.9	o	1010.6
US15309	42-05.2	140-56.5	6/16	1106-1110	84	calm	ESE-1	calm	17.6	13.8	c	1010.7
US15310	42-00.9	141-01.0	6/16	1225-1233	92	calm	ESE-1	calm	21.7	14.1	bc	1010.4
US15311	41-59.3	141-02.0	6/16	1247-1252	101	East-1	ESE-1	East-2	19.1	13.9	bc	1010.0
US15312	41-58.7	141-00.8	6/16	1301-1306	95	East-1	ESE-1	East-2	20.4	14.6	bc	1010.0
US15313	41-58.2	140-59.6	6/16	1317-1322	87	East-1	ESE-1	East-2	20.4	14.4	bc	1009.8
US15314	41-57.3	140-58.3	6/16	1342-1347	78	ESE-1	ESE-1	ESE-2	21.2	15.3	bc	1009.6

Cruise 337

Station	Lat. (N)	Long. (E)	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15315	44-19.9	140-40.6	6/21	0700-0715	141	South-2	North-1	South-3	14.0	15.5	bc	1011.6
US15316	44-59.6	140-40.2	6/21	1214-1232	356	SSW-2	North-1	SSW-3	20.2	14.1	c	1010.5
US15317	44-59.7	140-49.5	6/21	1325-1338	133	SSW-2	North-1	SSW-3	18.2	13.9	bc	1010.7
US15318	44-20.0	140-50.1	6/21	1828-1843	251	SW-3	SW-1	SW-5	16.0	15.0	bc	1010.6
US15319	44-19.9	140-59.7	6/21	1937-1945	311	SSW-3	SW-1	SSW-5	15.5	15.2	bc	1010.7
US15320	44-59.8	141-00.3	6/22	1155-1210	96	calm	SW-1	calm-2	14.3	14.0	o	1012.1

Cruise 338

Station	Lat. (N)	Long. (E)	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15321	41-39.0	140-33.2	7/29	0920-0923	46	calm	NNE-1	calm	25.0	19.8	o	1011.6
US15322	41-36.7	140-35.6	7/29	0942-0946	65	calm	NE-1	calm	25.2	20.0	f	1010.5
US15323	41-34.2	140-38.3	7/29	1008-1016	161	calm	NE-1	calm	25.7	23.0	f	1010.7
US15324	41-31.6	140-41.2	7/29	1043-1051	217	calm	North-1	calm	27.6	21.9	f	1010.6
US15325	41-29.1	140-44.0	7/29	1126-1134	196	calm	SW-1	calm	25.9	20.8	m	1010.7
US15326	41-27.2	140-46.7	7/29	1159-1208	163	South-1	SW-1	South-3	24.8	21.4	m	1012.1
US15327	41-25.9	140-48.4	7/29	1227-1235	75	SSW-2	SW-1	SSW-3	25.4	22.6	c	1008.6
US15328	41-41.9	141-13.0	7/29	2131-2139	218	SW-1	ESE-1	SW-3	23.2	19.5	c	1008.1
US15329	41-39.6	141-15.1	7/29	2159-2208	200	calm	ESE-1	calm	21.9	18.0	c	1006.8
US15330	41-37.1	141-17.0	7/29	2310-2318	207	SSW-1	ESE-1	SSW-3	22.4	18.0	m	1004.5
US15331	41-34.5	141-19.1	7/29	2341-2355	298	SSW-1	ESE-1	SSW-3	22.9	18.8	c	1006.4
US15332	41-31.8	141-20.9	7/30	0012-0025	258	South-1	ESE-1	South-2	23.0	20.3	c	1012.6
US15333	41-29.8	141-22.9	7/30	0050-0055	145	SSW-1	ESE-1	SSW-2	22.7	20.0	c	1012.5
US15334	41-26.9	141-24.9	7/30	0123-0126	40	SSW-1	ESE-1	SSW-2	22.6	19.9	c	1012.6
US15335_a1	41-39.9	140-54.1	7/31	0649-0701	171	west-1	SE-1	West-3	23.9	21.9	m	1012.7
US15336_b1	41-38.1	140-51.7	7/31	0731-0705	277	SW-1	SE-1	SW-3	24.8	21.7	m	1012.5
US15337_c1	41-38.0	140-56.3	7/31	0804-0814	179	SSW-2	East-1	SSW-4	23.9	22.1	o	1012.1
US15338_d1	41-36.6	140-54.1	7/31	0847-0905	207	SSW-2	East-1	SSW-4	23.6	19.7	o	1012.1
US15339_e1	41-37.9	140-53.9	7/31	0919-0939	292	SW-1	East-1	SW-3	24.0	18.4	f	1012.2
a2	41-39.1	140-54.1	7/31	0957-1007	185							1011.6
b2	41-37.9	140-51.9	7/31	1038-1053	259							1011.6
c2	41-37.9	140-56.9	7/31	1107-1114	170							1010.8
d2	41-36.6	140-44.2	7/31	1206-1223	228							1010.5
e2	41-37.9	140-54.1	7/31	1244-1255	255							1008.1
a3	41-39.8	140-54.0	7/31	1330-1339	188							1011.7
b3	41-38.0	140-51.8	7/31	1415-1437	260							1010.1
c3	41-38.0	140-56.7	7/31	1446-1455	170							1010.2
d3	41-36.6	140-54.2	7/31	1537-1554	220							1010.1
e3	41-37.9	140-54.1	7/31	1617-1630	280							1010.1
a4	41-39.9	140-54.0	7/31	1652-1701	179							1010.1
b4	41-37.9	140-51.7	7/31	1731-1745	252							1009.6
c4	41-37.9	140-56.5	7/31	1802-1812	179							1009.6
d4	41-36.4	140-54.1	7/31	1840-1852	163							1009.3
e4	41-38.0	140-54.0	7/31	1911-1925	281							1009.1
a5	41-40.0	140-54.0	7/31	1043-1952	178							1009.0
b5	41-38.1	140-51.9	7/31	2016-2032	267							1008.6
c5	41-38.0	140-56.5	7/31	2050-2059	178							1008.6
d5	41-36.6	140-54.3	7/31	2122-2135	244							1008.6
e5	41-38.0	140-54.0	7/31	2148-2202	281							1009.7
a6	41-39.9	140-54.0	7/31	2222-2232	183							1010.1
b6	41-38.1	140-51.7	7/31	2255-2308	254							1010.1
c6	41-38.0	140-56.6	7/31	2327-2336	178							1010.6
d6	41-36.5	140-54.1	8/1	0003-0016	184							1010.6
e6	41-37.9	140-53.9	8/1	0029-0044	292							1010.6

Cruise 338 (continued)

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wt.	Bar. (hPa)
a7	41-39.9	140-54.0	8/1	0104-0114	180							1010.7
b7	41-38.0	140-51.6	8/1	0139-0152	252							1010.4
a8	41-40.0	140-54.0	8/1	0510-0520	179							1010.0
b8	41-38.1	140-51.9	8/1	0545-0559	267							1010.0
c8	41-37.9	140-56.4	8/1	0620-0631	184							1009.8
d8	41-36.6	140-54.2	8/1	0654-0707	203							1009.6
e8	41-37.9	140-54.0	8/1	0721-0736	282							1000.8
US15340	41-53.1	141-08.7	8/2	1157-1202	105	calm	SE-1	calm	22.9	21.1	c	1001.1
US15341	42-14.9	140-44.6	8/2	1614-1619	79	SE-1	SE-1	SE-3	22.5	22.5	c	1001.0
US15342	42-17.4	140-40.5	8/3	0732-0736	79	ESE-1	ESE-1	ESE-4	22.4	22.0	o	1001.1
US15343	42-12.1	140-35.0	8/3	1053-1058	83	East-1	NE-1	East-3	22.9	22.2	o	1001.6
US15344	41-59.2	141-01.8	8/3	1414-1419	100	calm	ESE-1	calm	24.2	22.0	o	1001.3
US15345	41-58.7	141-00.6	8/3	1443-1448	93	calm	ESE-1	calm	24.1	22.5	o	1001.7
US15346	41-58.1	140-59.5	8/3	1457-1501	86	calm	ESE-1	calm	24.3	22.0	c	1001.2
US15347	41-57.4	140-58.3	8/3	1504-1515	79	NW-1	ESE-1	NW-2	24.8	22.3	m	1001.8

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION US15269				STATION US15270				STATION US15271			
LATITUDE 41-40.5 N				LATITUDE 41-38.9 N				LATITUDE 41-29.8 N			
LONGITUDE 141-21.8 E				LONGITUDE 141-41.3 E				LONGITUDE 141-41.8 E			
DEPTH (m) 240				DEPTH (m) 697				DEPTH (m) 721			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	10.889	33.186	25.383	5	12.697	33.769	25.499	5	12.233	33.505	25.384
10	10.799	33.409	25.572	10	12.367	33.874	25.645	10	12.150	33.583	25.460
20	10.821	33.654	25.759	20	12.287	33.894	25.675	20	12.051	33.776	25.629
30	10.776	33.866	25.932	30	11.903	33.854	25.718	30	12.130	33.839	25.663
40	10.660	33.939	26.010	40	11.066	33.842	25.862	40	11.670	33.828	25.741
50	10.166	33.958	26.110	50	10.535	34.057	26.124	50	11.633	33.854	25.768
75	9.498	34.035	26.282	75	9.890	33.977	26.172	75	11.547	33.871	25.797
100	9.212	34.020	26.317	100	9.191	33.944	26.261	100	11.531	33.901	25.824
125	8.843	33.990	26.352	125	8.255	33.928	26.394	125	11.461	33.961	25.883

STATION US15272				STATION US15273				STATION US15274			
LATITUDE 41-29.8 N				LATITUDE 41-22.9 N				LATITUDE 41-23.4 N			
LONGITUDE 141-19.5 E				LONGITUDE 139-48.8 E				LONGITUDE 139-45.2 E			
DEPTH (m) 237				DEPTH (m) 409				DEPTH (m) 880			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.851	33.080	25.126	5	16.788	33.263	24.232	5	16.839	33.469	24.377
10	12.250	33.183	25.131	10	16.904	33.573	24.442	10	16.786	33.817	24.657
20	13.327	33.567	25.218	20	16.288	34.233	25.092	20	15.952	34.243	25.176
30	13.185	33.711	25.358	30	15.865	34.193	25.157	30	14.620	34.229	25.460
40	12.728	33.871	25.572	40	12.337	34.289	25.972	40	13.314	34.274	25.767
50	12.709	33.930	25.622	50	11.802	34.309	26.090	50	12.118	34.348	26.060
75	11.323	33.960	25.907	75	11.357	34.325	26.185	75	11.230	34.331	26.213
100	10.848	34.053	26.065	100	10.798	34.300	26.266	100	10.539	34.305	26.316
125	10.838	34.052	26.066	125	10.161	34.232	26.324	125	9.248	34.202	26.453
145	10.363	34.086	26.176					145	7.984	34.154	26.612

STATION		US15275	
LATITUDE	41-21.0	N	
LONGITUDE	139-44.6	E	
DEPTH (m)	460		
Press.	Temp.	Salinity	Sigma-T
5	16.500	33.049	24.133
10	16.553	33.338	24.343
20	16.197	34.180	25.072
30	15.846	34.253	25.208
40	12.866	34.110	25.730
50	11.810	34.304	26.085
75	10.778	34.231	26.216
100	10.262	34.256	26.326
125	10.079	34.271	26.370
150	8.772	34.174	26.508

STATION		US15276	
LATITUDE	41-20.0	N	
LONGITUDE	139-48.7	E	
DEPTH (m)	309		
Press.	Temp.	Salinity	Sigma-T
5	16.513	32.889	24.007
10	16.487	32.918	24.036
20	16.345	33.822	24.763
30	15.668	34.173	25.186
40	13.949	33.827	25.291
50	11.713	34.025	25.886
75	10.745	34.187	26.188
100	10.346	34.262	26.317
125	8.883	34.165	26.483
150	8.113	34.155	26.594

STATION		US15277	
LATITUDE	41-20.5	N	
LONGITUDE	139-41.8	E	
DEPTH (m)	522		
Press.	Temp.	Salinity	Sigma-T
5	16.330	33.187	24.279
10	16.355	33.215	24.294
20	16.537	33.410	24.402
30	16.234	34.132	25.026
40	13.915	33.956	25.398
50	11.686	34.055	25.914
75	10.884	34.191	26.167
100	10.433	34.220	26.269
125	9.781	34.232	26.389
150	9.593	34.219	26.410
155	9.298	34.222	26.461

STATION		US15278	
LATITUDE	41-20.4	N	
LONGITUDE	139-33.5	E	
DEPTH (m)	1168		
Press.	Temp.	Salinity	Sigma-T
5	16.817	34.068	24.843
10	16.526	34.205	25.015
20	15.030	34.168	25.324
30	12.919	34.184	25.777
40	12.227	34.359	26.048
50	11.576	34.331	26.149
75	10.383	34.262	26.310
100	9.383	34.238	26.460
125	8.672	34.182	26.529
150	7.170	34.116	26.699

STATION		US15279	
LATITUDE	41-23.6	N	
LONGITUDE	139-40.8	E	
DEPTH (m)	868		
Press.	Temp.	Salinity	Sigma-T
5	17.159	33.562	24.373
10	16.454	34.191	25.021
20	15.336	34.165	25.254
30	13.400	34.304	25.773
40	12.449	34.367	26.011
50	11.795	34.272	26.062
75	11.035	34.339	26.254
100	9.887	34.218	26.360
125	9.436	34.244	26.455

STATION		US15280	
LATITUDE	41-40.7	N	
LONGITUDE	140-45.1	E	
DEPTH (m)	167		
Press.	Temp.	Salinity	Sigma-T
5	13.742	33.895	25.387
10	13.583	33.942	25.456
20	13.137	34.028	25.613
30	12.277	34.052	25.800
40	11.273	34.099	26.024
50	10.442	34.148	26.210
75	9.799	34.160	26.330
100	9.532	34.171	26.383
125	9.353	34.162	26.405

STATION		US15281	
LATITUDE	41-42.9	N	
LONGITUDE	140-45.1	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	14.308	33.917	25.285
10	13.749	33.978	25.447
20	12.765	34.020	25.684
30	11.457	34.093	25.986
40	11.030	34.110	26.077
50	10.622	34.134	26.168
75	9.554	34.154	26.366

STATION		US15282	
LATITUDE	41-40.8	N	
LONGITUDE	140-47.2	E	
DEPTH (m)	221		
Press.	Temp.	Salinity	Sigma-T
5	15.510	32.827	25.112
10	15.428	32.679	25.128
20	13.679	32.455	25.465
30	12.337	32.875	25.762
40	11.928	33.063	25.912
50	11.860	33.243	25.963
75	11.519	33.210	26.039
100	10.248	33.287	26.257
125	9.910	33.382	26.304
150	9.756	33.424	26.335
175	9.609	33.700	26.366
200	9.554	33.484	26.373

STATION		US15283	
LATITUDE	41-38.9	N	
LONGITUDE	140-49.2	E	
DEPTH (m)	348		
Press.	Temp.	Salinity	Sigma-T
5	14.643	33.932	25.226
10	13.562	33.810	25.358
20	12.942	33.989	25.710
30	11.759	34.088	25.926
40	11.527	34.162	26.027
50	11.368	34.204	26.088
75	11.353	34.212	26.098
100	10.581	34.170	26.203
125	10.358	34.184	26.253
150	10.282	34.189	26.271
175	9.769	34.177	26.348
200	9.473	34.154	26.379
250	9.012	34.158	26.457
300	8.732	34.159	26.502
310	8.667	34.159	26.510

STATION US15284			
LATITUDE 41-37.2 N			
LONGITUDE 140-51.0 E			
DEPTH (m) 99			
Press.	Temp.	Salinity	Sigma-T
5	15.291	33.836	25.011
10	15.299	33.838	25.011
20	15.296	33.838	25.011
30	15.086	33.840	25.066
40	13.518	33.869	25.413
50	12.448	33.969	25.703
75	11.068	34.135	26.090

STATION US15286-2			
LATITUDE 41-57.1 N			
LONGITUDE 140-57.7 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	10.548	31.701	24.285
10	8.590	32.166	24.962
20	5.385	32.286	25.481
30	3.699	32.624	25.925
40	3.466	32.707	26.014
50	3.230	32.791	26.102
55	3.186	32.846	26.150

STATION US15287-2			
LATITUDE 41-57.0 N			
LONGITUDE 141-02.8 E			
DEPTH (m) 109			
Press.	Temp.	Salinity	Sigma-T
5	10.412	31.968	24.516
10	9.282	31.918	24.657
20	7.101	32.269	25.254
30	3.612	32.582	25.900
40	3.788	32.822	26.075
50	3.296	32.884	26.170
75	3.101	33.081	26.345
100	3.719	33.208	26.388

STATION US15288			
LATITUDE 42-10.1 N			
LONGITUDE 141-09.7 E			
DEPTH (m) 121			
Press.	Temp.	Salinity	Sigma-T
5	11.841	32.232	24.469
10	11.791	32.216	24.466
20	10.700	32.196	24.645
30	7.918	32.513	25.333
40	5.457	32.654	25.763
50	5.131	33.037	26.104
75	4.817	33.392	26.421
100	5.743	33.541	26.431
110	5.766	33.503	26.398

STATION US15285			
LATITUDE 41-36.0 N			
LONGITUDE 140-52.5 E			
DEPTH (m) 36			
Press.	Temp.	Salinity	Sigma-T
5	15.240	33.739	24.948
10	15.155	33.724	24.955
20	14.197	33.732	25.166
30	13.287	33.915	25.495

STATION US15286-3			
LATITUDE 41-57.1 N			
LONGITUDE 140-57.6 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	9.953	31.984	24.605
10	7.305	32.016	25.027
20	4.219	32.541	25.808
30	3.477	32.710	26.015
40	3.336	32.771	26.076
50	3.296	32.804	26.106

STATION US15287-3			
LATITUDE 41-58.1 N			
LONGITUDE 141-00.3 E			
DEPTH (m) 92			
Press.	Temp.	Salinity	Sigma-T
5	10.444	31.949	24.496
10	6.968	32.003	25.062
20	3.819	32.581	25.880
30	3.765	32.811	26.068
40	3.106	32.840	26.152
50	3.311	32.933	26.297
75	3.603	33.185	26.382

STATION US15289			
LATITUDE 42-01.4 N			
LONGITUDE 141-10.1 E			
DEPTH (m) 132			
Press.	Temp.	Salinity	Sigma-T
5	12.354	32.261	24.396
10	11.131	32.397	24.726
20	8.100	33.044	25.723
30	4.508	32.758	25.951
40	3.657	33.107	26.314
50	5.007	33.427	26.428
75	5.682	33.516	26.419
100	5.668	33.519	26.423
125	5.750	33.547	26.436

STATION US15286			
LATITUDE 41-57.1 N			
LONGITUDE 140-57.6 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	10.533	32.521	24.513
10	10.397	32.480	24.556
20	8.155	32.552	25.006
30	4.811	32.623	25.694
40	3.440	32.833	25.999
50	3.284	32.878	26.089

STATION US15287			
LATITUDE 41-58.0 N			
LONGITUDE 141-00.3 E			
DEPTH (m) 92			
Press.	Temp.	Salinity	Sigma-T
5	8.582	32.062	24.882
10	7.430	32.145	25.113
20	3.766	32.520	25.836
30	3.061	32.730	26.068
40	2.826	32.809	26.152
50	2.968	32.893	26.206
75	3.440	33.183	26.395
85	3.740	33.195	26.376

STATION US15287-4			
LATITUDE 41-56.8 N			
LONGITUDE 141-03.2 E			
DEPTH (m) 112			
Press.	Temp.	Salinity	Sigma-T
5	10.991	31.932	24.389
10	10.084	31.817	24.453
20	5.886	32.734	25.776
30	5.354	32.739	25.843
40	3.790	32.798	26.056
50	3.208	32.818	26.126
75	3.955	33.196	26.356
100	4.075	33.272	26.404

STATION US15290			
LATITUDE 42-10.4 N			
LONGITUDE 140-47.3 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	12.139	32.149	24.349
10	11.844	32.156	24.410
20	8.913	32.465	25.147
30	4.560	32.598	25.818
40	3.658	32.820	26.085
50	3.084	32.903	26.204
75	3.502	33.183	26.389

STATION		US15291	
LATITUDE		42-12.7	N
LONGITUDE		140-41.0	E
DEPTH (m)		90	
Press.	Temp.	Salinity	Sigma-T
5	12.608	32.174	24.281
10	11.920	32.168	24.405
20	9.164	32.712	25.301
30	3.979	32.399	25.719
40	3.372	32.731	26.041
50	3.057	32.843	26.159
75	3.909	33.323	26.461

STATION		US15294	
LATITUDE		42-16.2	N
LONGITUDE		140-36.7	E
DEPTH (m)		90	
Press.	Temp.	Salinity	Sigma-T
5	13.868	31.665	23.638
10	13.267	31.735	23.813
20	10.917	31.881	24.362
30	5.511	32.462	25.605
40	3.457	32.685	25.997
50	3.108	32.831	26.144
75	3.900	33.255	26.408
85	4.439	33.540	26.580

STATION		US15297	
LATITUDE		42-23.6	N
LONGITUDE		140-31.1	E
DEPTH (m)		96	
Press.	Temp.	Salinity	Sigma-T
5	13.703	31.806	23.780
10	12.903	31.795	23.930
20	12.585	31.822	24.012
30	8.074	31.912	24.839
40	3.925	32.344	25.756
50	3.061	32.774	26.103
75	3.581	33.184	26.382

STATION		US15300	
LATITUDE		42-24.3	N
LONGITUDE		140-41.5	E
DEPTH (m)		69	
Press.	Temp.	Salinity	Sigma-T
5	12.869	31.811	23.949
10	12.551	31.952	24.119
20	12.035	32.066	24.305
30	6.855	31.910	25.004
40	3.711	32.550	25.865
50	3.088	32.791	26.114

STATION		US15292	
LATITUDE		42-09.6	N
LONGITUDE		140-36.0	E
DEPTH (m)		70	
Press.	Temp.	Salinity	Sigma-T
5	12.147	32.007	24.238
10	11.069	31.952	24.391
20	7.111	32.054	25.084
30	4.049	32.449	25.752
40	3.402	32.668	25.088
50	3.086	32.822	26.139
60	3.071	32.869	26.178

STATION		US15295	
LATITUDE		42-14.0	N
LONGITUDE		140-30.0	E
DEPTH (m)		78	
Press.	Temp.	Salinity	Sigma-T
5	12.456	32.156	24.295
10	12.186	32.204	24.384
20	7.680	31.900	24.885
30	3.974	32.428	25.743
40	3.519	32.690	25.995
50	3.100	32.834	26.148
75	3.834	33.326	26.471

STATION		US15298	
LATITUDE		42-28.4	N
LONGITUDE		140-31.6	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	13.100	31.770	23.872
10	12.305	31.885	24.114
20	12.340	32.179	24.335
30	5.739	32.039	25.245
40	3.627	32.556	25.878
50	3.057	32.754	26.087

STATION		US15301	
LATITUDE		42-26.0	N
LONGITUDE		140-37.4	E
DEPTH (m)		83	
Press.	Temp.	Salinity	Sigma-T
5	13.378	31.740	23.795
10	12.915	31.788	23.922
20	12.643	31.784	23.972
30	8.314	31.815	24.728
40	3.920	32.473	25.784
50	3.303	32.703	26.025
75	3.863	33.284	26.435

STATION		US15293	
LATITUDE		43-29.6	N
LONGITUDE		145-22.6	E
DEPTH (m)		11	
Press.	Temp.	Salinity	Sigma-T
5	12.827	31.330	23.584
10	11.069	31.952	24.391
20	7.111	32.054	25.084
30	4.049	32.449	25.752
40	3.402	32.668	25.088
50	3.086	32.822	26.139
60	3.071	32.869	26.178
75	3.071	32.869	26.178

STATION		US15296	
LATITUDE		42-18.5	N
LONGITUDE		140-24.2	E
DEPTH (m)		59	
Press.	Temp.	Salinity	Sigma-T
5	13.288	31.842	23.891
10	12.577	31.964	24.124
20	7.515	31.937	24.937
30	3.753	32.534	25.849
40	3.349	32.670	25.995
50	3.158	32.805	26.119

STATION		US15299	
LATITUDE		42-31.2	N
LONGITUDE		140-37.6	E
DEPTH (m)		61	
Press.	Temp.	Salinity	Sigma-T
5	14.132	31.842	23.721
10	12.592	31.844	24.028
20	11.258	31.958	24.362
30	4.482	32.353	25.632
40	3.563	32.591	25.912
50	3.095	32.760	26.089
55	3.207	32.905	26.195

STATION		US15302	
LATITUDE		42-21.1	N
LONGITUDE		140-36.6	E
DEPTH (m)		87	
Press.	Temp.	Salinity	Sigma-T
5	13.703	31.700	23.699
10	13.061	31.770	23.880
20	12.637	31.807	23.990
30	10.608	31.831	24.377
40	4.022	32.404	25.720
50	3.166	32.721	26.052
75	3.844	33.195	26.366

STATION US15303			
LATITUDE 42-18.3 N			
LONGITUDE 140-42.0 E			
DEPTH (m) 65			
Press.	Temp.	Salinity	Sigma-T
5	12.280	31.764	24.025
10	12.415	31.998	24.181
20	12.144	32.004	24.237
30	7.926	31.867	24.824
40	4.193	32.516	25.791
50	3.132	32.788	26.108

STATION US15306			
LATITUDE 42-14.8 N			
LONGITUDE 141-04.7 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	11.702	32.296	24.544
10	9.875	32.357	24.909
20	7.206	32.591	25.493
30	5.116	32.702	25.841
40	5.347	33.050	26.090
50	3.345	32.906	26.183

STATION US15309			
LATITUDE 42-05.2 N			
LONGITUDE 140-56.5 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	12.946	32.435	24.417
10	10.721	32.345	24.757
20	7.627	32.531	25.389
30	5.816	32.746	25.794
40	4.961	32.955	26.058
50	3.810	32.813	26.065
75	3.930	33.325	26.461

STATION US15312			
LATITUDE 41-58.7 N			
LONGITUDE 141-00.8 E			
DEPTH (m) 95			
Press.	Temp.	Salinity	Sigma-T
5	12.568	32.280	24.370
10	11.474	32.408	24.673
20	8.117	32.439	25.246
30	5.848	32.715	25.766
40	5.348	32.953	26.013
50	3.643	32.770	26.047
75	3.344	33.091	26.330
90	3.783	33.233	26.402

STATION US15304			
LATITUDE 42-15.5 N			
LONGITUDE 140-47.5 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	13.560	31.751	23.767
10	11.899	31.993	24.274
20	11.395	32.178	24.508
30	8.179	32.564	25.335
40	4.439	32.524	25.772
50	3.237	32.739	26.060

STATION US15307			
LATITUDE 42-12.9 N			
LONGITUDE 140-57.1 E			
DEPTH (m) 69			
Press.	Temp.	Salinity	Sigma-T
5	12.209	32.123	24.316
10	11.898	32.218	24.448
20	10.643	32.697	25.045
30	7.493	32.589	25.452
40	6.526	32.656	25.635
50	4.939	32.536	25.728

STATION US15310			
LATITUDE 42-00.9 N			
LONGITUDE 141-01.0 E			
DEPTH (m) 92			
Press.	Temp.	Salinity	Sigma-T
5	13.513	32.184	24.111
10	12.915	32.354	24.361
20	11.722	33.018	25.101
30	6.546	32.520	25.525
40	3.507	32.646	25.961
50	3.899	32.910	26.134
75	6.280	33.558	26.378

STATION US15313			
LATITUDE 41-58.2 N			
LONGITUDE 140-59.6 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	11.968	32.268	24.474
10	11.262	32.310	24.635
20	7.935	32.486	25.309
30	5.658	32.836	25.884
40	4.125	32.791	26.016
50	3.065	32.819	26.138
75	3.146	33.008	26.282

STATION US15305			
LATITUDE 42-17.5 N			
LONGITUDE 140-54.0 E			
DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T
5	12.634	31.800	23.985
10	10.152	31.897	24.505
20	8.969	32.601	25.245
30	7.196	32.614	25.513
40	6.213	32.702	25.710
50	5.697	32.664	25.744

STATION US15308			
LATITUDE 42-09.8 N			
LONGITUDE 140-52.3 E			
DEPTH (m) 74			
Press.	Temp.	Salinity	Sigma-T
5	12.777	32.100	24.191
10	12.408	32.045	24.218
20	11.176	32.991	25.180
30	7.514	32.331	25.247
40	4.553	32.684	25.888
50	4.157	33.039	26.211
70	4.500	33.183	26.289

STATION US15311			
LATITUDE 41-59.3 N			
LONGITUDE 141-02.0 E			
DEPTH (m) 101			
Press.	Temp.	Salinity	Sigma-T
5	11.416	32.235	24.549
10	9.279	32.354	25.003
20	7.101	32.561	25.484
30	5.032	33.003	26.089
40	3.965	32.933	26.146
50	3.007	32.893	26.203
75	6.200	33.543	26.376
95	4.075	33.289	26.417

STATION US15314			
LATITUDE 41-57.3 N			
LONGITUDE 140-58.3 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	12.872	32.119	24.187
10	12.045	32.214	24.418
20	7.970	32.058	24.968
30	4.071	32.461	25.760
40	3.278	32.771	26.082
50	3.176	32.830	26.138

STATION US15315			
LATITUDE 44-19.1 N			
LONGITUDE 140-40.6 E			
DEPTH (m) 141			
Press.	Temp.	Salinity	Sigma-T
5	15.033	33.941	25.149
10	13.415	33.902	25.459
20	12.698	33.970	25.655
30	11.359	33.944	25.888
40	10.410	33.987	26.091
50	9.732	33.991	26.209
75	8.296	34.046	26.480
100	7.226	34.075	26.659
125	6.304	34.077	26.784

STATION US15316			
LATITUDE 44-59.6 N			
LONGITUDE 140-40.2 E			
DEPTH (m) 356			
Press.	Temp.	Salinity	Sigma-T
5	14.326	33.920	25.284
10	14.163	33.905	25.307
20	12.270	33.895	25.680
30	11.595	33.962	25.859
40	11.140	33.961	25.941
50	10.525	33.964	26.052
75	9.106	34.021	26.334
100	8.184	34.052	26.502
125	7.516	34.085	26.626
150	6.762	34.084	26.729
175	5.783	34.084	26.856
200	4.140	34.023	26.995
250	1.844	34.034	27.209
300	1.216	34.048	27.266

STATION US15317			
LATITUDE 44-59.7 N			
LONGITUDE 140-49.5 E			
DEPTH (m) 133			
Press.	Temp.	Salinity	Sigma-T
5	14.127	33.838	25.263
10	13.765	33.847	25.345
20	11.764	33.915	25.791
30	10.981	33.928	25.944
40	10.549	33.966	26.050
50	9.578	33.927	26.185
75	8.225	34.015	26.467
100	7.135	34.072	26.669

STATION US15318			
LATITUDE 44-20.0 N			
LONGITUDE 140-50.1 E			
DEPTH (m) 251			
Press.	Temp.	Salinity	Sigma-T
5	15.196	33.890	25.073
10	14.469	33.830	25.184
20	12.268	33.838	25.635
30	11.494	33.890	25.822
40	10.707	33.986	26.038
50	9.551	33.990	26.238
75	7.880	34.068	26.560
100	6.905	34.064	26.694
125	5.909	34.074	26.832
150	5.121	34.070	26.924
175	4.362	34.046	26.989
200	3.519	34.050	27.078

STATION US15319			
LATITUDE 44-19.9 N			
LONGITUDE 140-59.7 E			
DEPTH (m) 311			
Press.	Temp.	Salinity	Sigma-T
5	15.451	33.836	24.976
10	12.525	33.830	25.580
20	11.320	33.951	25.901
30	10.881	33.989	26.010
40	10.192	33.995	26.135
50	8.757	34.012	26.383
75	7.513	34.076	26.619
100	6.724	34.079	26.730
125	5.951	34.079	26.831
150	4.704	34.066	26.968
175	4.214	34.068	27.023
200	3.496	34.041	27.073
250	1.971	34.037	27.202

STATION US15320			
LATITUDE 44-59.8 N			
LONGITUDE 141-00.3 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	14.110	33.837	25.265
10	12.750	33.813	25.524
20	11.168	33.955	25.932
30	10.051	34.001	26.163
40	9.058	34.040	26.357
50	8.200	34.049	26.497
75	7.291	34.080	26.654

STATION US15321			
LATITUDE 41-39.0 N			
LONGITUDE 140-33.2 E			
DEPTH (m) 46			
Press.	Temp.	Salinity	Sigma-T
5	19.811	33.853	23.937
10	19.570	33.912	24.044
20	18.371	33.997	24.413
30	17.579	34.068	24.661
40	16.811	34.081	24.854

STATION US15322			
LATITUDE 41-36.9 N			
LONGITUDE 140-35.6 E			
DEPTH (m) 65			
Press.	Temp.	Salinity	Sigma-T
5	20.097	33.667	23.720
10	18.934	33.876	24.179
20	18.412	34.021	24.421
30	16.947	33.993	24.754
40	15.786	34.176	25.162
50	14.571	34.160	25.417
60	13.447	34.066	25.579

STATION US15323			
LATITUDE 41-34.2 N			
LONGITUDE 140-38.3 E			
DEPTH (m) 161			
Press.	Temp.	Salinity	Sigma-T
5	21.654	33.784	23.390
10	21.090	33.847	23.592
20	20.084	33.907	23.906
30	18.897	34.019	24.297
40	16.769	34.079	24.862
50	16.066	34.080	25.025
75	13.080	34.186	25.746
100	11.374	34.198	26.083
125	10.833	34.196	26.179
150	9.643	34.194	26.382

STATION		US15324	
LATITUDE		41-31.6	N
LONGITUDE		140-41.2	E
DEPTH (m)		217	
Press.	Temp.	Salinity	Sigma-T
5	20.909	33.928	23.703
10	20.679	33.941	23.775
20	19.714	33.976	24.055
30	19.448	33.973	24.122
40	19.258	33.962	24.163
50	17.341	34.053	24.706
75	15.252	34.192	25.293
100	12.271	34.184	25.903
125	10.782	34.226	26.212
150	10.333	34.224	26.289
175	10.071	34.217	26.328

STATION		US15327	
LATITUDE		41-25.9	N
LONGITUDE		140-48.4	E
DEPTH (m)		75	
Press.	Temp.	Salinity	Sigma-T
5	20.357	33.925	23.848
10	16.645	33.940	24.784
20	15.144	34.199	25.323
30	14.767	34.206	25.410
40	14.275	34.221	25.527
50	13.936	34.189	25.574

STATION		US15330	
LATITUDE		41-37.1	N
LONGITUDE		141-17.0	E
DEPTH (m)		207	
Press.	Temp.	Salinity	Sigma-T
5	18.885	33.940	24.240
10	18.359	33.975	24.399
20	16.957	33.983	24.744
30	16.012	33.958	24.943
40	15.157	33.990	25.159
50	14.765	34.012	25.261
75	11.726	34.043	25.897
100	9.496	34.031	26.280
125	9.536	34.078	26.309
150	9.532	34.079	26.311
175	9.360	34.053	26.318

STATION		US15325	
LATITUDE		41-29.1	N
LONGITUDE		140-44.0	E
DEPTH (m)		196	
Press.	Temp.	Salinity	Sigma-T
5	19.368	34.047	24.199
10	18.622	34.072	24.408
20	17.123	34.131	24.818
30	16.419	34.143	24.992
40	16.246	34.170	25.053
50	16.200	34.178	25.070
75	14.731	34.195	25.410
100	12.865	34.265	25.850
125	12.095	34.244	25.984
150	11.194	34.252	26.158

STATION		US15328	
LATITUDE		41-41.9	N
LONGITUDE		141-13.0	E
DEPTH (m)		218	
Press.	Temp.	Salinity	Sigma-T
5	18.195	34.003	24.460
10	15.907	34.005	25.004
20	13.937	34.130	25.528
30	13.316	34.166	25.684
40	12.715	34.177	25.812
50	12.668	34.195	25.855
75	8.884	33.650	26.080
100	8.002	33.703	26.255
125	6.193	33.460	26.312
150	5.444	33.460	26.403
175	4.202	33.376	26.474

STATION		US15331	
LATITUDE		41-34.5	N
LONGITUDE		141-19.1	E
DEPTH (m)		248	
Press.	Temp.	Salinity	Sigma-T
5	19.678	33.964	24.055
10	19.489	33.982	24.118
20	18.945	33.998	24.269
30	18.569	34.016	24.378
40	18.048	33.957	24.462
50	17.450	34.048	24.676
75	14.914	34.118	25.311
100	14.649	34.156	25.397
125	14.232	34.145	25.478
150	10.858	34.096	26.097
175	10.172	34.138	26.249
200	9.933	34.124	26.279

STATION		US15326	
LATITUDE		41-27.2	N
LONGITUDE		140-46.7	E
DEPTH (m)		163	
Press.	Temp.	Salinity	Sigma-T
5	20.541	33.966	23.831
10	19.409	33.933	24.101
20	16.443	34.083	24.940
30	15.131	34.189	25.318
40	14.496	34.201	25.465
50	13.950	34.238	25.609
75	13.457	34.283	25.745
100	12.554	34.242	25.894
125	12.020	34.262	26.012

STATION		US15329	
LATITUDE		41-39.6	N
LONGITUDE		141-15.1	E
DEPTH (m)		200	
Press.	Temp.	Salinity	Sigma-T
5	17.216	34.015	24.707
10	16.815	33.943	24.746
20	14.956	34.094	25.283
30	14.101	34.105	25.475
40	12.784	34.128	25.760
50	12.379	34.178	25.878
75	11.588	34.142	26.000
100	9.904	33.994	26.183
125	8.488	33.866	26.309
150	7.719	33.788	26.363
175	7.541	33.798	26.396

STATION		US15332	
LATITUDE		41-31.8	N
LONGITUDE		141-20.9	E
DEPTH (m)		258	
Press.	Temp.	Salinity	Sigma-T
5	20.271	33.944	23.885
10	19.463	33.968	24.114
20	18.895	33.985	24.272
30	18.735	33.994	24.320
40	18.622	34.007	24.358
50	18.555	34.013	24.379
75	15.196	34.004	25.162
100	13.600	34.140	25.605
125	12.703	34.192	25.826
150	12.226	34.218	25.939
175	11.929	34.222	25.999
200	10.984	34.225	26.175

STATION US15333			
LATITUDE	41-29.8	N	
LONGITUDE	141-22.9	E	
DEPTH (m)	145		
Press.	Temp.	Salinity	Sigma-T
5	20.106	33.851	23.858
10	19.834	33.874	23.946
20	19.703	33.910	24.008
30	19.542	33.962	24.089
40	19.452	33.957	24.109
50	19.554	33.992	24.109
75	14.734	33.959	25.227
100	13.078	34.179	25.741
125	12.285	34.204	25.916

STATION US15336_b1			
LATITUDE	41-38.1	N	
LONGITUDE	140-51.7	E	
DEPTH (m)	277		
Press.	Temp.	Salinity	Sigma-T
5	21.649	33.934	23.505
10	19.395	34.060	24.202
20	17.117	34.149	24.833
30	16.533	34.184	24.997
40	15.773	34.193	25.178
50	15.525	34.206	25.244
75	14.952	34.208	25.372
100	14.045	34.209	25.567
125	12.955	34.225	25.802
150	12.032	34.238	25.991
175	11.789	34.240	26.039
200	11.604	34.233	26.068
250	10.636	34.209	26.224

STATION US15339_e1			
LATITUDE	41-37.8	N	
LONGITUDE	140-53.9	E	
DEPTH (m)	296		
Press.	Temp.	Salinity	Sigma-T
5	17.722	34.044	24.608
10	16.876	34.098	24.851
20	14.889	34.184	25.367
30	14.620	34.211	25.446
40	14.244	34.223	25.535
50	14.247	34.226	25.537
75	14.064	34.238	25.585
100	13.900	34.240	25.620
125	12.844	34.247	25.840
150	11.724	34.240	26.050
200	10.714	34.217	26.216

STATION US15334			
LATITUDE	41-26.9	N	
LONGITUDE	141-24.9	E	
DEPTH (m)	40		
Press.	Temp.	Salinity	Sigma-T
5	18.512	33.805	24.231
10	17.789	33.851	24.444
20	17.209	33.972	24.676
30	17.213	33.985	24.685

STATION US15337_c1			
LATITUDE	41-38.0	N	
LONGITUDE	140-56.4	E	
DEPTH (m)	179		
Press.	Temp.	Salinity	Sigma-T
5	20.585	34.021	23.860
10	19.905	34.091	24.093
20	19.193	34.112	24.294
30	17.478	34.082	24.696
40	16.457	34.100	24.950
50	16.175	34.114	25.027
75	14.472	34.166	25.443
100	14.038	34.226	25.581
125	13.006	34.235	25.799

STATION USa2			
LATITUDE	41-39.8	N	
LONGITUDE	140-53.9	E	
DEPTH (m)	187		
Press.	Temp.	Salinity	Sigma-T
5	19.264	34.051	24.229
10	18.827	34.060	24.347
20	18.278	34.084	24.502
30	16.002	34.144	25.089
40	14.874	34.200	25.383
50	14.425	34.215	25.491
75	13.496	34.240	25.704
100	12.864	34.249	25.838
125	11.776	34.225	26.030
150	11.465	34.231	26.092

STATION US15335_a1			
LATITUDE	41-39.9	N	
LONGITUDE	140-54.1	E	
DEPTH (m)	171		
Press.	Temp.	Salinity	Sigma-T
5	21.394	33.965	23.599
10	20.633	34.047	23.867
20	18.397	34.116	24.497
30	17.047	34.139	24.842
40	16.735	34.118	24.900
50	16.320	34.108	24.988
75	15.342	34.187	25.270
100	14.322	34.231	25.525
125	12.887	34.247	25.832
150	12.166	34.248	25.973
160	12.051	34.248	25.995

STATION US15338_d1			
LATITUDE	41-36.6	N	
LONGITUDE	140-54.1	E	
DEPTH (m)	207		
Press.	Temp.	Salinity	Sigma-T
5	18.434	34.104	18.434
10	18.336	34.112	18.336
20	17.950	34.125	17.950
30	17.352	34.145	17.352
40	16.776	34.151	16.776
50	16.689	34.168	16.689
75	15.893	34.194	15.893
100	15.041	34.211	15.041
125	14.461	34.225	14.461
150	12.697	34.220	12.697
175	11.956	34.246	11.956

STATION USb2			
LATITUDE	41-37.9	N	
LONGITUDE	140-51.8	E	
DEPTH (m)	255		
Press.	Temp.	Salinity	Sigma-T
5	20.235	34.011	23.945
10	17.591	34.039	24.635
20	14.575	34.159	25.416
30	12.060	34.188	25.947
40	11.925	34.208	25.988
50	12.437	34.229	25.906
75	11.727	34.228	26.041
100	12.126	34.228	25.966
125	11.071	34.222	26.157
150	11.136	34.225	26.148
175	10.852	34.217	26.193
200	10.957	34.223	26.178
230	10.090	34.204	26.315

STATION		USc2	
LATITUDE	41-37.9	N	
LONGITUDE	140-56.7	E	
DEPTH (m)	170		
Press.	Temp.	Salinity	Sigma-T
5	20.429	34.032	23.910
10	19.712	33.998	24.072
20	18.388	34.106	24.492
30	18.237	34.126	24.545
40	17.227	34.127	24.790
50	16.436	34.142	24.988
75	13.706	34.191	25.623
100	13.445	34.227	25.705
125	12.821	34.234	25.835
140	12.110	34.229	25.969

STATION		USd2	
LATITUDE	41-36.6	N	
LONGITUDE	140-54.1	E	
DEPTH (m)	197		
Press.	Temp.	Salinity	Sigma-T
5	21.134	34.013	23.706
10	20.285	34.033	23.949
20	19.713	34.065	24.123
30	18.863	34.091	24.361
40	18.315	34.103	24.508
50	18.351	34.113	24.506
75	18.210	34.117	24.544
100	15.273	34.152	25.258
125	10.848	34.190	26.172
150	10.586	34.212	26.236
175	10.527	34.214	26.247

STATION		USc2	
LATITUDE	41-37.9	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	286		
Press.	Temp.	Salinity	Sigma-T
5	21.512	33.953	23.557
10	20.566	33.970	23.826
20	18.063	34.118	24.581
30	14.731	34.187	25.404
40	13.562	34.213	25.670
50	13.404	34.226	25.712
75	12.651	34.222	25.859
100	11.891	34.218	26.003
125	11.077	34.227	25.993
150	11.993	34.228	25.991
175	11.853	34.221	26.012
200	11.773	34.223	26.029

STATION		USa3	
LATITUDE	41-39.8	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	188		
Press.	Temp.	Salinity	Sigma-T
5	16.654	34.071	24.882
10	15.968	34.090	25.055
20	15.337	34.117	25.217
30	15.320	34.122	25.225
40	14.903	34.134	25.325
50	12.330	34.139	25.857
75	11.397	34.220	26.096
100	11.342	34.223	26.108
125	11.254	34.230	26.130
150	11.240	34.232	26.134

STATION		USb3	
LATITUDE	41-38.0	N	
LONGITUDE	140-51.7	E	
DEPTH (m)	255		
Press.	Temp.	Salinity	Sigma-T
5	19.121	34.047	24.262
10	19.102	34.054	24.272
20	18.972	34.062	24.311
30	18.952	34.072	24.324
40	18.705	34.066	24.382
50	18.078	34.090	24.556
75	15.314	34.156	25.252
100	13.772	34.219	25.631
125	12.299	34.224	25.929
150	12.037	34.229	25.983
175	11.218	34.208	26.119
200	10.812	34.208	26.192

STATION		USc3	
LATITUDE	41-38.0	N	
LONGITUDE	140-56.7	E	
DEPTH (m)	170		
Press.	Temp.	Salinity	Sigma-T
5	19.996	34.005	24.004
10	19.137	34.015	24.234
20	18.220	34.077	24.511
30	17.375	34.119	24.749
40	16.480	34.145	24.980
50	16.224	34.172	25.060
75	15.284	34.201	25.294
100	12.164	34.151	25.898
125	11.535	34.219	26.070
130	10.765	34.209	26.201

STATION		USd3	
LATITUDE	41-36.6	N	
LONGITUDE	140-54.2	E	
DEPTH (m)	220		
Press.	Temp.	Salinity	Sigma-T
5	23.510	33.918	22.966
10	22.273	33.905	23.309
20	19.504	33.985	24.117
30	18.245	34.035	24.472
40	17.344	34.099	24.741
50	17.190	34.116	24.790
75	16.160	34.158	25.063
100	11.557	34.221	26.067
125	10.462	34.213	26.258
150	10.443	34.213	26.261
175	10.274	34.212	26.290
200	10.232	34.209	26.294

STATION		USc3	
LATITUDE	41-37.9	N	
LONGITUDE	140-54.1	E	
DEPTH (m)	280		
Press.	Temp.	Salinity	Sigma-T
5	20.525	33.983	23.847
10	18.380	34.088	24.480
20	17.655	34.111	24.675
30	15.920	34.160	25.120
40	15.524	34.210	25.247
50	14.824	34.227	25.414
75	14.027	34.244	25.597
100	12.826	34.245	25.843
125	12.494	34.246	25.908
150	12.313	34.238	25.937
175	12.174	34.222	25.952
200	11.365	34.199	26.085
240	10.230	34.209	26.295

STATION		USa4	
LATITUDE	41-39.9	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	179		
Press.	Temp.	Salinity	Sigma-T
5	21.266	33.939	23.614
10	20.422	34.001	23.889
20	17.499	34.071	24.683
30	15.187	34.159	25.283
40	14.790	34.169	25.377
50	14.076	34.172	25.531
75	11.077	34.204	26.142
100	10.803	34.217	26.201
125	10.720	34.217	26.215
150	10.662	34.216	26.225

STATION		USb4	
LATITUDE		41-37.9	N
LONGITUDE		140-51.7	E
DEPTH (m)		252	
Press.	Temp.	Salinity	Sigma-T
5	22.311	33.963	23.343
10	20.323	33.995	23.911
20	18.255	34.027	24.465
30	16.459	34.064	24.922
40	16.128	34.138	25.055
50	15.736	34.185	25.181
75	14.772	34.247	25.441
100	13.611	34.254	25.691
125	13.032	34.249	25.805
150	12.378	34.247	25.932
175	11.870	34.241	26.024
200	11.423	34.216	26.088

STATION		USc4	
LATITUDE		41-38.0	N
LONGITUDE		140-54.0	E
DEPTH (m)		281	
Press.	Temp.	Salinity	Sigma-T
5	19.384	33.973	24.138
10	18.766	33.991	24.309
20	17.537	34.056	24.662
30	16.178	34.113	25.025
40	15.702	34.155	25.165
50	15.046	34.179	25.329
75	13.916	34.224	25.605
100	11.997	34.236	25.996
125	11.412	34.215	26.089
150	11.294	34.212	26.109
175	11.181	34.216	26.132
200	10.778	34.212	26.201

STATION		USc5	
LATITUDE		41-38.0	N
LONGITUDE		140-56.5	E
DEPTH (m)		178	
Press.	Temp.	Salinity	Sigma-T
5	22.116	33.936	23.377
10	21.927	33.931	23.426
20	19.518	33.964	24.097
30	18.109	34.065	24.529
40	18.102	34.086	24.547
50	17.218	34.097	24.770
75	14.717	34.208	25.423
100	13.494	34.211	25.682
125	12.165	34.242	25.969
150	12.041	34.229	25.982

STATION		USc4	
LATITUDE		41-37.9	N
LONGITUDE		140-56.5	E
DEPTH (m)		179	
Press.	Temp.	Salinity	Sigma-T
5	19.607	34.040	24.132
10	18.697	34.063	24.382
20	17.123	34.018	24.732
30	16.357	34.129	24.996
40	16.233	34.144	25.036
50	15.800	34.156	25.143
75	15.040	34.197	25.344
100	13.735	34.219	25.638
125	12.116	34.179	25.929
150	10.734	34.207	26.206

STATION		USa5	
LATITUDE		41-40.0	N
LONGITUDE		140-54.0	E
DEPTH (m)		178	
Press.	Temp.	Salinity	Sigma-T
5	22.393	33.919	23.287
10	21.298	33.892	23.570
20	19.455	34.037	24.169
30	18.740	34.103	24.401
40	16.738	34.084	24.873
50	15.997	34.134	25.082
75	14.328	34.227	25.521
100	12.742	34.193	25.819
125	12.218	34.211	25.935
150	11.978	34.217	25.985

STATION		USd5	
LATITUDE		41-36.6	N
LONGITUDE		140-54.3	E
DEPTH (m)		244	
Press.	Temp.	Salinity	Sigma-T
5	23.141	33.912	23.068
10	21.988	33.885	23.374
20	19.546	34.007	24.123
30	18.859	34.034	24.318
40	18.337	34.057	24.467
50	17.640	34.084	24.659
75	11.689	34.162	25.997
100	11.095	34.217	26.149
125	10.749	34.214	26.208
150	10.600	34.212	26.233
175	10.385	34.210	26.269
200	10.356	34.211	26.275
220	10.288	34.210	26.286

STATION		USd4	
LATITUDE		41-36.4	N
LONGITUDE		140-54.1	E
DEPTH (m)		163	
Press.	Temp.	Salinity	Sigma-T
5	22.342	33.921	23.302
10	20.914	33.883	23.667
20	19.456	33.991	24.133
30	18.580	34.060	24.409
40	17.687	34.100	24.659
50	16.673	34.126	24.921
75	14.151	34.160	25.506
100	11.961	34.205	25.979
125	10.436	34.209	26.259
150	10.268	34.209	26.288

STATION		USb5	
LATITUDE		41-38.1	N
LONGITUDE		140-51.9	E
DEPTH (m)		267	
Press.	Temp.	Salinity	Sigma-T
5	22.634	33.919	23.218
10	21.227	33.955	23.637
20	18.275	34.058	24.483
30	17.862	34.088	24.607
40	16.413	34.129	24.983
50	15.748	34.163	25.161
75	13.773	34.227	25.637
100	12.539	34.240	25.895
125	11.460	34.229	26.092
150	10.911	34.212	26.178
175	10.285	34.208	26.285
200	10.181	34.208	26.302
240	10.094	34.207	26.317

STATION		USe5	
LATITUDE		41-38.0	N
LONGITUDE		140-54.0	E
DEPTH (m)		280	
Press.	Temp.	Salinity	Sigma-T
5	22.115	33.904	23.353
10	21.513	33.935	23.544
20	20.859	33.973	23.750
30	19.880	34.017	24.043
40	18.937	34.061	24.319
50	18.080	34.077	24.546
75	15.343	34.131	25.227
100	13.959	34.234	25.604
125	13.124	34.242	25.781
150	11.310	34.219	26.111
175	10.941	34.212	26.173
200	10.681	34.206	26.214
250	10.211	34.207	26.297

STATION		USa6	
LATITUDE	41-39.9	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	183		
Press.	Temp.	Salinity	Sigma-T
5	22.869	33.934	23.163
10	21.836	33.998	23.502
20	20.206	34.025	23.964
30	18.178	34.040	24.493
40	17.764	34.070	24.618
50	17.036	34.095	24.811
75	14.443	34.215	25.487
100	12.467	34.241	25.911
125	12.319	34.252	25.947
150	12.024	34.238	25.992

STATION		USb6	
LATITUDE	41-38.1	N	
LONGITUDE	140-51.7	E	
DEPTH (m)	254		
Press.	Temp.	Salinity	Sigma-T
5	21.393	34.010	23.634
10	19.974	34.032	24.030
20	19.765	34.045	24.095
30	19.285	34.057	24.228
40	19.067	34.061	24.286
50	18.633	34.055	24.392
75	16.355	34.134	25.000
100	12.941	34.229	25.807
125	12.187	34.240	25.963
150	11.259	34.232	26.130
175	10.569	34.211	26.238
200	10.503	34.215	26.252
235	10.290	34.210	26.285

STATION		USc6	
LATITUDE	41-38.0		
LONGITUDE	140-56.6	E	
DEPTH (m)	178		
Press.	Temp.	Salinity	Sigma-T
5	22.423	33.972	23.319
10	20.972	33.985	23.729
20	19.864	34.006	24.039
30	19.498	34.053	24.197
40	19.451	34.058	24.186
50	19.210	34.049	24.241
75	14.367	34.189	25.483
100	12.392	34.238	25.922
125	11.736	34.225	26.037
150	10.561	34.198	26.229

STATION		USd6	
LATITUDE	41-36.5	N	
LONGITUDE	140-54.1	E	
DEPTH (m)	184		
Press.	Temp.	Salinity	Sigma-T
5	21.568	34.000	23.578
10	21.403	33.998	23.622
20	20.655	33.988	23.817
30	20.065	33.986	23.971
40	18.177	34.021	24.479
50	14.971	34.157	25.328
75	13.642	34.222	25.660
100	12.966	34.229	25.802
125	11.913	34.217	25.997
150	11.228	34.222	26.129
175	11.147	34.221	26.143

STATION		USe6	
LATITUDE	41-37.9	N	
LONGITUDE	140-53.9	E	
DEPTH (m)	292		
Press.	Temp.	Salinity	Sigma-T
5	20.998	34.008	23.740
10	20.963	34.012	23.752
20	20.856	34.005	23.776
30	20.753	33.981	23.785
40	19.989	33.966	23.976
50	18.417	34.021	24.419
75	15.850	34.150	25.128
100	12.871	34.247	25.835
125	12.040	34.243	25.993
150	11.341	34.230	26.114
175	11.094	34.217	26.149
200	10.603	34.210	26.231
250	10.498	34.212	26.251
260	10.504	34.213	26.251

STATION		USa7	
LATITUDE	41-39.9		
LONGITUDE	140-54.0	E	
DEPTH (m)	180		
Press.	Temp.	Salinity	Sigma-T
5	20.865	34.031	23.793
10	20.364	34.038	23.932
20	20.275	34.045	23.961
30	19.993	34.049	24.038
40	19.732	34.056	24.112
50	19.102	34.042	24.263
75	15.131	34.149	25.287
100	12.745	34.252	25.864
125	11.764	34.229	26.035
150	11.547	34.222	26.070
160	11.450	34.222	26.088

STATION		USb7	
LATITUDE	41-38.0	N	
LONGITUDE	140-51.6	E	
DEPTH (m)	252		
Press.	Temp.	Salinity	Sigma-T
5	21.271	33.989	23.651
10	21.007	34.001	23.732
20	20.462	34.029	23.899
30	19.629	34.010	24.104
40	17.347	34.074	24.721
50	15.217	34.161	25.278
75	14.593	34.214	25.454
100	13.186	34.247	25.772
125	12.615	34.238	25.879
150	11.799	34.239	26.036
175	11.205	34.233	26.141
200	10.886	34.225	26.193

STATION		USa8	
LATITUDE	41-40.0	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	179		
Press.	Temp.	Salinity	Sigma-T
5	21.676	33.964	23.521
10	21.340	33.967	23.615
20	20.558	33.998	23.850
30	19.271	34.013	24.198
40	17.929	34.084	24.588
50	16.945	34.127	24.857
75	15.116	34.167	25.305
100	14.079	34.220	25.568
125	12.704	34.257	25.876
150	12.115	34.238	25.976

STATION		USb8	
LATITUDE	41-38.1		
LONGITUDE	140-51.9	E	
DEPTH (m)	267		
Press.	Temp.	Salinity	Sigma-T
5	21.275	33.958	23.626
10	21.175	33.958	23.654
20	20.571	33.961	23.818
30	19.013	34.026	24.274
40	16.726	34.119	24.902
50	16.207	34.157	25.052
75	15.575	34.177	25.210
100	14.515	34.210	25.468
125	12.193	34.236	25.958
150	11.819	34.245	26.037
175	11.826	34.246	26.036
200	11.350	34.233	26.115
250	11.056	34.217	26.156

STATION		USc8	
LATITUDE		41-37.9	N
LONGITUDE		140-56.4	E
DEPTH (m)		184	
Press.	Temp.	Salinity	Sigma-T
5	21.767	33.962	23.494
10	21.453	33.952	23.573
20	20.532	33.944	23.816
30	18.843	33.974	24.277
40	15.713	34.108	25.127
50	15.634	34.151	25.178
75	15.649	34.165	25.185
100	13.643	34.245	25.677
125	13.123	34.259	25.794
150	12.003	34.233	25.993
160	11.669	34.227	26.051

STATION		USd8	
LATITUDE		41-36.6	N
LONGITUDE		140-54.2	E
DEPTH (m)		203	
Press.	Temp.	Salinity	Sigma-T
5	21.986	33.949	23.424
10	21.701	33.943	23.498
20	20.276	33.950	23.889
30	19.028	34.027	24.270
40	18.940	34.047	24.308
50	17.998	34.024	24.525
75	15.055	34.186	25.332
100	14.301	34.207	25.511
125	14.046	34.220	25.575
150	12.265	34.213	25.928
175	11.844	34.237	26.026
200	11.642	34.228	26.057
210	11.411	34.223	26.095

STATION		USe8	
LATITUDE		41-37.9	
LONGITUDE		140-54.0	E
DEPTH (m)		282	
Press.	Temp.	Salinity	Sigma-T
5	21.486	33.940	23.555
10	21.432	33.939	23.569
20	19.922	33.972	23.999
30	18.568	34.053	24.406
40	17.899	34.050	24.596
50	16.085	34.101	25.037
75	15.074	34.195	25.335
100	13.956	34.235	25.605
125	13.004	34.221	25.788
150	12.487	34.249	25.912
175	11.870	34.233	26.018
200	11.481	34.231	26.089

STATION		US15340	
LATITUDE		41-53.2	N
LONGITUDE		141-08.7	E
DEPTH (m)		105	
Press.	Temp.	Salinity	Sigma-T
5	19.427	32.094	22.693
10	17.438	32.200	23.263
20	12.278	32.546	24.632
30	11.055	33.036	25.237
40	9.653	33.353	25.723
50	7.844	33.224	25.902
75	7.923	33.664	26.236

STATION		US15341	
LATITUDE		42-14.9	N
LONGITUDE		140-44.6	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	21.317	31.468	21.723
10	19.167	31.662	22.430
20	14.422	31.810	23.636
30	10.438	32.301	24.771
40	7.361	32.565	25.452
50	4.582	32.518	25.753
75	4.459	33.052	26.190

STATION		US15342	
LATITUDE		42-17.4	
LONGITUDE		140-40.5	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	21.995	31.585	21.627
10	19.860	31.642	22.238
20	13.879	32.135	23.999
30	10.555	32.518	24.921
40	6.030	32.419	25.510
50	5.213	32.742	25.862

STATION		US15343	
LATITUDE		42-12.1	N
LONGITUDE		140-35.0	E
DEPTH (m)		83	
Press.	Temp.	Salinity	Sigma-T
5	19.593	31.606	22.279
10	18.531	31.718	22.631
20	13.081	32.464	24.413
30	9.743	32.570	25.098
40	7.445	32.449	25.349
50	4.711	32.506	25.730
75	3.256	32.968	26.241

STATION		US15344	
LATITUDE		41-59.2	N
LONGITUDE		141-01.8	E
DEPTH (m)		100	
Press.	Temp.	Salinity	Sigma-T
5	19.104	32.130	22.803
10	15.500	32.333	23.808
20	12.789	32.823	24.748
30	11.554	33.282	25.338
40	10.035	33.151	25.502
50	7.137	32.951	25.787
75	6.867	33.423	26.194

STATION		US15345	
LATITUDE		41-58.7	
LONGITUDE		141-00.6	E
DEPTH (m)		93	
Press.	Temp.	Salinity	Sigma-T
5	19.737	31.926	22.486
10	15.786	32.068	23.541
20	12.698	32.710	24.678
30	11.316	33.178	25.300
40	9.395	32.938	25.440
50	8.532	33.575	26.075
75	5.712	33.335	26.273

STATION		US15346	
LATITUDE		41-58.1	N
LONGITUDE		140-59.5	E
DEPTH (m)		86	
Press.	Temp.	Salinity	Sigma-T
5	18.711	31.970	22.779
10	16.406	32.196	23.500
20	11.716	32.657	24.822
30	11.216	33.249	25.373
40	9.649	33.147	25.564
50	6.633	33.020	25.908
75	5.169	33.396	26.385

STATION		US15347	
LATITUDE		41-57.4	N
LONGITUDE		140-58.3	E
DEPTH (m)		79	
Press.	Temp.	Salinity	Sigma-T
5	19.232	31.897	22.593
10	17.649	32.062	23.107
20	13.539	32.575	24.408
30	10.745	32.908	25.191
40	10.035	33.048	25.422
50	8.574	32.987	25.608

THE " USHIO MARU "

CRUISE 339

CRUISE 340

CRUISE 341

IN AUGUST 2015

IN SEPTEMBER 2015

1.Cruise Itinerary

Cruise 339

Departure from Hakodate	Aug.	7, 2015
Start hydrographic research (US15348)		9
Arrival at Nemuro		9
Departure from Nemuro		10
Start marine mammals watching research		10
Finish marine mammals watching research		12
Finish hydrographic research (US15377)		12
Start squid jigging research		12
Finish squid jigging research		13
Return to Hakodate		13
Total coverage 1080.2 miles		

Cruise 340

Departure from Hakodate	Aug.	23, 2015
Start hydrographic research (US15378)		23
Start squid jigging research		23
Finish squid jigging research		24
Arrival at Hakodate		25
Departure from Hakodate		28
Finish hydrographic research (US15385)		30
Return to Hakodate		31
Total coverage 346.0 miles		

Cruise 341

Departure from Hakodate	Sep.	3, 2015
Start hydrographic research (US15386)		3
Set mooring current meter		3
Start squid jigging research		3
Start and finish seabirds sighting research		4
Finish squid jigging research		4
Arrival at Hakodate		5
Departure from Hakodate		6
Start skin diving research		6
Finish skin diving research and hydrographic research (US15403)		7
Sampling by NORPAC net		8
Return to Hakodate		8
Total coverage 381.8 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

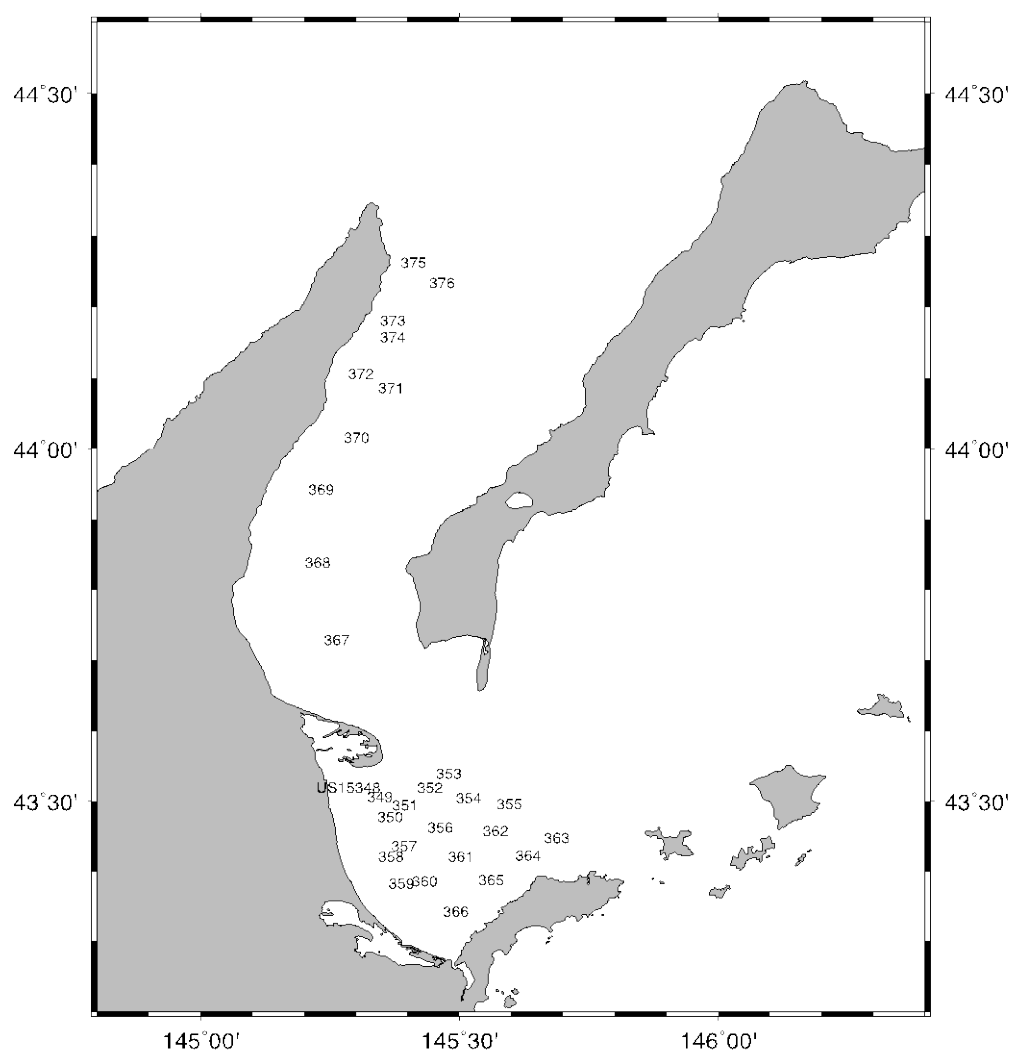


Figure 1. Oceanographic stations (Cruise 339)

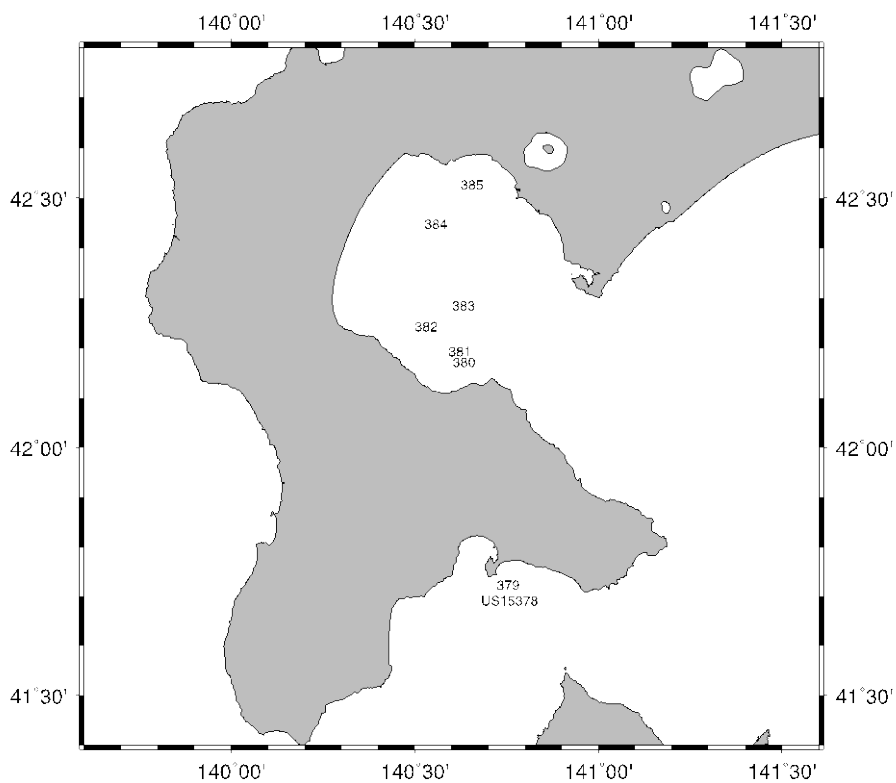


Figure 2. Oceanographic stations (Cruise 340)

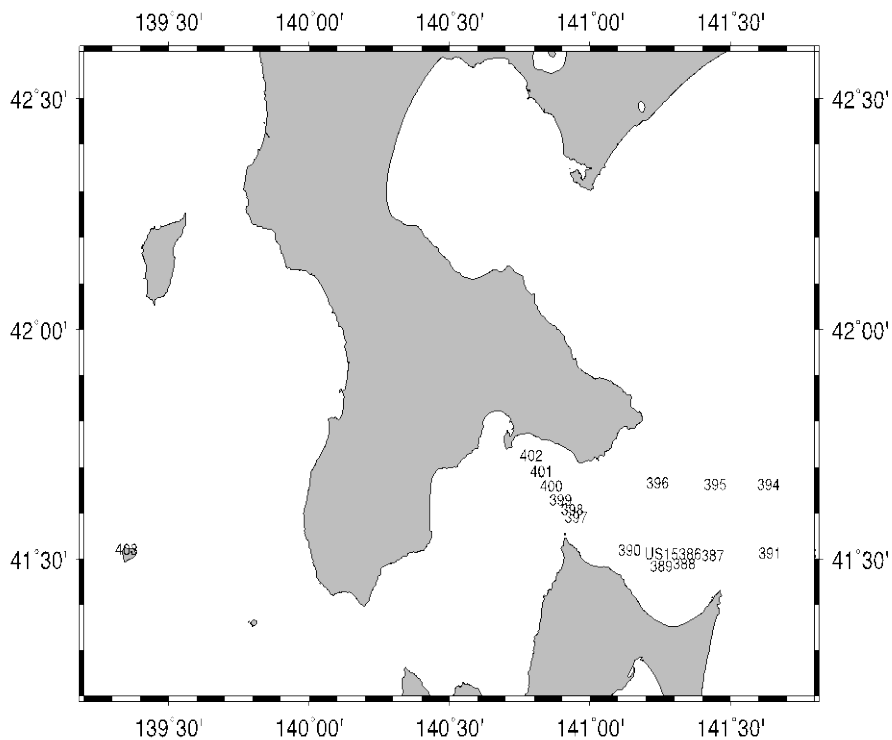


Figure 3. Oceanographic stations (Cruise 341)

Table 1. List of Oceanographic Station

Cruise 339												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15348	43-30.7	145-20.9	8/9	0630-0635	7	South-2	South-1	South-4	18.5	17.2	c	1016.2
US15349	43-29.9	145-19.3	8/9	0651-0653	7	South-2	South-1	South-4	18.4	17.0	c	1016.1
US15350	43-28.2	145-20.5	8/9	0720-0723	9	South-2	South-1	South-4	18.4	17.1	c	1016.1
US15351	43-29.2	145-22.2	8/9	0739-0742	11	South-2	South-1	South-4	18.6	17.3	c	1016.1
US15352	43-30.7	145-25.1	8/9	0802-0804	12	SSW-2	NE-1	SSW-3	18.7	14.5	o	1016.1
US15353	43-31.9	145-27.3	8/9	0820-0823	17	South-2	NE-1	South-4	17.8	14.6	o	1016.1
US15354	43-29.8	145-29.6	8/9	0850-0852	22	SSW-2	NE-1	SSW-4	18.6	16.5	c	1016.1
US15355	43-29.3	145-34.3	8/9	0916-0919	29	SSW-2	NE-1	SSW-3	19.1	16.5	o	1016.1
US15356	43-27.3	145-26.3	8/9	1009-1011	19	SSW-2	NE-1	SSW-4	20.4	17.3	o	1016.0
US15357	43-25.7	145-22.1	8/9	1035-1038	10	SSW-2	NE-1	SSW-4	20.0	17.2	c	1015.6
US15358	43-24.8	145-20.6	8/9	1050-1052	9	SSW-2	NE-1	SSW-4	20.5	16.9	o	1015.6
US15359	43-22.5	145-21.8	8/9	1116-1118	11	SSW-2	NE-1	SSW-4	19.6	16.1	o	1015.6
US15360	43-22.7	145-24.5	8/9	1135-1138	13	SSW-2	NE-1	SSW-4	19.6	16.6	o	1015.7
US15361	43-24.8	145-28.7	8/9	1203-1206	20	SSW-2	NE-1	SSW-4	20.0	17.2	o	1015.4
US15362	43-27.0	145-32.7	8/9	1231-1233	26	SSW-2	NE-1	SSW-4	19.9	17.2	o	1015.4
US15363	43-26.4	145-39.8	8/9	1312-1315	29	SSW-2	NE-1	SSW-4	19.6	16.5	c	1015.4
US15364	43-24.9	145-36.5	8/9	1344-1347	26	SSW-2	NE-1	SSW-4	20.3	16.7	c	1015.1
US15365	43-22.8	145-32.2	8/9	1413-1415	18	SSW-2	NE-1	SSW-4	21.0	16.2	bc	1014.7
US15366	43-20.1	145-28.1	8/9	1443-1445	15	SSW-2	NE-1	SSW-4	21.3	16.2	bc	1014.7
US15367	43-43.3	145-14.3	8/10	0742-0745	17	calm	SE-1	calm	19.7	17.0	o	1013.6
US15368	43-49.9	145-12.1	8/10	0826-0830	44	SE-1	SE-1	SE-3	20.9	17.2	o	1013.6
US15369	43-56.1	145-12.5	8/10	0906-0910	79	South-1	SE-1	South-3	20.9	16.9	d	1013.5
US15370	44-00.5	145-16.6	8/10	0942-0956	424	South-1	SE-1	South-2	20.6	17.3	o	1013.5
US15371	44-04.7	145-20.6	8/10	1026-1046	1118	South-1	SE-1	South-3	20.4	15.6	r	1013.1
US15372	44-05.9	145-17.1	8/10	1106-1122	552	SSW-1	SE-1	SSW-4	19.1	15.5	m	1012.6
US15373	44-10.4	145-20.8	8/10	1153-1200	185	South-1	SE-1	South-4	19.2	15.9	o	1012.6
US15374	44-09.0	145-20.8	8/10	1218-1238	1080	SSW-1	SE-1	SSW-4	19.1	15.9	o	1012.5
US15375	44-15.3	145-23.2	8/10	1318-1324	198	SSW-2	SE-2	SSW-4	20.2	15.8	m	1012.1
US15376	44-13.6	145-26.5	8/10	1343-1401	1650	SSW-2	SE-2	SSW-4	18.4	15.6	o	1011.6
US15377	41-20.9	139-48.9	8/12	1804	50	North-1	NE-1	North-3	25.9	25.2	bc	1006.8
Cruise 340												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15378	41-40.9	140-40.8	8/23	1905-1913	119	East-3	East-1	East-5	21.6	23.1	c	1012.1
US15379	41-42.8	140-43.4	8/24	1846-1853	95	ESE-3	East-1	ESE-4	20.1	22.3	o	1014.6
US15380	42-09.7	140-36.2	8/30	1052-1100	72	East-3	East-2	East-5	20.1	20.9	o	1016.6
US15381	42-11.0	140-35.5	8/30	1110-1118	78	East-3	East-2	East-5	20.5	20.9	c	1016.1
US15382	42-14.0	140-30.0	8/30	1249-1255	76	ENE-3	East-2	ENE-5	20.7	20.9	bc	1016.1
US15383	42-16.5	140-36.1	8/30	1337-1346	90	East-3	East-2	East-5	21.2	20.9	bc	1015.8
US15384	42-26.3	140-31.6	8/30	1609-1617	88	ESE-3	East-1	ESE-5	21.4	20.8	bc	1015.6
US15385	42-31.0	140-37.5	8/30	1714-1719	61	ESE-3	East-1	ESE-5	20.8	20.6	bc	1015.8

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Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US15386	41-29.9	141-11.6	9/3	1154-1211	265	WSW-3	WSW-1	WSW-5	23.2	21.3	bc	1011.7
US15387	41-29.7	141-23.8	9/3	1311-1320	108	West-3	West-1	West-4	26.8	21.0	bc	1011.6
US15388	41-28.6	141-17.7	9/3	1350-1401	225	West-3	WNW-1	West-3	25.2	21.0	bc	1011.5
US15389	41-28.3	141-12.8	9/3	1851-1857	146	West-3	WNW-1	West-4	22.5	21.0	c	1011.5
US15390	41-30.4	141-06.0	9/3	2215-2221	106	SE-1	NW-1	SE-2	23.1	21.1	o	1011.1
US15391	41-30.0	141-36.0	9/4	0716-0744	357	South-1	SE-1	South-2	21.6	20.1	o	1006.0
US15392	41-30.0	141-47.9	9/4	0832-0927	912	SE-2	SE-1	SE-4	21.2	20.7	o	1005.6
US15393	41-38.5	141-48.3	9/4	1009-1038	1077	SSW-2	SE-1	SSW-4	22.8	20.8	c	1005.1
US15394	41-39.0	141-35.7	9/4	1204-1209	110	WSW-2	SE-1	WEW-5	22.6	21.9	bc	1004.0
US15395	41-39.0	141-24.3	9/4	1333-1346	290	NW-2	SE-1	NW-4	20.1	21.5	d	1004.1
US15396	41-39.2	141-12.0	9/4	1500-1508	200	West-1	West-1	West-4	21.6	22.2	c	1004.1
US15397	41-34.7	140-54.6	9/4	1726-1732	48	NW-2	WNW-1	NW-3	22.6	22.8	bc	1006.1
US15398	41-35.7	140-53.8	9/4	1742-1748	62	West-2	WNW-1	West-3	22.6	22.6	bc	1006.2
US15399	41-37.0	140-51.3	9/4	1807-1814	96	WNW-2	WNW-1	WNW-4	22.5	22.7	bc	1006.4
US15400	41-38.8	140-49.3	9/4	1833-1849	333	West-3	West-1	West-5	22.0	22.7	c	1006.6
US15401	41-40.7	140-47.2	9/4	1909-1918	228	WNW-3	West-1	WNW-5	21.6	23.0	c	1007.1
US15402	41-42.8	140-45.0	9/4	1938-1943	83	NW-2	West-1	NW-3	21.4	22.7	c	1007.7
US15403	41-30.5	139-18.6	9/7	1903-1914	567	NNE-3	SE-1	NNE-4	22.4	23.0	bc	1014.8

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION	US15348
LATITUDE	43-30.7 N
LONGITUDE	145-20.9 E
DEPTH (m)	7

Press.	Temp.	Salinity	Sigma-T
5	15.566	32.242	23.726

STATION	US15351
LATITUDE	43-29.2 N
LONGITUDE	145-22.2 E
DEPTH (m)	11

Press.	Temp.	Salinity	Sigma-T
5	16.878	32.123	23.123

STATION	US15354
LATITUDE	43-29.8 N
LONGITUDE	145-29.6 E
DEPTH (m)	22

Press.	Temp.	Salinity	Sigma-T
5	14.856	32.428	24.021
10	14.270	32.476	24.181

STATION	US15357
LATITUDE	43-25.7 N
LONGITUDE	145-22.1 E
DEPTH (m)	10

Press.	Temp.	Salinity	Sigma-T
5	14.552	32.252	23.949

STATION	US15349
LATITUDE	43-29.9 N
LONGITUDE	145-19.3 E
DEPTH (m)	7

Press.	Temp.	Salinity	Sigma-T
No Data			

STATION	US15352
LATITUDE	43-30.7 N
LONGITUDE	145-25.1 E
DEPTH (m)	12

Press.	Temp.	Salinity	Sigma-T
5	14.676	32.452	24.078

STATION	US15355
LATITUDE	43-29.3 N
LONGITUDE	145-34.3 E
DEPTH (m)	29

Press.	Temp.	Salinity	Sigma-T
5	16.542	32.229	23.494
10	13.454	32.615	24.456
20	12.045	32.607	24.723
25	11.125	32.576	24.867

STATION	US15358
LATITUDE	43-24.8 N
LONGITUDE	145-20.6 E
DEPTH (m)	9

Press.	Temp.	Salinity	Sigma-T
5	15.591	32.202	23.687

STATION	US15350
LATITUDE	43-28.2 N
LONGITUDE	145-20.5 E
DEPTH (m)	9

Press.	Temp.	Salinity	Sigma-T
5	15.328	32.336	23.847

STATION	US15353
LATITUDE	43-31.9 N
LONGITUDE	145-27.3 E
DEPTH (m)	17

Press.	Temp.	Salinity	Sigma-T
5	14.657	31.198	21.612
10	14.170	32.381	24.129

STATION	US15356
LATITUDE	43-27.3 N
LONGITUDE	145-26.3 E
DEPTH (m)	19

Press.	Temp.	Salinity	Sigma-T
5	16.140	32.213	23.573
10	14.501	32.323	24.015

STATION	US15359
LATITUDE	43-22.5 N
LONGITUDE	145-21.8 E
DEPTH (m)	11

Press.	Temp.	Salinity	Sigma-T
5	15.699	32.215	23.673

STATION US15360			
LATITUDE 43-22.7 N			
LONGITUDE 145-24.5 E			
DEPTH (m) 13			
Press.	Temp.	Salinity	Sigma-T
5	16.595	32.016	23.319

STATION US15361			
LATITUDE 43-24.8 N			
LONGITUDE 145-28.7 E			
DEPTH (m) 20			
Press.	Temp.	Salinity	Sigma-T
5	16.597	32.140	23.413
10	13.602	32.381	24.245

STATION US15362			
LATITUDE 43-27.0 N			
LONGITUDE 145-32.7 E			
DEPTH (m) 26			
Press.	Temp.	Salinity	Sigma-T
5	17.090	32.193	23.340
10	13.142	32.422	24.369
20	11.284	32.548	24.816

STATION US15363			
LATITUDE 43-26.4 N			
LONGITUDE 145-39.8 E			
DEPTH (m) 29			
Press.	Temp.	Salinity	Sigma-T
5	16.352	32.286	23.582
10	15.203	31.992	23.607
20	12.253	32.848	24.871
25	10.676	32.572	24.942

STATION US15364			
LATITUDE 42-24.9 N			
LONGITUDE 145-36.5 E			
DEPTH (m) 26			
Press.	Temp.	Salinity	Sigma-T
5	16.265	32.293	23.607
10	11.882	32.376	24.574
20	10.401	32.650	25.050

STATION US15365			
LATITUDE 43-22.8 N			
LONGITUDE 145-32.2 E			
DEPTH (m) 18			
Press.	Temp.	Salinity	Sigma-T
5	17.527	32.145	23.200
10	13.378	32.284	24.215

STATION US15366			
LATITUDE 43-20.1 N			
LONGITUDE 145-28.1 E			
DEPTH (m) 15			
Press.	Temp.	Salinity	Sigma-T
5	15.830	32.283	23.697
10	13.495	32.359	24.249

STATION US15367			
LATITUDE 43-43.3 N			
LONGITUDE 145-14.3 E			
DEPTH (m) 17			
Press.	Temp.	Salinity	Sigma-T
5	15.693	32.458	23.862
10	13.236	32.866	24.694

STATION US15368			
LATITUDE 43-49.9 N			
LONGITUDE 145-12.1 E			
DEPTH (m) 44			
Press.	Temp.	Salinity	Sigma-T
5	17.002	32.588	23.664
10	14.788	32.658	24.213
20	13.358	33.180	24.912
30	12.441	33.325	25.204
40	10.596	33.456	25.645

STATION US15369			
LATITUDE 43-56.1 N			
LONGITUDE 145-12.5 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	16.030	32.867	24.100
10	14.847	33.121	24.557
20	13.403	33.200	24.918
30	12.314	33.301	25.210
40	12.040	33.433	25.365
50	11.604	33.446	25.456

STATION US15370			
LATITUDE 43-00.5 N			
LONGITUDE 145-16.6 E			
DEPTH (m) 424			
Press.	Temp.	Salinity	Sigma-T
5	16.415	33.022	24.133
10	16.003	33.150	24.324
20	13.191	32.936	24.756
30	12.852	33.392	25.176
40	12.022	33.429	25.365
50	11.316	33.462	25.521
75	9.664	33.547	25.874
100	8.003	33.521	26.112
125	6.125	33.485	26.340
150	4.733	33.426	26.457
175	3.213	33.303	26.512
200	2.408	33.278	26.561
250	1.571	33.290	26.633
300	1.437	33.370	26.706

STATION US15371			
LATITUDE 44-04.7 N			
LONGITUDE 145-20.6 E			
DEPTH (m) 1118			
Press.	Temp.	Salinity	Sigma-T
5	15.403	33.015	24.354
10	14.334	33.334	24.830
20	13.837	33.531	25.086
30	12.725	33.500	25.285
40	11.977	33.529	25.451
50	11.132	33.531	25.608
75	9.366	33.477	25.867
100	8.045	33.491	26.082
125	7.117	33.527	26.242
150	4.716	33.348	26.397
175	3.184	33.294	26.507
200	2.181	33.268	26.570
250	1.735	33.307	26.635
300	1.507	33.359	26.692
400	1.470	33.508	26.815
500	1.618	33.658	26.925

STATION		US15372	
LATITUDE		44-05.9	N
LONGITUDE		145-17.1	E
DEPTH (m)		552	
Press.	Temp.	Salinity	Sigma-T
5	15.905	33.243	24.418
10	13.544	32.857	24.624
20	12.748	33.259	25.094
30	12.517	33.498	25.324
40	11.548	33.447	25.467
50	10.170	33.465	25.725
75	8.519	33.516	26.031
100	7.772	33.578	26.190
125	6.796	33.517	26.278
150	5.680	33.451	26.368
175	3.846	33.314	26.461
200	2.661	33.251	26.518
250	1.645	33.289	26.627
300	1.722	33.372	26.688
400	1.469	33.493	26.803

STATION		US15375	
LATITUDE		44-15.3	N
LONGITUDE		145-23.2	E
DEPTH (m)		198	
Press.	Temp.	Salinity	Sigma-T
5	16.052	33.484	24.570
10	15.893	33.481	24.604
20	15.365	33.436	24.687
30	13.556	33.313	24.974
40	12.367	33.504	25.357
50	11.105	33.578	25.650
75	10.417	33.617	25.801
100	8.078	33.561	26.132
125	6.765	33.538	26.299
150	5.872	33.502	26.385

STATION		US15378	
LATITUDE		41-40.9	N
LONGITUDE		140-40.8	E
DEPTH (m)		119	
Press.	Temp.	Salinity	Sigma-T
5	23.424	33.867	22.952
10	23.383	33.882	22.976
20	22.628	33.795	23.126
30	19.742	33.870	23.967
40	17.611	34.086	24.667
50	14.706	34.170	25.395
75	12.115	34.251	25.986

STATION		US15373	
LATITUDE		44-10.4	N
LONGITUDE		145-20.8	E
DEPTH (m)		185	
Press.	Temp.	Salinity	Sigma-T
5	16.395	33.294	24.346
10	15.494	33.277	24.535
20	13.696	33.452	25.053
30	12.993	33.545	25.267
40	11.707	33.616	25.569
50	10.429	33.586	25.775
75	8.004	33.584	26.161
100	7.403	33.568	26.235
125	6.945	33.563	26.294
150	5.957	33.519	26.388

STATION		US15376	
LATITUDE		44-13.6	N
LONGITUDE		145-26.5	E
DEPTH (m)		1650	
Press.	Temp.	Salinity	Sigma-T
5	16.098	33.333	24.443
10	16.027	33.373	24.490
20	15.621	33.386	24.592
30	14.352	33.407	24.882
40	12.710	33.425	25.230
50	11.395	33.478	25.520
75	8.736	33.555	26.028
100	8.584	33.654	26.129
125	6.913	33.607	26.333
150	6.383	33.594	26.393
175	5.903	33.539	26.410
200	4.429	33.475	26.529
250	3.123	33.415	26.609
300	1.645	33.351	26.676
400	1.457	33.468	26.784

STATION		US15379	
LATITUDE		41-42.8	N
LONGITUDE		140-43.4	E
DEPTH (m)		95	
Press.	Temp.	Salinity	Sigma-T
5	22.479	34.013	23.334
10	22.475	34.015	23.336
20	21.393	33.998	23.624
30	19.126	34.090	24.294
40	17.995	34.204	24.664
50	15.295	34.240	25.321
75	12.709	34.242	25.863

STATION		US15374	
LATITUDE		44-09.0	N
LONGITUDE		145-23.8	E
DEPTH (m)		1080	
Press.	Temp.	Salinity	Sigma-T
5	14.344	33.175	24.705
10	13.022	32.999	24.839
20	13.351	33.439	25.113
30	12.491	33.351	25.215
40	12.033	33.498	25.416
50	11.257	33.510	25.569
75	8.978	33.474	25.927
100	7.430	33.465	26.150
125	6.720	33.560	26.322
150	5.467	33.475	26.413
175	3.645	33.313	26.479
200	2.789	33.352	26.588
250	1.961	33.325	26.633
300	1.520	33.343	26.679
400	1.465	33.460	26.777
460	1.488	33.553	26.849

STATION		US15377	
LATITUDE		41-20.9	N
LONGITUDE		139-48.9	E
DEPTH (m)		50	
Press.	Temp.	Salinity	Sigma-T

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STATION		US15380	
LATITUDE		42-09.7	N
LONGITUDE		140-36.2	E
DEPTH (m)		72	
Press.	Temp.	Salinity	Sigma-T
5	21.103	32.050	22.223
10	21.097	32.051	22.225
20	21.013	32.090	22.277
30	17.640	32.306	23.297
40	12.720	32.431	24.457
50	10.015	32.563	25.047

STATION	US15381		
LATITUDE	42-11.0	N	
LONGITUDE	140-35.5	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	21.026	32.060	22.250
10	21.022	32.059	22.251
20	21.021	32.059	22.251
30	17.738	32.243	23.225
40	12.349	32.389	24.496
50	8.928	32.500	25.172

STATION	US15384		
LATITUDE	42-26.3	N	
LONGITUDE	140-31.6	E	
DEPTH (m)	88		
Press.	Temp.	Salinity	Sigma-T
5	20.916	32.138	22.339
10	20.498	32.711	22.886
20	19.994	33.040	23.269
30	19.821	33.516	23.677
40	18.858	33.677	24.046
50	11.846	32.725	24.851
75	3.990	32.723	25.976

STATION	US15387		
LATITUDE	41-29.7	N	
LONGITUDE	141-23.8	E	
DEPTH (m)	108		
Press.	Temp.	Salinity	Sigma-T
5	21.129	33.930	23.645
10	21.122	33.930	23.645
20	21.110	33.931	23.650
30	21.100	33.932	23.654
40	21.091	33.936	23.659
50	20.924	33.933	23.702
75	14.155	34.185	25.525
90	11.931	34.250	26.019

STATION	US15382		
LATITUDE	42-14.0	N	
LONGITUDE	140-30.0	E	
DEPTH (m)	76		
Press.	Temp.	Salinity	Sigma-T
5	21.186	31.850	22.048
10	21.191	31.853	22.049
20	20.834	32.064	22.305
30	16.595	32.190	23.452
40	12.458	32.610	24.647
50	9.655	32.634	25.162

STATION	US15385		
LATITUDE	42-31.0	N	
LONGITUDE	140-37.5	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	20.802	32.363	22.541
10	20.799	32.406	22.574
20	20.635	32.572	22.744
30	20.645	33.161	23.190
40	19.569	33.386	23.643
50	11.710	32.618	24.791

STATION	US15388		
LATITUDE	41-28.6	N	
LONGITUDE	141-17.7	E	
DEPTH (m)	225		
Press.	Temp.	Salinity	Sigma-T
5	21.129	33.973	23.678
10	21.117	33.977	23.683
20	21.119	33.975	23.681
30	21.122	33.973	23.679
40	21.025	33.948	23.687
50	20.378	33.863	23.795
75	13.257	34.251	25.761
100	12.898	34.279	25.855
125	12.068	34.280	26.017
150	11.949	34.277	26.037
175	11.840	34.270	26.053
200	11.773	34.268	26.063

STATION	US15383		
LATITUDE	42-16.5	N	
LONGITUDE	140-36.1	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	21.081	31.957	22.158
10	21.069	31.957	22.161
20	19.935	32.735	23.052
30	16.016	32.813	24.062
40	13.114	33.012	24.831
50	10.779	32.996	25.254
75	4.193	32.794	26.012

STATION	US15386		
LATITUDE	41-30.0	N	
LONGITUDE	141-11.6	E	
DEPTH (m)	265		
Press.	Temp.	Salinity	Sigma-T
5	21.392	33.904	23.553
10	21.272	33.907	23.588
20	21.239	33.911	23.601
30	21.034	33.916	23.660
40	20.918	33.918	23.692
50	20.435	33.878	23.791
75	19.758	33.829	23.932
100	14.853	34.162	25.358
125	13.788	34.237	25.642
150	13.163	34.245	25.776
175	12.520	34.251	25.908
200	12.317	34.263	25.956
250	11.845	34.262	26.045

STATION	US15389		
LATITUDE	41-28.3	N	
LONGITUDE	141-12.8	E	
DEPTH (m)	146		
Press.	Temp.	Salinity	Sigma-T
5	21.220	33.959	23.642
10	21.217	33.956	23.640
20	21.111	33.937	23.655
30	20.329	33.841	23.792
40	19.597	33.767	23.911
50	18.481	33.849	24.272
75	15.031	34.150	25.310
100	14.163	34.236	25.563

STATION	US15390		
LATITUDE	41-30.4	N	
LONGITUDE	141-06.0	E	
DEPTH (m)	106		
Press.	Temp.	Salinity	Sigma-T
5	21.288	33.949	23.616
10	21.157	33.910	23.622
20	20.835	33.887	23.692
30	18.526	33.877	24.282
40	17.835	34.063	24.594
50	16.659	34.121	24.920
75	15.950	34.230	25.166

STATION	US15391		
LATITUDE	41-30.0	N	
LONGITUDE	141-36.0	E	
DEPTH (m)	357		
Press.	Temp.	Salinity	Sigma-T
5	20.461	33.630	23.595
10	20.488	33.672	23.620
20	20.479	33.679	23.628
30	20.466	33.727	23.668
40	20.435	33.729	23.678
50	20.514	33.791	23.704
75	19.830	33.708	23.821
100	17.509	33.901	24.549
125	12.222	33.809	25.426
150	10.830	33.876	25.930
175	10.312	33.885	26.028
200	9.373	33.808	26.125
250	5.685	33.546	26.442
300	3.170	33.608	26.759

STATION	US15392		
LATITUDE	41-30.0	N	
LONGITUDE	141-47.9	E	
DEPTH (m)	912		
Press.	Temp.	Salinity	Sigma-T
5	21.113	33.892	23.620
10	20.920	33.891	23.671
20	20.806	33.894	23.704
30	20.789	33.896	23.711
40	20.763	33.892	23.715
50	20.700	33.893	23.732
75	19.122	33.594	23.916
100	17.712	34.011	24.585
125	16.692	34.105	24.900
150	14.314	34.071	25.408
175	13.029	34.154	25.732
200	11.903	34.102	25.910
250	9.685	33.961	26.193
300	4.309	33.413	26.492
400	3.205	33.519	26.684
500	3.195	33.716	26.843
600	3.541	33.999	27.036

STATION	US15393		
LATITUDE	41-38.5	N	
LONGITUDE	141-48.3	E	
DEPTH (m)	1077		
Press.	Temp.	Salinity	Sigma-T
5	20.957	33.835	23.619
10	20.890	33.862	23.657
20	20.819	33.889	23.697
30	20.732	33.896	23.726
40	20.700	33.894	23.733
50	20.595	33.871	23.743
75	19.111	33.955	24.194
100	17.717	34.029	24.598
125	15.479	34.077	25.155
150	14.039	34.130	25.507
175	12.373	34.084	25.806
200	11.472	34.079	25.972
250	5.842	33.538	26.417
300	4.016	33.467	26.565
400	3.188	33.665	26.803
500	2.475	33.907	26.969

STATION	US15394		
LATITUDE	41-39.0	N	
LONGITUDE	141-35.7	E	
DEPTH (m)	110		
Press.	Temp.	Salinity	Sigma-T
5	21.788	33.909	23.448
10	21.614	33.909	23.496
20	21.568	33.915	23.513
30	21.568	33.917	23.515
40	21.221	33.896	23.594
50	20.942	33.940	23.702
75	20.396	33.938	23.848

STATION	US15395		
LATITUDE	41-39.0	N	
LONGITUDE	141-24.3	E	
DEPTH (m)	290		
Press.	Temp.	Salinity	Sigma-T
5	21.665	33.947	23.511
10	21.542	33.951	23.548
20	21.197	33.954	23.644
30	19.598	34.018	24.118
40	19.478	34.047	24.171
50	19.400	34.045	24.189
75	16.865	34.040	24.809
100	14.449	34.099	25.396
125	11.948	33.965	25.795
150	9.776	33.874	26.110
175	8.675	33.894	26.303
200	6.802	33.734	26.448

STATION		US15396	
LATITUDE		41-39.2	N
LONGITUDE		141-12.0	E
DEPTH (m)		200	
Press.	Temp.	Salinity	Sigma-T
5	22.133	33.921	23.361
10	22.077	33.922	23.377
20	22.039	33.922	23.388
30	21.993	33.922	23.401
40	21.921	33.915	23.416
50	21.831	33.919	23.444
75	19.097	34.033	24.257
100	15.056	34.064	25.238
125	11.346	33.624	25.642
150	7.327	33.778	26.411
165	6.849	33.771	26.471

STATION		US15399	
LATITUDE		41-37.0	N
LONGITUDE		140-51.3	E
DEPTH (m)		96	
Press.	Temp.	Salinity	Sigma-T
5	22.675	33.973	23.248
10	22.680	33.973	23.247
20	22.578	33.969	23.272
30	21.498	33.966	23.571
40	21.266	33.961	23.631
50	17.751	34.131	24.668
75	14.740	34.274	25.469

STATION		US15402	
LATITUDE		41-42.8	N
LONGITUDE		140-45.0	E
DEPTH (m)		83	
Press.	Temp.	Salinity	Sigma-T
5	22.172	33.910	23.342
10	21.354	33.947	23.596
20	20.710	34.006	23.816
30	18.874	34.090	24.358
40	18.786	34.110	24.395
50	18.421	34.118	24.493
75	13.669	34.240	25.668

STATION		US15397	
LATITUDE		41-34.7	N
LONGITUDE		140-54.6	E
DEPTH (m)		48	
Press.	Temp.	Salinity	Sigma-T
5	22.805	33.906	23.160
10	22.748	33.901	23.172
20	22.679	33.896	23.188
30	22.641	33.895	23.199
40	22.639	33.893	23.200

STATION		US15400	
LATITUDE		41-38.8	N
LONGITUDE		140-49.3	E
DEPTH (m)		333	
Press.	Temp.	Salinity	Sigma-T
5	22.645	33.938	23.230
10	22.391	33.979	23.333
20	21.228	33.981	23.656
30	18.891	34.087	24.351
40	18.284	34.125	24.532
50	17.584	34.180	24.745
75	14.208	34.276	25.584
100	13.296	34.298	25.790
125	12.815	34.293	25.882
150	12.341	34.275	25.961
175	11.626	34.264	26.087
200	11.383	34.270	26.137
250	11.273	34.269	26.157
300	11.261	34.270	26.160
310	11.251	34.269	26.161

STATION		US15403	
LATITUDE		41-30.5	N
LONGITUDE		139-18.6	E
DEPTH (m)		567	
Press.	Temp.	Salinity	Sigma-T
5	23.082	33.747	22.960
10	22.900	33.713	22.987
20	22.873	33.722	23.001
30	19.755	33.643	23.791
40	14.978	34.048	25.243
50	13.297	34.212	25.723
75	8.744	34.145	26.489
100	6.420	34.085	26.775
125	4.643	34.025	26.942
150	2.977	33.993	27.083
175	1.974	34.010	27.181

STATION		US15398	
LATITUDE		41-35.7	N
LONGITUDE		140-53.8	E
DEPTH (m)		62	
Press.	Temp.	Salinity	Sigma-T
5	22.549	33.920	23.243
10	22.584	33.915	23.230
20	22.418	33.923	23.283
30	22.386	33.928	23.295
40	22.246	33.926	23.333
50	19.788	33.972	24.033

STATION		US15401	
LATITUDE		41-40.7	N
LONGITUDE		140-47.2	E
DEPTH (m)		228	
Press.	Temp.	Salinity	Sigma-T
5	23.165	33.943	23.085
10	23.141	33.937	23.087
20	21.956	33.994	23.465
30	20.075	34.061	24.026
40	18.347	34.161	24.544
50	17.243	34.171	24.820
75	14.245	34.232	25.542
100	13.391	34.275	25.752
125	12.684	34.272	25.891
150	11.981	34.269	26.025
175	11.576	34.263	26.096
200	11.396	34.272	26.136

THE " USHIO MARU "

CRUISE 342

CRUISE 343

CRUISE 344

IN SEPTEMBER 2015

IN OCTOBER 2015

1.Cruise Itinerary

Cruise 342

Departure from Hakodate	Sep.	14, 2015
Start marine mammal research		14
Start hydrographic research (US15404) and echo sounding research		15
Finish hydrographic research (US15409) and echo sounding research		16
Start and finish fishing research		16
Start and finish ADCP research		16
Return to Hakodate		18
Total coverage 807.6 miles		

Cruise 343

Departure from Hakodate	Sep.	24, 2015
Start hydrographic research (US15410)		24
Finish hydrographic research (US15416)		24
Return to Hakodate		25
Total coverage 133.5 miles		

Cruise 344

Departure from Hakodate	Oct.	5, 2015
Start hydrographic research (US15417)		6
Sampling by tuna long line		6
Finish hydrographic research (US15424)		7
Sampling by tuna long line		7
Return to Hakodate		8
Total coverage 252.3 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

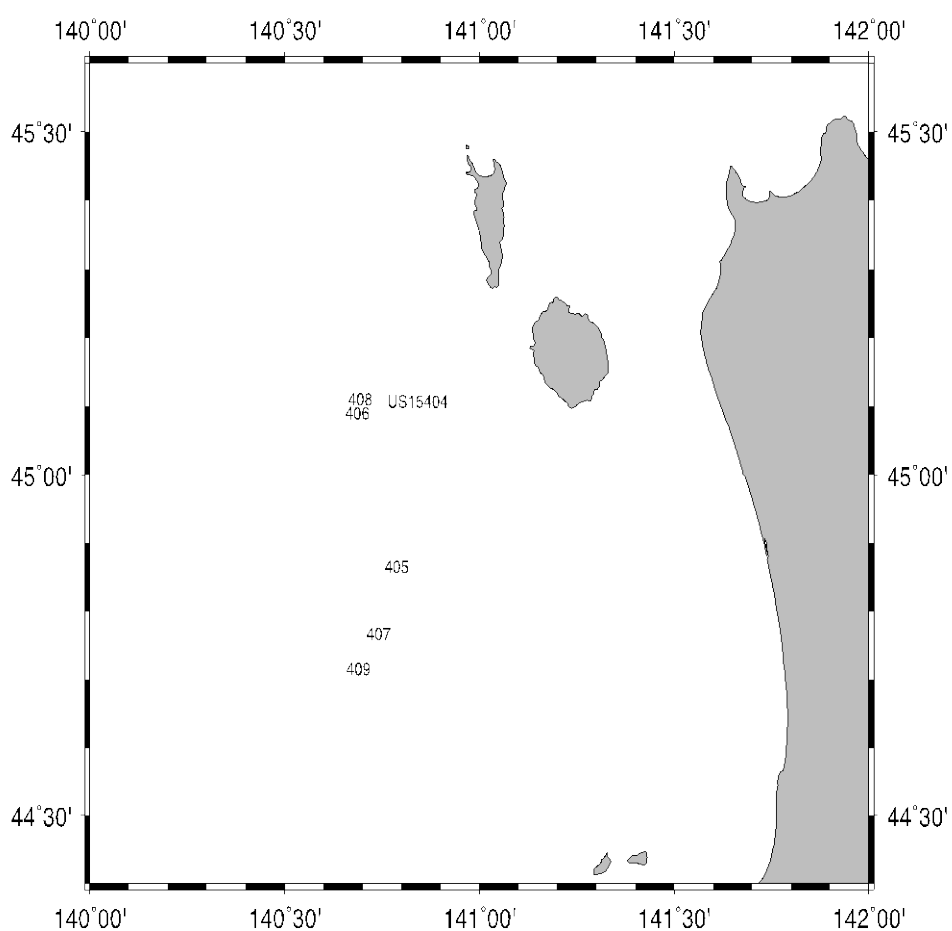


Figure 1. Oceanographic stations (Cruise 342)

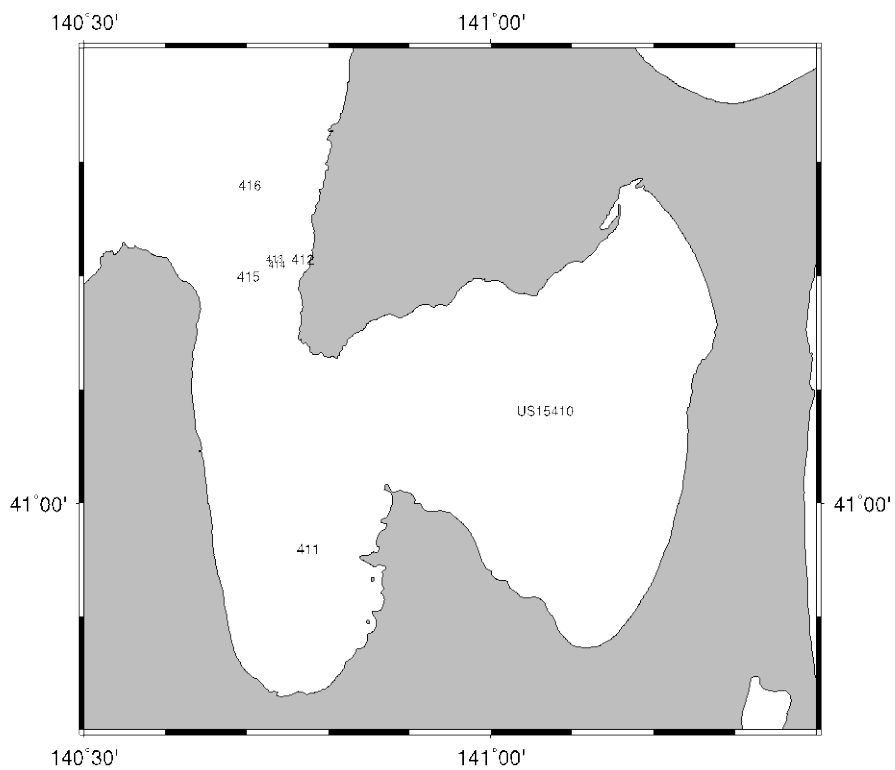


Figure 2. Oceanographic stations (Cruise 343)

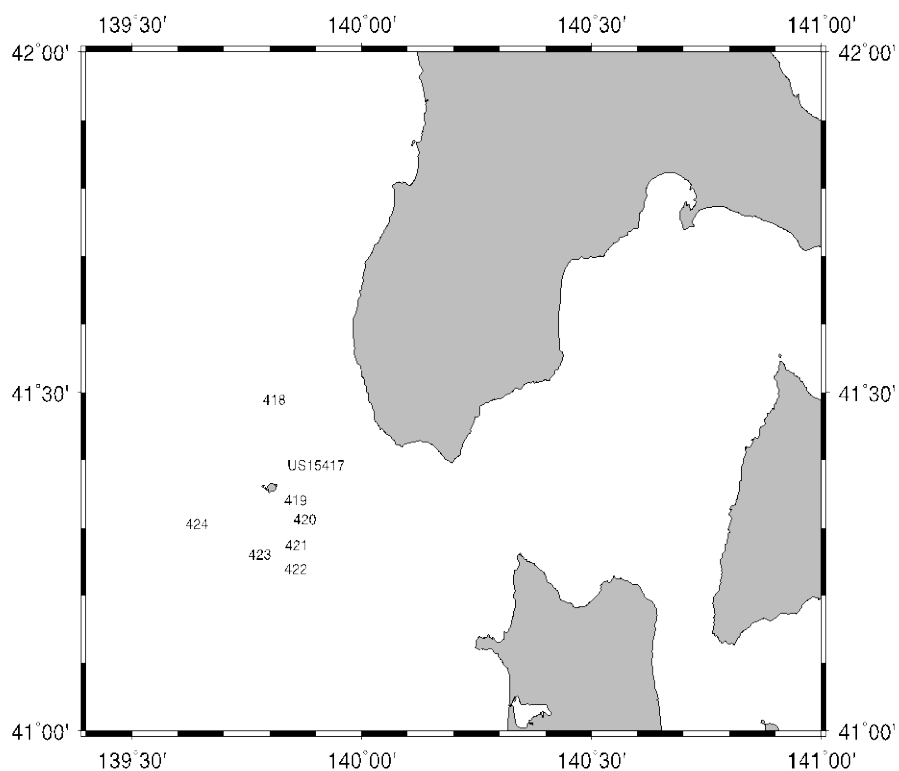


Figure 3. Oceanographic stations (Cruise 344)

Table 1. List of Oceanographic Station

Cruise 342												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15404	45-05.9	140-45.8	9/15	1548-1602	313	SW-2	SW-1	SW-3	21.1	20.5	b	1021.6
US15405	44-51.4	140-45.4	9/15	1746-1755	209	WSW-2	SW-1	West-3	20.5	20.9	bc	1021.6
US15406	45-06.0	140-43.1	9/15	1955-2008	353	NW-1	SW-1	NW-2	19.3	20.4	bc	1021.5
US15407	44-45.5	140-42.6	9/15	2240-2252	204	NW-1	SW-1	NW-2	19.9	20.8	bc	1021.5
US15408	45-06.1	140-39.8	9/16	0143-0204	355	NNW-1	SW-1	NNW-2	19.2	20.6	bc	1021.5
US15409	44-42.4	140-39.5	9/16	0501-0512	209	calm	SW-1	calm	19.1	20.6	b	1021.2

Cruise 343												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15410	41-04.6	141-01.9	9/24	1341-1351	46	East-2	ESE-1	East-4	20.7	20.7	c	1014.8
US15411	40-57.3	140-45.7	9/24	1610-1621	49	East-3	ENE-1	East-5	20.8	20.8	c	1013.5
US15412	41-12.6	140-45.3	9/24	1748-1802	63	ESE-3	SE-1	ESE-5	19.7	21.4	c	1013.1
US15413	41-12.7	140-44.7	9/24	1810-1821	66	East-3	SE-1	East-5	19.7	21.4	c	1013.2
US15414	41-12.4	140-43.6	9/24	1833-1845	72	SE-3	SE-1	SE-5	19.7	21.3	c	1013.6
US15415	41-11.7	140-41.3	9/24	1857-1908	68	ESE-3	SE-1	ESE-4	19.9	21.3	c	1013.7
US15416	41-16.5	140-41.4	9/24	1938-1950	144	ESE-2	SE-1	ESE-4	19.7	21.4	c	1014.0

Cruise 344												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15417	41-23.1	139-50.3	10/6	0836-0843	565	calm	WNW-1	calm	16.1	17.6	bc	1025.3
US15418	41-28.9	139-47.1	10/6	1025-1031	1394	calm	WNW-1	calm	18.1	16.8	bc	1025.6
US15419	41-20.0	139-49.9	10/6	1400-1408	344	calm	WNW-1	calm	19.2	18.8	b	1024.3
US15420	41-18.3	139-51.1	10/6	1427-1434	744	North-1	WNW-1	North-2	20.6	19.2	b	1024.3
US15421	41-16.0	139-50.0	10/6	1455-1501	863	North-1	NW-1	North-2	21.0	18.7	b	1024.0
US15422	41-13.9	139-49.9	10/6	1519-1526	1169	North-1	North-1	North-2	19.5	19.5	b	1024.0
US15423	41-15.2	139-45.1	10/7	0347-0356	1332	ENE-2	NE-1	ENE-4	16.5	18.9	b	1023.0
US15424	41-17.9	139-37.0	10/7	0507-0513	1381	East-1	NE-2	East-4	16.1	17.9	bc	1022.8

(*) : Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION US15404				STATION US15405				STATION US15406			
LATITUDE 45-05.9 N				LATITUDE 44-51.4 N				LATITUDE 42-06.0 N			
LONGITUDE 140-45.8 E				LONGITUDE 140-45.4 E				LONGITUDE 140-43.1 E			
DEPTH (m) 313				DEPTH (m) 209				DEPTH (m) 353			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.453	33.991	23.873	5	21.091	33.934	23.658	5	20.637	33.950	23.792
10	20.430	33.993	23.880	10	21.030	33.923	23.666	10	20.589	33.943	23.800
20	16.582	34.034	24.871	20	20.919	33.930	23.701	20	19.018	33.884	24.164
30	14.521	34.149	25.419	30	17.674	33.934	24.533	30	14.768	34.056	25.295
40	13.189	34.198	25.734	40	14.690	34.332	25.524	40	13.820	34.129	25.552
50	12.234	34.268	25.958	50	12.646	34.241	25.875	50	12.702	34.167	25.806
75	10.840	34.242	26.214	75	9.778	34.185	26.353	75	10.879	34.228	26.196
100	9.734	34.221	26.388	100	8.411	34.170	26.560	100	9.883	34.202	26.349
125	8.587	34.176	26.538	125	7.240	34.122	26.694	125	7.985	34.139	26.600
150	8.057	34.160	26.605	150	6.257	34.102	26.810	150	7.400	34.143	26.688
175	5.785	34.054	26.832	175	5.014	34.073	26.939	175	6.110	34.080	26.812
200	4.502	34.063	26.988					200	4.255	34.028	26.986
250	1.523	34.037	27.236					250	1.564	34.034	27.231
290	1.014	34.052	27.282					300	1.038	34.048	27.278

STATION US15407				STATION US15408				STATION US15409			
LATITUDE 44-45.5 N				LATITUDE 45-06.1 N				LATITUDE 44-42.4 N			
LONGITUDE 140-42.6 E				LONGITUDE 140-39.8 E				LONGITUDE 140-39.5 E			
DEPTH (m) 204				DEPTH (m) 355				DEPTH (m) 209			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	21.050	33.932	23.667	5	20.806	33.917	23.722	5	20.932	33.949	23.712
10	21.054	33.933	23.667	10	20.804	33.917	23.799	10	20.935	33.948	23.711
20	21.092	33.930	23.672	20	20.265	33.829	25.177	20	20.899	33.943	23.717
30	20.035	33.921	23.930	30	15.352	34.070	25.640	30	17.123	33.966	24.692
40	13.853	34.239	25.630	40	13.752	34.225	25.874	40	13.071	34.283	25.823
50	11.881	34.246	26.026	50	12.490	34.200	26.215	50	11.047	34.161	26.114
75	8.992	34.149	26.453	75	10.791	34.232	26.401	75	8.735	34.187	26.524
100	7.333	34.122	26.681	100	9.370	34.160	26.613	100	6.730	34.098	26.745
125	5.863	34.075	26.838	125	7.908	34.142	26.796	125	5.345	34.061	26.891
150	4.768	34.036	26.937	150	6.314	34.093	26.922	150	4.178	34.058	27.018
175	3.723	34.047	27.056	175	5.093	34.063	27.056	175	3.614	34.051	27.070
				200	3.554	34.027	27.237				
				250	1.487	34.035	27.288				
				300	0.965	34.055	27.308				

STATION US15410				STATION US15411				STATION US15412			
LATITUDE 41-04.7 N				LATITUDE 40-57.3 N				LATITUDE 41-12.7 N			
LONGITUDE 141-02.0 E				LONGITUDE 140-45.7 E				LONGITUDE 140-45.3 E			
DEPTH (m) 46				DEPTH (m) 49				DEPTH (m) 63			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.833	33.402	23.323	5	20.937	33.563	23.417	5	21.494	33.683	23.357
10	20.819	33.398	23.324	10	20.933	33.586	23.436	10	21.476	33.678	23.358
20	20.718	33.378	23.335	20	20.899	33.614	23.466	20	21.255	33.659	23.404
30	20.674	33.433	23.389	30	20.853	33.647	23.503	30	21.214	33.704	23.450
40	20.342	33.577	23.586	40	20.654	33.867	23.725	40	21.250	33.744	23.470
								40	21.202	33.756	23.493

STATION US15413			
LATITUDE 41-12.8 N			
LONGITUDE 140-45.0 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	21.502	33.692	23.362
10	21.496	33.689	23.361
20	21.500	33.691	23.362
30	21.103	33.664	23.450
40	20.749	33.733	23.597
50	20.813	33.774	23.611

STATION US15416			
LATITUDE 41-16.6 N			
LONGITUDE 140-41.4 E			
DEPTH (m) 144			
Press.	Temp.	Salinity	Sigma-T
5	21.677	33.638	23.273
10	21.677	33.640	23.274
20	21.669	33.642	23.278
30	21.602	33.654	23.306
40	21.473	33.666	23.350
50	19.063	33.823	24.106
75	15.104	34.152	25.296
100	14.115	34.231	25.568
125	13.392	34.263	25.743

STATION US15419			
LATITUDE 41-20.0 N			
LONGITUDE 139-49.9 E			
DEPTH (m) 344			
Press.	Temp.	Salinity	Sigma-T
5	18.962	33.612	23.970
10	18.731	33.637	24.047
20	18.307	33.686	24.191
30	17.709	33.760	24.394
40	16.701	33.837	24.691
50	13.149	34.174	25.723
75	9.786	34.155	26.328
100	7.736	34.136	26.634
125	5.759	34.063	26.843

STATION US15422			
LATITUDE 41-13.9 N			
LONGITUDE 139-49.9 E			
DEPTH (m) 1169			
Press.	Temp.	Salinity	Sigma-T
5	19.500	33.523	23.765
10	19.465	33.526	23.776
20	19.408	33.534	23.797
30	18.900	33.594	23.972
40	18.508	33.642	24.107
50	17.331	33.849	24.552
75	11.738	34.243	26.050
100	10.162	34.220	26.315
125	8.028	34.170	26.618

STATION US15414			
LATITUDE 41-12.4 N			
LONGITUDE 140-43.6 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	21.421	33.656	23.357
10	21.426	33.655	23.355
20	21.381	33.660	23.371
30	21.307	33.664	23.394
40	20.906	33.689	23.522
50	20.356	33.744	23.710

STATION US15417			
LATITUDE 41-23.1 N			
LONGITUDE 139-50.3 E			
DEPTH (m) 565			
Press.	Temp.	Salinity	Sigma-T
5	17.120	33.839	24.595
10	17.116	33.841	24.598
20	17.098	33.847	24.606
30	16.626	33.869	24.734
40	16.069	33.932	24.911
50	15.536	34.009	25.090
75	6.757	34.090	26.735
100	6.353	34.128	26.818
125	4.919	34.037	26.921

STATION US15420			
LATITUDE 41-18.3 N			
LONGITUDE 139-51.1 E			
DEPTH (m) 744			
Press.	Temp.	Salinity	Sigma-T
5	18.818	33.601	23.998
10	18.607	33.634	24.077
20	18.110	33.691	24.243
30	17.377	33.755	24.496
40	16.174	33.938	24.891
50	14.401	34.177	25.467
75	11.317	34.254	26.137
100	8.555	34.155	26.526
125	6.604	34.070	26.740

STATION US15423			
LATITUDE 41-15.2 N			
LONGITUDE 139-45.1 E			
DEPTH (m) 1332			
Press.	Temp.	Salinity	Sigma-T
5	19.236	33.545	23.849
10	19.237	33.544	23.849
20	19.216	33.555	23.862
30	19.167	33.576	23.891
40	17.809	33.748	24.360
50	14.678	34.108	25.354
75	10.097	34.190	26.303
100	7.291	34.111	26.678
125	5.896	34.071	26.831

STATION US15415			
LATITUDE 41-11.7 N			
LONGITUDE 140-41.3 E			
DEPTH (m) 68			
Press.	Temp.	Salinity	Sigma-T
5	21.407	33.650	23.356
10	21.411	33.649	23.354
20	21.403	33.650	23.357
30	21.335	33.654	23.378
40	21.251	33.661	23.407
50	20.599	33.720	23.628

STATION US15418			
LATITUDE 41-28.9 N			
LONGITUDE 139-47.1 E			
DEPTH (m) 1394			
Press.	Temp.	Salinity	Sigma-T
5	16.936	33.773	24.588
10	16.927	33.776	24.592
20	16.598	33.815	24.699
30	15.688	33.921	24.988
40	13.684	34.177	25.617
50	13.032	34.209	25.773
75	9.104	34.147	26.434
100	4.858	34.005	26.902
125	3.709	34.025	27.040

STATION US15421			
LATITUDE 41-16.0 N			
LONGITUDE 139-50.0 E			
DEPTH (m) 863			
Press.	Temp.	Salinity	Sigma-T
5	19.047	33.600	23.939
10	18.875	33.602	23.985
20	18.091	33.655	24.220
30	17.796	33.726	24.346
40	17.131	33.744	24.520
50	16.560	33.735	24.646
75	11.545	34.239	26.083
100	9.541	34.140	26.357
125	7.170	34.131	26.711
145	5.824	34.018	26.799

STATION US15424			
LATITUDE 41-17.9 N			
LONGITUDE 139-37.0 E			
DEPTH (m) 1381			
Press.	Temp.	Salinity	Sigma-T
5	17.434	33.734	24.440
10	16.421	33.744	24.685
20	15.906	33.752	24.809
30	15.667	33.794	24.895
40	14.342	33.753	25.152
50	11.597	33.843	25.766
75	6.802	34.080	26.721
100	4.530	33.992	26.928
125	3.230	33.984	27.053

THE " USHIO MARU "

CRUISE 345

CRUISE 346

CRUISE 347

IN OCTOBER 2015

IN NOVEMBER 2015

1.Cruise Itinerary

Cruise 345

Departure from Hakodate	Oct.	14, 2015
Set ARGOS buoys		14
Start marine mammals sighting research		15
Start and finish frame trawl net sampling		15
Start hydrographic research (US15425)		16
Finish hydrographic research (US15442)		16
Arrival at Kushiro		18
Departure from Kushiro		19
Finish marine mammals sighting research		19
Return to Hakodate		21
Total coverage 928.9 miles		

Cruise 346

Departure from Hakodate	Oct.	26, 2015
Start hydrographic research (US15443)		27
Retrieval mooring ADCP system		27
Set mooring ADCP system		27
Sampling by sledge net		27
Arrival at Muroran		27
Departure from Muroran		29
Start trawl net sampling		29
Arrival at Muroran		29
Departure from Muroran		30
Finish trawl net sampling and hydrographic research (US15465)		30
Return to Hakodate		31
Total coverage 323.2 miles		

Cruise 347

Departure from Hakodate	Nov.	9, 2015
Start hydrographic research (US15466)		9
Arrival at Ominato		9
Departure from Ominato		10
Arrival at Aomori		10
Departure from Aomori		11
Finish hydrographic research (US15482)		11
Return to Hakodate		12
Total coverage 187.3 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

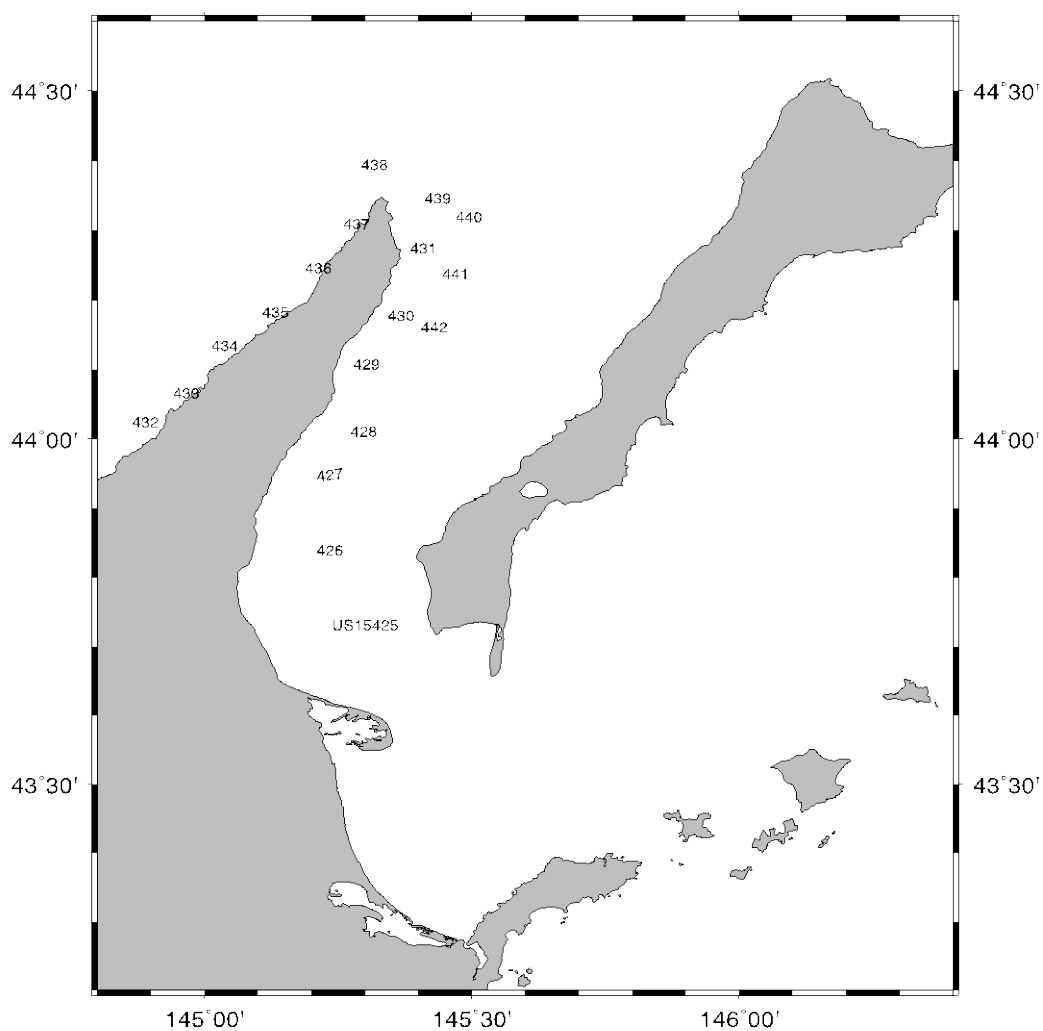


Figure 1. Oceanographic stations (Cruise 345)

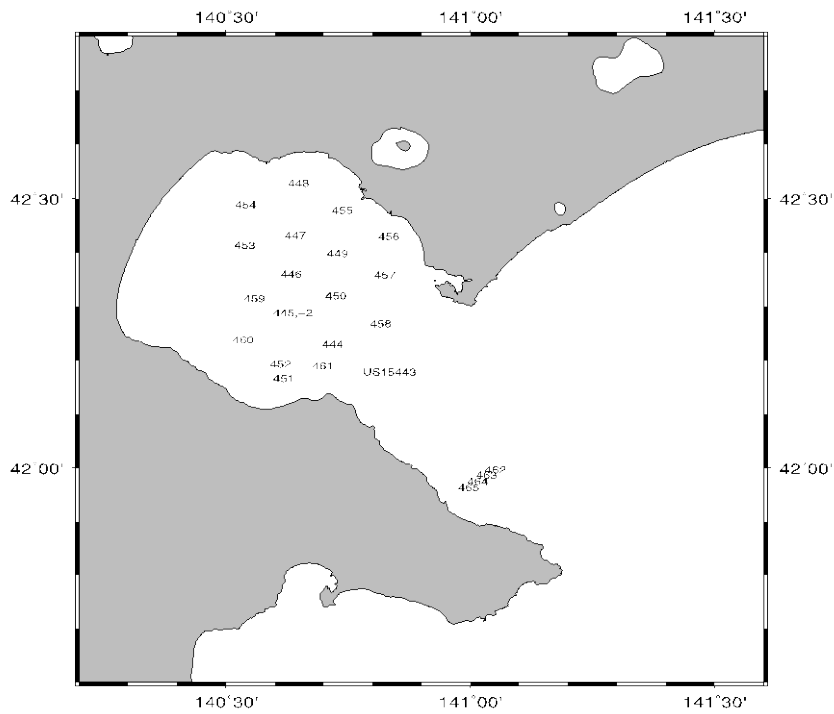


Figure 2. Oceanographic stations (Cruise 346)

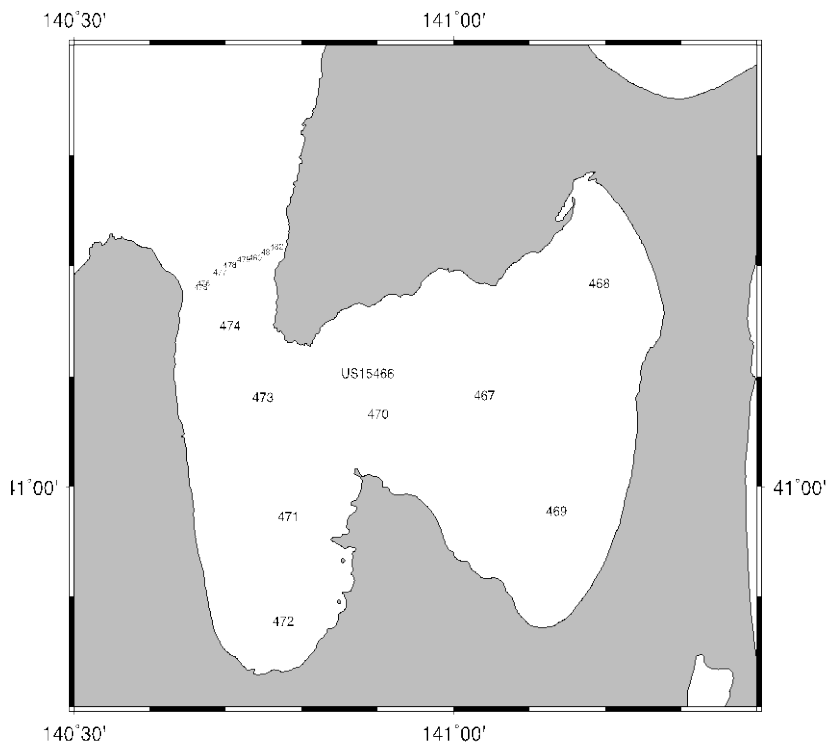


Figure 3. Oceanographic stations (Cruise 347)

Table 1. List of Oceanographic Station

Cruise 345												
Station	Lat. (N) ^a	Long. (E) ^a	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15425	43-43.4	145-14.3	10/16	0515-0519	17	West-3	North-1	West-4	8.9	14.3	b	1021.1
US15426	43-49.9	145-12.6	10/16	0558-0601	45	SW-2	NNE-1	SW-3	9.5	14.2	b	1021.0
US15427	43-56.3	145-12.7	10/16	0639-0646	82	West-2	NNE-1	West-3	10.0	14.4	b	1020.9
US15428	44-00.2	145-16.4	10/16	0716-0733	404	NW-1	NNE-1	NW-2	11.5	14.0	b	1021.0
US15429	44-06.0	145-16.7	10/16	0808-0820	380	SE-2	NNE-1	SE-3	12.3	14.0	b	1021.1
US15430	44-10.2	145-20.6	10/16	0850-0857	175	SSW-2	NNE-1	SSW-3	13.1	14.1	b	1021.1
US15431	44-16.0	145-23.1	10/16	0934-0939	81	ESE-2	NNE-1	ESE-3	13.9	14.2	bc	1020.6
US15432	44-01.0	144-51.9	10/16	1349-1353	43	SE-1	NNE-2	SE-2	14.9	13.1	b	1018.5
US15433	44-03.5	144-56.5	10/16	1419-1422	60	East-1	NNE-2	East-2	15.2	10.6	b	1018.1
US15434	44-07.6	145-00.8	10/16	1456-1501	110	calm	NNE-2	calm	14.2	11.9	b	1018.0
US15435	44-10.5	145-06.5	10/16	1531-1541	210	calm	NNE-2	calm	13.5	8.3	b	1018.1
US15436	44-14.3	145-11.3	10/16	1610-1616	136	SE-1	NNE-2	SE-3	12.4	8.0	b	1018.1
US15437	44-18.1	145-15.6	10/16	1646-1653	118	North-1	NNE-2	North-2	12.8	9.2	b	1018.0
US15438	44-23.2	145-17.6	10/16	1733-1752	749	ESE-1	NNE-1	ESE-2	11.6	8.1	b	1018.1
US15439	44-20.3	145-24.7	10/16	1833-1852	887	South-2	NNE-1	South-4	13.3	12.8	bc	1018.1
US15440	44-18.7	145-28.2	10/16	1915-1938	1533	South-2	NNE-1	South-4	13.3	12.8	bc	1018.1
US15441	44-13.8	145-26.7	10/16	2012-2029	1622	South-2	NNE-1	South-4	13.2	13.1	bc	1018.1
US15442	44-09.2	145-24.3	10/16	2102-2120	1499	South-1	NNE-1	South-3	13.0	14.1	bc	1018.1
Cruise 346												
Station	Lat. (N) ^a	Long. (E) ^a	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15443	42-10.3	140-46.8	10/27	0300-0305	92	NNW-1	ESE-1	NNW-4	9.1	13.0	bc	1019.8
US15444	42-13.4	140-41.8	10/27	0357-0404	87	calm	SE-1	calm	9.6	12.8	c	1018.7
US15445	42-16.9	140-35.8	10/27	0605-0615	90	SE-1	SE-1	SE-2	98.0	12.8	bc	1018.0
US15445-2	42-17.1	140-35.8	10/27	0646-0650	90							
US15446	42-21.2	140-36.7	10/27	0724-0732	85	SE-1	NE-1	SE-2	10.3	13.2	bc	1018.1
US15447	42-25.5	140-37.2	10/27	0800-0806	83	SE-2	NE-1	SE-3	10.8	13.3	bc	1017.6
US15448	42-31.3	140-37.6	10/27	0851-0856	60	ESE-2		ESE-4	10.9	11.6	bc	1017.1
US15449	42-23.5	140-42.4	10/27	0951-0956	61	East-3	ESE-1	East-5	11.6	13.4	bc	1015.6
US15450	42-18.8	140-42.2	10/27	1027-1032	67	SE-3	ESE-1	SE-5	12.6	13.0	bc	1015.0
US15451	42-09.6	140-35.8	10/27	1208-1215	71	East-3	East-1	East-4	13.9	13.0	bc	1014.0
US15452	42-11.2	140-35.4	10/27	1405-1409	80	SSE-2	East-1	SSE-4	14.2	13.0	c	1012.0
US15453	42-24.4	140-31.0	10/29	0900-0907	93	West-1	SW-1	West-4	9.3	13.0	c	1016.2
US15454	42-28.9	140-31.1	10/29	1035-1040	74	Calm	SE-1	Calm	9.2	12.5	c	1015.5
US15455	42-28.3	140-43.0	10/29	1132-1137	59	West-3	SE-1	West-7	8.8	12.5	c	1015.9
US15456	42-25.4	140-48.7	10/29	1208-1212	43	WSW-3	WSW-1	WSW-6	9.4	12.9	bc	1015.7
US15457	42-21.1	140-48.2	10/29	1238-1243	50	West-4	WSW-1	West-6	10.0	12.8	bc	1015.0
US15458	42-15.7	140-47.7	10/30	0558-0602	71	West-2	West-1	West-3	6.0	12.8	c	1017.6
US15459	42-18.5	140-32.2	10/30	0713-0719	93	West-1	West-1	West-2	6.1	12.3	c	1017.7
US15460	42-13.9	140-30.8	10/30	0849-0853	80	West-1	East-1	West-2	6.6	12.6	o	1018.1
US15461	42-11.0	140-40.6	10/30	1018-1023	87	WSW-1	East-2	WSW-3	7.2	12.5	o	1018.0
US15462	41-59.4	141-01.8	10/30	1219-1224	99	NW-1	ESE-1	NW-3	8.9	14.0	bc	1016.8
US15463	41-58.8	141-00.7	10/30	1234-1239	93	West-1	ESE-1	West-3	8.3	14.0	bc	1016.6
US15464	41-58.1	140-59.6	10/30	1248-1252	86	West-1	ESE-1	West-3	8.1	13.7	c	1016.6
US15465	41-57.4	140-58.5	10/30	1301-1305	79	WNW-1	ESE-1	WNW-2	8.4	13.6	bc	1016.6

Cruise 347

Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wt.	Bar. (hPa)
US15466	41-05.9	140-51.1	11/9	1256-1306	52	East-2	ESE-1	East-3	14.0	15.8	o	1011.7
US15467	41-04.7	141-01.6	11/9	1355-1402	47	East-2	ENE-1	East-3	13.3	15.5	o	1011.6
US15468	41-10.8	141-10.7	11/9	1544-1550	29	NNE-1	ENE-1	NNE-2	12.6	14.3	o	1013.1
US15469	40-58.4	141-07.3	11/10	0807-0813	39	South-2	SSE-1	South-3	12.1	14.9	r	1016.2
US15470	41-03.7	140-53.2	11/10	0925-0933	50	SW-2	SW-1	SW-4	12.9	15.3	o	1016.6
US15471	40-58.1	140-46.1	11/10	1023-1030	50	West-2	SW-1	West-4	12.2	16.2	c	1017.1
US15472	40-52.4	140-45.7	11/10	1138-1444	30	WSW-2	SW-1	WSW-4	12.7	16.0	c	1017.0
US15473	41-04.6	140-44.1	11/11	0818-0825	58	NW-3	NW-1	NW-5	10.1	15.5	bc	1027.0
US15474	41-08.5	140-41.5	11/11	0853-0900	48	NW-3	NW-1	NW-5	11.0	16.1	bc	1027.1
US15475	41-10.7	140-39.5	11/11	1018-1023	38	NW-3	NW-1	NW-5	10.7	16.2	bc	1027.7
US15476	41-10.9	140-39.7	11/11	1031-1036	53	NW-3	NW-1	NW-5	11.4	16.2	bc	1027.7
US15477	41-11.5	140-41.0	11/11	1044-1051	66	NW-3	NW-1	NW-5	12.1	16.4	bc	1027.9
US15478	41-11.9	140-41.8	11/11	1100-1107	73	NW-3	NW-1	NW-5	12.1	16.3	bc	1028.0
US15479	41-12.2	140-42.9	11/11	1114-1120	72	NW-3	NW-1	NW-5	12.1	16.4	bc	1028.0
US15480	41-12.3	140-43.8	11/11	1128-1134	71	NW-3	NW-1	NW-4	12.1	16.2	bc	1028.1
US15481	41-12.6	140-44.8	11/11	1143-1149	67	NW-3	NW-1	NW-4	11.6	16.2	bc	1028.1
US15482	41-12.9	140-45.5	11/11	1159-1204	64	NW-3	NW-1	NW-5	11.4	16.3	bc	1028.3

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION US15425				STATION US15426				STATION US15427			
LATITUDE 43-43.4 N				LATITUDE 43-49.9 N				LATITUDE 43-56.3 N			
LONGITUDE 145-14.3 E				LONGITUDE 145-12.6 E				LONGITUDE 145-12.7 E			
DEPTH (m) 17				DEPTH (m) 45				DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	14.507	33.637	25.027	5	14.597	33.620	24.995	5	14.493	33.585	24.990
10	14.510	33.637	25.027	10	14.613	33.620	24.991	10	14.493	33.584	24.990
				20	14.612	33.619	24.991	20	14.487	33.584	24.991
				30	14.608	33.620	24.992	30	14.212	33.514	24.995
								40	13.304	33.561	25.218
								50	12.879	33.637	25.360
								75	12.300	33.722	25.539

STATION		US15428	
LATITUDE		44-00.2	N
LONGITUDE		145-16.4	E
DEPTH (m)		404	
Press.	Temp.	Salinity	Sigma-T
5	14.288	33.591	25.038
10	14.282	33.593	25.041
20	14.218	33.602	25.062
30	14.119	33.608	25.087
40	14.113	33.614	25.093
50	14.115	33.629	25.104
75	12.112	33.777	25.618
100	11.672	33.865	25.769
125	11.182	33.861	25.855
150	9.963	33.802	26.023
175	7.709	33.675	26.276
200	6.225	33.597	26.416
250	4.107	33.497	26.558
300	3.154	33.414	26.605

STATION		US15431	
LATITUDE		44-16.0	N
LONGITUDE		145-23.1	E
DEPTH (m)		81	
Press.	Temp.	Salinity	Sigma-T
5	13.784	33.552	25.113
10	12.915	33.506	25.252
20	12.814	33.526	25.288
30	12.777	33.525	25.294
40	12.639	33.509	25.309
50	12.456	33.503	25.339

STATION		US15434	
LATITUDE		44-07.6	N
LONGITUDE		145-00.8	E
DEPTH (m)		110	
Press.	Temp.	Salinity	Sigma-T
5	11.458	33.150	25.253
10	11.866	33.429	25.254
20	11.338	33.046	25.194
30	10.292	32.933	25.289
40	10.515	33.045	25.338
50	10.680	33.113	25.362
75	10.535	33.221	25.472
100	10.553	33.241	25.484

STATION		US15429	
LATITUDE		44-06.0	N
LONGITUDE		145-16.7	E
DEPTH (m)		380	
Press.	Temp.	Salinity	Sigma-T
5	14.393	33.542	24.978
10	14.368	33.556	24.994
20	14.209	33.602	25.064
30	14.110	33.606	25.087
40	14.068	33.604	25.094
50	14.055	33.606	25.099
75	12.846	33.615	25.351
100	11.735	33.707	25.635
125	10.967	33.730	25.792
150	9.850	33.695	25.958
175	9.208	33.731	26.092
200	7.492	33.646	26.284
250	5.116	33.560	26.520
300	3.566	33.434	26.583

STATION		US15432	
LATITUDE		44-01.0	N
LONGITUDE		144-51.9	E
DEPTH (m)		43	
Press.	Temp.	Salinity	Sigma-T
5	12.157	33.385	25.305
10	12.218	33.382	25.291
20	10.506	32.852	25.189
30	11.262	33.111	25.258
40	11.289	33.115	25.256

STATION		US15435	
LATITUDE		44-10.5	N
LONGITUDE		145-06.5	E
DEPTH (m)		210	
Press.	Temp.	Salinity	Sigma-T
5	9.137	32.634	25.245
10	11.176	33.200	25.342
20	11.992	33.256	25.236
30	11.985	33.248	25.231
40	11.969	33.244	25.231
50	11.689	33.199	25.249
75	10.610	33.328	25.542
100	10.257	33.326	25.601
125	9.805	33.258	25.624
150	6.061	33.329	26.224
175	5.363	33.423	26.384

STATION		US15430	
LATITUDE		44-10.2	N
LONGITUDE		145-20.6	E
DEPTH (m)		175	
Press.	Temp.	Salinity	Sigma-T
5	14.346	33.565	25.006
10	14.342	33.566	25.007
20	14.120	33.586	25.070
30	13.802	33.569	25.122
40	13.692	33.615	25.180
50	13.378	33.625	25.252
75	12.158	33.543	25.428
100	11.653	33.590	25.558
125	11.014	33.603	25.685
150	10.766	33.680	25.789

STATION		US15433	
LATITUDE		44-03.5	N
LONGITUDE		144-56.5	E
DEPTH (m)		60	
Press.	Temp.	Salinity	Sigma-T
5	10.408	32.885	25.232
10	10.867	32.854	25.128
20	10.309	32.819	25.197
30	10.721	32.860	25.158
40	10.511	33.021	25.320
50	10.418	33.057	25.365

STATION		US15436	
LATITUDE		44-14.3	N
LONGITUDE		145-11.3	E
DEPTH (m)		136	
Press.	Temp.	Salinity	Sigma-T
5	11.072	33.099	25.283
10	11.478	33.183	25.275
20	11.994	33.252	25.233
30	11.907	33.242	25.241
40	11.811	33.236	25.254
50	11.578	33.217	25.283
75	10.728	33.210	25.430
100	10.092	33.259	25.577

STATION		US15437	
LATITUDE		44-18.1	N
LONGITUDE		145-15.6	E
DEPTH (m)		118	
Press.	Temp.	Salinity	Sigma-T
5	11.642	33.184	25.245
10	11.653	33.158	25.223
20	11.594	33.136	25.217
30	11.589	33.139	25.220
40	11.548	33.129	25.220
50	11.554	33.134	25.223
75	11.471	33.121	25.228
100	10.122	33.203	25.529

STATION		US15438	
LATITUDE		44-23.2	N
LONGITUDE		145-17.6	E
DEPTH (m)		749	
Press.	Temp.	Salinity	Sigma-T
5	10.797	33.171	25.387
10	11.405	33.171	25.279
20	11.634	33.174	25.239
30	11.196	33.051	25.223
40	10.921	33.009	25.239
50	10.952	33.030	25.250
75	10.055	33.120	25.475
100	9.594	33.517	25.861
125	8.944	33.459	25.920
150	6.658	33.429	26.227
175	1.729	33.052	26.431
200	1.484	33.185	26.554
250	0.639	33.187	26.609
300	0.570	33.225	26.643
400	0.853	33.297	26.685

STATION		US15439	
LATITUDE		44-20.3	N
LONGITUDE		145-24.7	E
DEPTH (m)		887	
Press.	Temp.	Salinity	Sigma-T
5	13.022	33.522	25.244
10	12.984	33.505	25.238
20	12.593	33.455	25.276
30	12.191	33.395	25.306
40	11.855	33.332	25.321
50	11.512	33.288	25.350
75	11.481	33.298	25.364
100	11.845	33.429	25.398
125	11.540	33.711	25.674
150	9.759	33.804	26.058
175	8.809	33.770	26.185
200	7.007	33.654	26.358
250	2.554	33.291	26.559
300	2.077	33.324	26.623
400	1.503	33.386	26.715

STATION		US15440	
LATITUDE		44-18.7	N
LONGITUDE		145-28.2	E
DEPTH (m)		1533	
Press.	Temp.	Salinity	Sigma-T
5	13.070	33.447	25.176
10	12.305	33.272	25.189
20	11.262	33.031	25.196
30	10.712	33.003	25.271
40	11.377	33.246	25.342
50	11.422	33.258	25.343
75	11.448	33.293	25.365
100	10.961	33.208	25.388
125	11.828	33.741	25.643
150	9.865	33.800	26.038
175	8.326	33.751	26.245
200	6.392	33.670	26.452
250	3.356	33.456	26.620
300	2.166	33.346	26.634
400	1.406	33.398	26.731
495	1.477	33.531	26.833

STATION		US15441	
LATITUDE		44-13.8	N
LONGITUDE		145-26.7	E
DEPTH (m)		1622	
Press.	Temp.	Salinity	Sigma-T
5	13.305	33.494	25.165
10	13.172	33.466	25.170
20	12.955	33.433	25.188
30	12.917	33.441	25.202
40	12.815	33.431	25.214
50	12.365	33.348	25.237
75	12.223	33.422	25.321
100	11.798	33.772	25.674
125	11.117	33.819	25.835
150	8.196	33.604	26.148
175	6.889	33.648	26.369
200	5.252	33.522	26.474
250	3.628	33.430	26.574
300	2.405	33.363	26.629
400	1.705	33.409	26.719
500	1.554	33.539	26.834
515	1.572	33.567	26.855

STATION		US15442	
LATITUDE		44-09.2	N
LONGITUDE		145-24.3	E
DEPTH (m)		1499	
Press.	Temp.	Salinity	Sigma-T
5	14.196	33.605	25.068
10	14.201	33.605	25.067
20	14.142	33.600	25.075
30	14.062	33.603	25.095
40	14.049	33.604	25.098
50	14.039	33.605	25.101
75	13.797	33.606	25.152
100	11.181	33.518	25.589
125	9.833	33.511	25.817
150	8.846	33.667	26.098
175	7.691	33.729	26.320
200	6.372	33.630	26.423
250	3.888	33.460	26.573
300	2.572	33.363	26.615
400	1.640	33.404	26.719
500	1.557	33.555	26.846
515	1.579	33.585	26.869

STATION	US15443		
LATITUDE	42-10.3	N	
LONGITUDE	140-46.8	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	12.790	33.814	25.516
10	12.792	33.818	25.518
20	12.785	33.821	25.523
30	12.784	33.822	25.523
40	12.802	33.830	25.525
50	12.817	33.835	25.526
75	9.091	33.704	26.089

STATION	US15445-2		
LATITUDE	42-17.1	N	
LONGITUDE	140-35.8	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	12.844	33.552	25.302
10	12.880	33.587	25.322
20	12.906	33.615	25.339
30	12.835	33.614	25.352
40	11.046	33.542	25.632
50	10.344	33.706	25.883
75	8.534	33.737	26.202

STATION	US15448		
LATITUDE	42-31.3	N	
LONGITUDE	140-37.6	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	12.594	33.537	25.339
10	12.273	33.545	25.407
20	11.198	33.620	25.666
30	10.295	33.885	26.031
40	9.334	33.818	26.139
50	8.332	33.703	26.206
55	7.215	33.609	26.293

STATION	US15451		
LATITUDE	42-09.6	N	
LONGITUDE	140-35.8	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	13.249	33.580	25.243
10	13.240	33.579	25.245
20	13.195	33.578	25.253
30	13.175	33.574	25.254
40	11.631	33.589	25.562
50	9.957	33.708	25.950
60	9.690	33.811	26.075

STATION	US15444		
LATITUDE	42-13.4	N	
LONGITUDE	140-41.8	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	12.956	33.741	25.426
10	12.954	33.741	25.426
20	12.962	33.742	25.426
30	13.028	33.769	25.433
40	13.109	33.843	25.475
50	13.120	33.885	25.505
75	9.946	33.852	26.065

STATION	US15446		
LATITUDE	42-21.2	N	
LONGITUDE	140-36.7	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	13.439	33.634	25.247
10	13.441	33.633	25.246
20	13.444	33.634	25.246
30	13.441	33.638	25.250
40	13.398	33.654	25.271
50	11.233	33.725	25.741
75	8.406	33.743	26.226

STATION	US15449		
LATITUDE	42-23.5	N	
LONGITUDE	140-42.4	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	13.637	33.595	25.176
10	13.635	33.594	25.176
20	13.636	33.594	25.176
30	13.637	33.594	25.175
40	13.612	33.611	25.193
50	12.223	33.767	25.589

STATION	US15452		
LATITUDE	42-11.2	N	
LONGITUDE	140-35.4	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	13.226	33.580	25.248
10	13.224	No Data	No Data
20	13.227	33.579	25.247
30	13.095	33.566	25.263
40	11.943	33.456	25.400
50	9.044	33.517	25.950
75	8.218	33.709	26.227

STATION	US15445		
LATITUDE	42-16.9	N	
LONGITUDE	140-35.8	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	12.900	33.624	25.347
10	12.911	33.618	25.340
20	12.907	33.616	25.339
30	12.857	33.615	25.348
40	11.165	33.543	25.611
50	10.252	33.716	25.907
75	8.271	33.702	26.213

STATION	US15447		
LATITUDE	42-25.5	N	
LONGITUDE	140-37.2	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	13.513	33.610	25.213
10	13.533	33.628	25.223
20	13.540	33.634	25.226
30	12.775	33.484	25.263
40	12.379	33.491	25.345
50	10.102	33.739	25.950
75	7.596	33.643	26.266
80	7.396	33.679	26.323

STATION	US15450		
LATITUDE	42-18.8	N	
LONGITUDE	140-42.2	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	13.257	33.619	25.272
10	13.242	33.620	25.275
20	13.151	33.627	25.299
30	13.070	33.635	25.321
40	13.060	33.639	25.327
50	13.154	33.706	25.360

STATION	US15453		
LATITUDE	42-24.4	N	
LONGITUDE	140-31.0	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	13.086	33.652	25.331
10	13.084	33.655	25.334
20	13.084	33.660	25.339
30	13.079	33.663	25.341
40	10.546	33.674	25.823
50	9.987	33.803	26.019
75	8.703	33.796	26.201
90	7.329	33.675	26.330

STATION US15454			
LATITUDE 42-28.9 N			
LONGITUDE 140-31.1 E			
DEPTH (m) 74			
Press.	Temp.	Salinity	Sigma-T
5	12.519	33.505	25.329
10	12.495	33.505	25.333
20	12.482	33.503	25.335
30	11.326	33.601	25.627
40	10.785	33.752	25.842
50	10.229	33.794	25.972
70	8.592	33.734	26.190

STATION US15457			
LATITUDE 42-21.1 N			
LONGITUDE 140-48.2 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	12.924	33.580	25.308
10	12.925	33.578	25.306
20	12.942	33.586	25.309
30	12.930	33.587	25.312
40	12.893	33.594	25.325

STATION US15460			
LATITUDE 42-13.9 N			
LONGITUDE 140-30.8 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	12.880	33.606	25.336
10	12.880	33.606	25.336
20	12.882	33.609	25.339
30	12.873	33.623	25.371
40	10.922	33.682	25.763
50	10.040	33.680	25.914
75	8.201	33.654	26.187

STATION US15463			
LATITUDE 41-58.8 N			
LONGITUDE 141-00.7 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	14.050	33.863	25.298
10	14.051	33.861	25.296
20	13.960	33.839	25.298
30	13.542	33.813	25.364
40	13.502	33.844	25.396
50	13.485	33.844	25.400
75	11.662	33.922	25.816

STATION US15455			
LATITUDE 42-28.3 N			
LONGITUDE 140-43.0 E			
DEPTH (m) 59			
Press.	Temp.	Salinity	Sigma-T
5	12.763	33.497	25.276
10	12.747	33.495	25.277
20	12.730	33.495	25.281
30	12.727	33.496	25.281
40	12.597	33.707	25.471
50	11.429	33.840	25.795

STATION US15458			
LATITUDE 42-15.5 N			
LONGITUDE 140-47.7 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	13.043	33.618	25.314
10	13.058	33.622	25.314
20	13.121	33.654	25.327
30	13.284	33.709	25.336
40	13.305	33.752	25.365
50	12.547	33.777	25.534

STATION US15461			
LATITUDE 42-11.0 N			
LONGITUDE 140-40.6 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	12.874	33.713	25.421
10	12.888	33.714	25.419
20	12.796	33.694	25.421
30	12.735	33.739	25.468
40	12.749	33.787	25.503
50	10.111	33.672	25.897
75	8.149	33.690	26.223

STATION US15464			
LATITUDE 41-58.1 N			
LONGITUDE 140-59.6 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	13.630	33.828	25.358
10	13.580	33.829	25.369
20	13.551	33.830	25.375
30	13.479	33.823	25.385
40	13.294	33.798	25.403
50	13.264	33.807	25.416
75	11.002	33.884	25.907

STATION US15456			
LATITUDE 42-25.4 N			
LONGITUDE 140-48.7 E			
DEPTH (m) 43			
Press.	Temp.	Salinity	Sigma-T
5	13.145	33.629	25.302
10	13.146	33.628	25.301
20	13.128	33.628	25.305
30	13.001	33.753	25.427

STATION US15459			
LATITUDE 42-18.5 N			
LONGITUDE 140-32.2 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	12.554	33.498	25.317
10	12.562	33.497	25.315
20	12.579	33.508	25.319
30	12.562	33.557	25.361
40	11.132	33.764	25.790
50	10.393	33.718	25.884
75	7.910	33.643	26.221

STATION US15462			
LATITUDE 41-59.4 N			
LONGITUDE 141-01.8 E			
DEPTH (m) 99			
Press.	Temp.	Salinity	Sigma-T
5	14.230	33.871	25.267
10	14.230	33.870	25.266
20	13.904	33.824	25.298
30	13.757	33.819	25.325
40	13.669	33.807	25.333
50	13.450	33.743	25.329
75	12.437	33.836	25.601

STATION US15465			
LATITUDE 41-57.4 N			
LONGITUDE 140-58.5 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	14.199	33.851	25.257
10	14.194	33.883	25.283
20	14.113	33.874	25.293
30	13.921	33.885	25.342
40	13.495	33.838	25.393
50	13.293	33.906	25.487
75	9.825	33.820	26.060

STATION US15466			
LATITUDE 41-05.9 N			
LONGITUDE 140-51.1 E			
DEPTH (m) 52			
Press.	Temp.	Salinity	Sigma-T
5	16.041	33.621	24.678
10	15.978	33.613	24.686
20	15.960	33.612	24.689
30	15.951	33.640	24.713
40	15.824	33.660	24.756

STATION US15469			
LATITUDE 40-58.4 N			
LONGITUDE 141-07.3 E			
DEPTH (m) 39			
Press.	Temp.	Salinity	Sigma-T
5	15.178	33.609	24.861
10	15.188	33.613	24.862
20	15.017	33.601	24.890
30	14.647	33.600	24.969
35	14.602	33.605	24.983

STATION US15472			
LATITUDE 40-52.4 N			
LONGITUDE 140-45.7 E			
DEPTH (m) 30			
Press.	Temp.	Salinity	Sigma-T
5	15.820	33.165	24.377
10	16.227	33.613	24.629
20	16.229	33.618	24.633
25	16.213	33.616	24.635

STATION US15475			
LATITUDE 41-10.7 N			
LONGITUDE 140-39.5 E			
DEPTH (m) 38			
Press.	Temp.	Salinity	Sigma-T
5	16.394	33.635	24.608
10	16.402	33.633	24.605
20	16.413	33.633	24.602
30	16.416	33.634	24.602

STATION US15467			
LATITUDE 41-04.7 N			
LONGITUDE 141-01.6 E			
DEPTH (m) 47			
Press.	Temp.	Salinity	Sigma-T
5	15.083	33.636	24.903
10	15.069	33.633	24.904
20	14.919	33.621	24.927
30	14.897	33.621	24.931
40	14.886	33.621	24.933

STATION US15470			
LATITUDE 41-03.7 N			
LONGITUDE 140-53.2 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	15.609	33.620	24.774
10	15.532	33.614	24.787
20	15.307	33.600	24.826
30	14.818	33.618	24.946
40	14.811	33.621	24.950

STATION US15473			
LATITUDE 41-04.6 N			
LONGITUDE 140-44.1 E			
DEPTH (m) 58			
Press.	Temp.	Salinity	Sigma-T
5	15.692	33.617	24.753
10	15.691	33.615	24.752
20	15.659	33.616	24.760
30	15.640	33.617	24.765
40	15.530	33.624	24.794
50	15.203	33.635	24.875

STATION US15476			
LATITUDE 41-10.9 N			
LONGITUDE 140-39.7 E			
DEPTH (m) 53			
Press.	Temp.	Salinity	Sigma-T
5	16.525	33.644	24.585
10	16.534	33.646	24.584
20	16.519	33.642	24.584
30	16.523	33.642	24.583
40	16.559	33.668	24.595

STATION US15468			
LATITUDE 41-10.8 N			
LONGITUDE 141-10.7 E			
DEPTH (m) 29			
Press.	Temp.	Salinity	Sigma-T
5	14.594	33.608	24.986
10	14.560	33.599	24.987
20	14.262	33.566	25.025
25	14.010	33.577	25.086

STATION US15471			
LATITUDE 40-58.1 N			
LONGITUDE 140-46.1 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	16.470	33.601	24.564
10	16.479	33.600	24.561
20	16.440	33.602	24.572
30	16.068	33.603	24.658
40	16.051	33.620	24.675

STATION US15474			
LATITUDE 41-08.5 N			
LONGITUDE 140-41.5 E			
DEPTH (m) 48			
Press.	Temp.	Salinity	Sigma-T
5	16.461	33.637	24.594
10	16.463	33.637	24.593
20	16.464	33.640	24.595
30	16.461	33.644	24.600
40	16.226	33.649	24.657

STATION US15477			
LATITUDE 41-11.5 N			
LONGITUDE 140-41.0 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	16.536	33.683	24.612
10	16.539	33.682	24.610
20	16.539	33.681	24.610
30	16.542	33.681	24.609
40	16.544	33.680	24.608
50	16.544	33.681	24.608

STATION		US15478		
LATITUDE		41-11.9	N	
LONGITUDE		140-41.9	E	
DEPTH (m)		73		
Press.	Temp.	Salinity	Sigma-T	
5	16.500	33.683	24.620	
10	16.500	33.682	24.619	
20	16.506	33.681	24.617	
30	16.507	33.680	24.617	
40	16.509	33.680	24.616	
50	16.513	33.681	24.615	
70	16.237	33.711	24.702	

STATION		US15481		
LATITUDE		41-12.6	N	
LONGITUDE		140-44.8	E	
DEPTH (m)		67		
Press.	Temp.	Salinity	Sigma-T	
5	16.479	33.647	24.597	
10	16.479	33.645	24.596	
20	16.483	33.645	24.595	
30	16.484	33.644	24.594	
40	16.426	33.647	24.610	
50	16.445	33.674	24.626	

STATION		US15479		
LATITUDE		41-12.2	N	
LONGITUDE		140-42.9	E	
DEPTH (m)		72		
Press.	Temp.	Salinity	Sigma-T	
5	16.438	33.691	24.641	
10	16.442	33.690	24.639	
20	16.445	33.689	24.638	
30	16.444	33.689	24.638	
40	16.440	33.689	24.639	
50	16.440	33.689	24.639	

STATION		US15482		
LATITUDE		41-12.9	N	
LONGITUDE		140-45.5	E	
DEPTH (m)		64		
Press.	Temp.	Salinity	Sigma-T	
5	16.482	33.650	24.599	
10	16.483	33.648	24.598	
20	16.487	33.648	24.596	
30	16.478	33.652	24.602	
40	16.393	33.647	24.617	
50	15.867	33.658	24.746	

STATION		US15480		
LATITUDE		41-12.4	N	
LONGITUDE		140-43.8	E	
DEPTH (m)		71		
Press.	Temp.	Salinity	Sigma-T	
5	16.443	33.656	24.612	
10	16.446	33.665	24.619	
20	16.445	33.675	24.627	
30	16.440	33.678	24.630	
40	16.437	33.679	24.632	
50	16.420	33.683	24.639	

THE " USHIO MARU "

CRUISE 348

CRUISE 349

CRUISE 350

IN NOVEMBER 2015

IN DECEMBER 2015

1.Cruise Itinerary

Cruise 348

Departure from Hakodate	Nov.	16, 2015
Start hydrographic research (US15483)		16
Finish hydrographic research (US1504-2)		17
Return to Hakodate		18
Total coverage 156.5 miles		

Cruise 349

Departure from Hakodate	Nov.	25, 2015
Start hydrographic research (US15505) and trawl net sampling		25
Finish trawl net sampling and hydrographic research (US15508)		25
Return to Hakodate		25
Total coverage 162.1 miles		

Cruise 350

Departure from Hakodate	Dec.	14, 2015
Retrieval of mooring current meter		14
Start hydrographic research (US15509)		14
Set mooring current meter		15
Arrival at and departure from Mori		15
Start trawl net sampling		15
Finish trawl net sampling and hydrographic research (US15521)		16
Arrival at Muroran		16
Departure from Muroran		18
Return to Hakodate		18
Total coverage 306.2 miles		

2. 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 SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

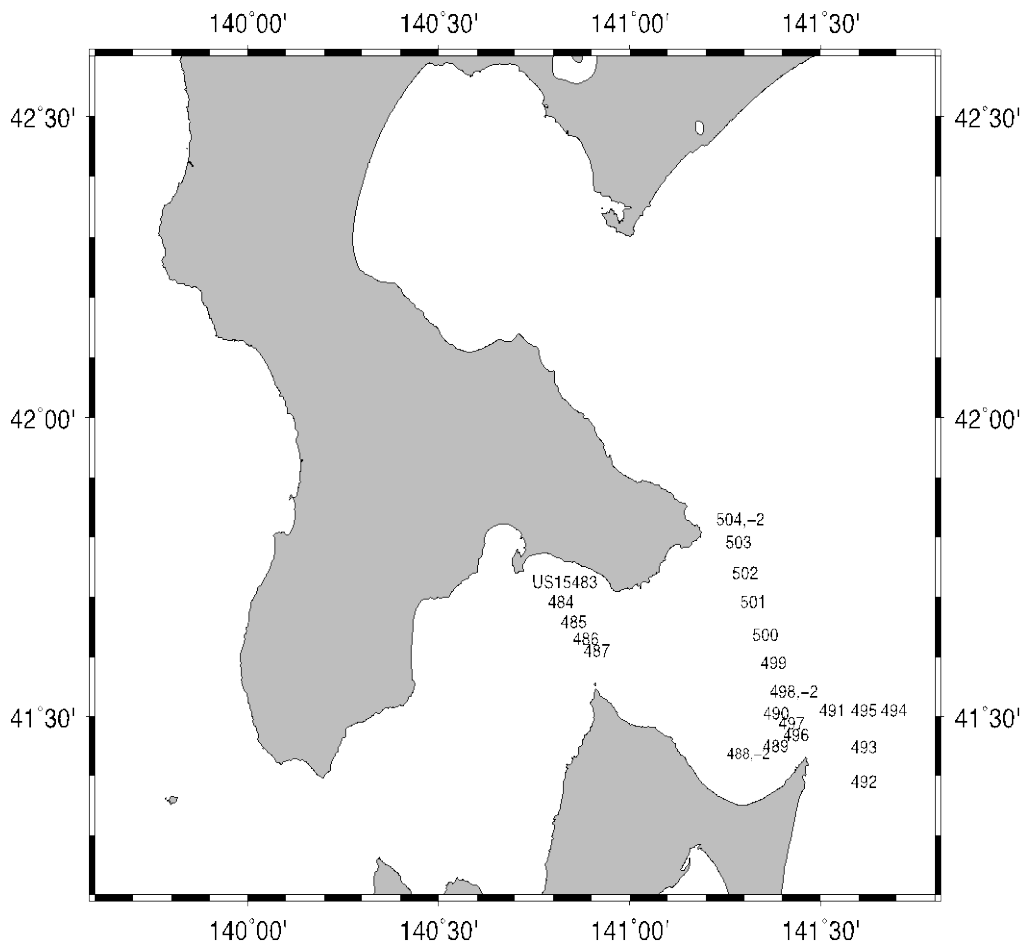


Figure 1. Oceanographic stations (Cruise 348)

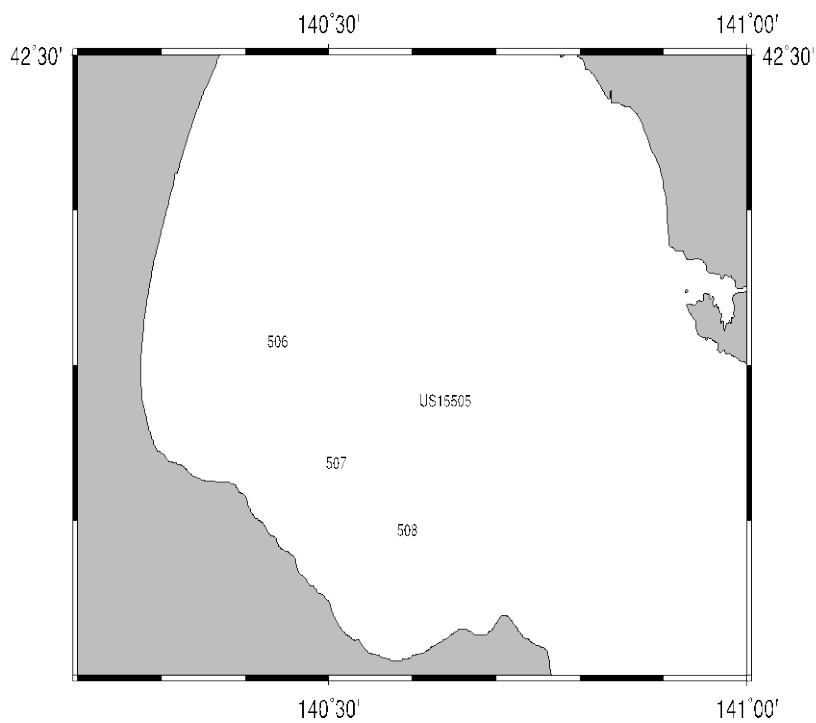


Figure 2. Oceanographic stations (Cruise 349)

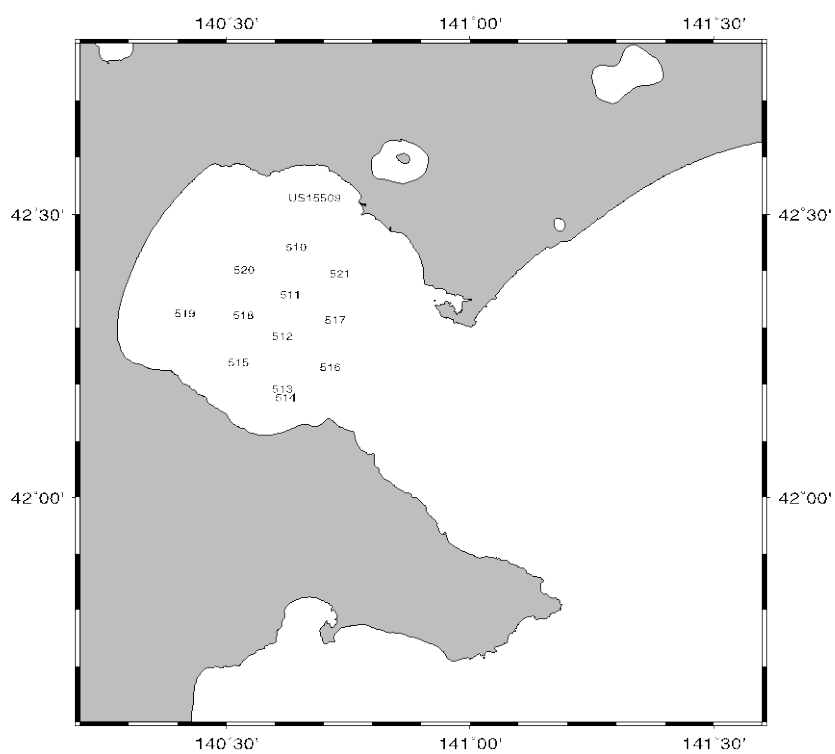


Figure 3. Oceanographic stations (Cruise 350)

Table 1. List of Oceanographic Station

Cruise 348												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15483	41-42.9	140-44.7	11/16	0915-1924	82	West-2	East-1	West-3	14.1	16.0	bc	1021.1
US15484	41-40.9	140-47.2	11/16	0942-0956	215	WSW-2	East-1	WSW-4	14.4	16.2	bc	1021.2
US15485	41-38.9	140-49.2	11/16	1013-1033	344	West-2	East-1	West-4	14.6	16.5	bc	1021.2
US15486	41-37.2	140-51.1	11/16	1101-1112	98	West-2	East-1	West-4	14.9	16.6	bc	1021.2
US15487	41-36.0	140-52.8	11/16	1133-1139	49	West-2	East-1	West-3	15.3	16.5	bc	1021.3
US15488	41-26.3	141-15.3	11/16	1338-1347	77	WNW-2	WNW-1	WNW-4	15.5	15.6	bc	1021.1
US15488-2	41-25.9	141-14.4	11/16	1403-1410	71	WNW-2	WNW-1	WNW-4	15.3	15.1	bc	1021.1
US15489	41-26.4	141-20.9	11/16	1451-1458	63	WNW-2	WSW-1	WNW-4	15.6	15.6	bc	1021.5
US15490	41-29.7	141-21.0	11/16	1526-1542	220	WNW-2	NW-1	WNW-4	15.0	15.5	bc	1021.5
US15491	41-30.0	141-29.8	11/16	1626-1634	60	WNW-3	WNW-1	NW-4	14.5	15.6	bc	1022.1
US15492	41-22.8	141-34.8	11/16	1727-1752	460	WNW-3	SE-1	NW-3	14.3	15.3	c	1022.2
US15493	41-26.3	141-34.8	11/16	1820-1842	325	WNW-3	WNW-1	WNW-3	14.2	15.3	bc	1022.5
US15494	41-30.0	141-39.5	11/16	1922-1954	610	WNW-3	WNW-1	WNW-3	13.9	15.7	bc	1022.5
US15495	41-30.0	141-34.8	11/16	2018-2027	111	NW-2	WNW-1	NW-3	13.4	15.7	bc	1022.6
US19496	41-27.5	141-24.1	11/17	0739-0745	50	calm	East-1	calm	13.9	15.9	c	1019.7
US19497	41-28.7	141-23.4	11/17	0758-0807	87	calm	East-1	calm	14.3	15.7	c	1019.6
US15498	41-31.9	141-22.0	11/17	0837-0853	252	calm	East-1	calm	14.6	15.9	bc	1019.2
US15498-2	41-31.7	141-22.0	11/17	0934-0951	245							
US15499	41-34.8	141-20.6	11/17	1016-1035	321	South-1	East-1	South-1	15.8	15.5	bc	1018.6
US15500	41-37.6	141-19.3	11/17	1100-1115	216	SSW-1	East-1	SSW-2	15.8	15.4	bc	1018.2
US15501	41-40.9	141-17.4	11/17	1140-1159	229	West-2	East-1	West-2	15.6	15.5	bc	1018.0
US15502	41-43.8	141-16.1	11/17	1220-1236	229	NW-2	ESE-1	NW-2	15.1	15.5	bc	1017.4
US15503	41-46.9	141-15.1	11/17	1300-1315	209	West-1	ESE-1	calm	15.0	14.5	bc	1016.7
US15504	41-49.2	141-13.6	11/17	1334-1347	181	South-1	ESE-1	South-2	14.8	15.0	c	1016.6
US15504-2	41-49.8	141-13.7	11/17	1420-1434	198							
Cruise 349												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15505	42-16.4	140-36.5	11/25	1240-1246	90	NE-1	NE-1	NE-2	3.2	10.8	bc	1024.0
US15506	42-18.7	140-25.6	11/25	1348-1353	68	calm	NE-1	calm	3.2	11.1	s	1023.5
US15507	42-14.0	140-29.8	11/25	1523-1528	77	West-1	North-1	West-2	3.5	11.0	bc	1022.6
US15508	42-11.4	140-34.9	11/25	1625-1628	80	NW-1	North-1	NW-2	3.4	10.9	bc	1023.8
Cruise 350												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15509	42-31.3	140-37.6	12/14	1603-1607	60	calm	SE-1	calm	5.8	9.4	bc	1025.6
US15510	42-26.1	140-37.3	12/15	0645-0652	82	ESE-3	ESE-1	SE-3	8.3	9.5	o	1019.6
US15511	42-21.1	140-36.6	12/15	0736-0742	87	SE-3	ESE-1	SE-3	8.1	9.4	o	1019.1
US15512	42-16.7	140-35.6	12/15	0824-0830	91	SE-2	ESE-1	SE-2	7.5	8.5	o	1018.8
US15513	42-11.1	140-35.6	12/15	0957-1001	79	SSE-2	ESE-1	SSE-4	9.4	8.5	c	1017.6
US15514	42-10.2	140-36.0	12/15	1044-1049	75	SSE-2	ESE-1	SSE-4	8.8	9.4	c	1016.6
US15515	42-13.9	140-30.2	12/15	1250-1256	77	SSE-2	ESE-1	SSE-4	10.6	9.4	o	1014.2
US15516	42-13.4	140-41.5	12/15	1526-1532	87	South-2	ESE-2	South-3	10.3	9.5	o	1013.0
US15517	42-18.4	140-42.1	12/16	0653-0658	65	NE-3	East-1	NW-4	7.5	9.9	o	1008.0
US15518	42-18.9	140-30.8	12/16	0801-0807	93	West-2	East-1	West-3	7.3	9.5	c	1008.6
US15519	42-19.1	140-23.6	12/16	0853-0857	56	West-2	East-1	West-3	6.8	9.1	c	1008.1
US15520	42-23.7	140-30.9	12/16	1228-1233	94	ESE-1	ENE-1	ESE-2	6.9	9.4	c	1004.8
US15521	42-23.3	140-42.7	12/16	1342-1347	60	SSE-1	ESE-1	SSE-3	8.0	9.5	c	1004.0

(*): Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION US15483			
LATITUDE 41-42.9 N			
LONGITUDE 140-44.8 E			
DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T
5	16.226	33.638	24.648
10	16.205	33.639	24.655
20	16.084	33.663	24.700
30	15.961	33.712	24.766
40	15.697	33.762	24.863
50	15.515	33.755	24.899
75	14.135	33.872	25.287

STATION US15484			
LATITUDE 41-40.9 N			
LONGITUDE 140-17.2 E			
DEPTH (m) 215			
Press.	Temp.	Salinity	Sigma-T
5	16.510	33.607	24.560
10	16.517	33.610	24.560
20	16.294	33.735	24.707
30	15.949	33.805	24.840
40	15.894	33.813	24.859
50	15.869	33.822	24.871
75	15.166	33.869	25.064
100	13.902	33.976	25.416
125	12.787	34.047	25.697
150	12.422	34.097	25.807
175	11.948	34.126	25.920
200	11.585	34.136	25.996

STATION US15485			
LATITUDE 41-38.9 N			
LONGITUDE 140-49.2 E			
DEPTH (m) 344			
Press.	Temp.	Salinity	Sigma-T
5	16.761	33.601	24.496
10	16.564	33.694	24.614
20	16.231	33.729	24.717
30	16.021	33.800	24.820
40	15.965	33.888	24.900
50	15.639	33.909	24.990
75	15.242	33.912	25.080
100	14.012	34.038	25.441
125	13.221	34.088	25.643
150	12.682	34.110	25.766
175	12.318	34.135	25.857
200	11.861	34.159	25.962
250	10.733	34.162	26.170
300	10.639	34.161	26.186

STATION US15486			
LATITUDE 41-37.2 N			
LONGITUDE 140-51.1 E			
DEPTH (m) 98			
Press.	Temp.	Salinity	Sigma-T
5	16.763	33.650	24.534
10	16.750	33.650	24.537
20	16.690	33.666	24.563
30	16.627	33.676	24.586
40	16.348	33.710	24.676
50	15.909	33.785	24.834
75	15.647	33.836	24.932

STATION US15487			
LATITUDE 41-36.0 N			
LONGITUDE 140-52.9 E			
DEPTH (m) 51			
Press.	Temp.	Salinity	Sigma-T
5	16.743	33.648	24.537
10	16.745	33.648	24.536
20	16.617	33.664	24.579
30	16.270	33.725	24.705
40	16.065	33.768	24.786

STATION US15488			
LATITUDE 41-26.3 N			
LONGITUDE 141-15.3 E			
DEPTH (m) 77			
Press.	Temp.	Salinity	Sigma-T
5	15.897	33.774	24.828
10	15.900	33.774	24.827
20	15.809	33.776	24.849
30	15.783	33.780	24.858
40	15.619	33.794	24.906
50	15.413	33.815	24.968

STATION US15488-2			
LATITUDE 41-25.9 N			
LONGITUDE 141-14.4 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	15.894	33.777	24.831
10	15.888	33.775	24.831
20	15.798	33.776	24.852
30	15.663	33.787	24.891
40	15.548	33.797	24.924
50	15.524	33.802	24.933
60	15.480	33.806	24.946

STATION US15489			
LATITUDE 41-26.4 N			
LONGITUDE 141-20.9 E			
DEPTH (m) 63			
Press.	Temp.	Salinity	Sigma-T
5	15.644	33.778	24.888
10	15.644	33.777	24.887
20	15.645	33.777	24.887
30	15.643	33.777	24.887
40	15.640	33.776	24.887
50	15.639	33.777	24.888
55	15.625	33.779	24.892

STATION US15490			
LATITUDE 42-01.4 N			
LONGITUDE 141-07.0 E			
DEPTH (m) 220			
Press.	Temp.	Salinity	Sigma-T
5	15.811	33.788	24.859
10	15.811	33.787	24.858
20	15.807	33.786	24.858
30	15.793	33.786	24.861
40	15.775	33.785	24.864
50	15.762	33.785	24.867
75	15.737	33.783	24.871
100	14.579	33.891	25.208
125	13.548	34.014	25.519
150	12.762	34.044	25.700
175	11.447	34.068	25.968
200	11.129	34.034	26.000

STATION	US15491		
LATITUDE	41-30.0	N	
LONGITUDE	141-29.8	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	15.588	33.810	24.925
10	15.585	33.809	24.925
20	15.589	33.808	24.923
30	15.570	33.807	24.927
40	15.553	33.806	24.930
50	15.549	33.805	24.930

STATION	US15492		
LATITUDE	41-22.8	N	
LONGITUDE	141-34.8	E	
DEPTH (m)	460		
Press.	Temp.	Salinity	Sigma-T
5	15.557	33.791	24.917
10	15.560	33.790	24.916
20	15.560	33.790	24.916
30	15.556	33.791	24.918
40	15.555	33.791	24.918
50	15.557	33.792	24.918
75	15.560	33.794	24.919
100	15.560	33.795	24.920
125	15.267	33.825	25.007
150	14.866	33.866	25.127
175	13.420	33.946	25.492
200	11.039	33.931	25.936
250	5.016	33.530	26.508
300	3.408	33.635	26.758
400	3.389	33.860	26.939
405	3.386	33.856	26.936

STATION	US15493		
LATITUDE	41-26.3	N	
LONGITUDE	141-34.8	E	
DEPTH (m)	325		
Press.	Temp.	Salinity	Sigma-T
5	15.546	33.794	24.922
10	15.541	33.794	24.923
20	15.516	33.795	24.929
30	15.513	33.796	24.931
40	15.514	33.797	24.932
50	15.514	33.799	24.933
75	15.486	33.802	24.941
100	15.475	33.803	24.944
125	15.474	33.804	24.946
150	15.173	33.831	25.033
175	15.100	33.846	25.060
200	9.496	33.863	26.148
250	4.128	33.549	26.619
300	3.393	33.689	26.803
310	3.363	33.747	26.851

STATION	US15494		
LATITUDE	41-30.0	N	
LONGITUDE	141-39.5	E	
DEPTH (m)	610		
Press.	Temp.	Salinity	Sigma-T
5	15.897	33.766	24.822
10	15.905	33.763	24.818
20	15.808	33.769	24.844
30	15.665	33.782	24.887
40	15.567	33.792	24.916
50	15.545	33.795	24.923
75	15.505	33.800	24.936
100	15.395	33.814	24.971
125	15.144	33.825	25.034
150	14.313	33.896	25.268
175	11.646	33.923	25.819
200	7.950	33.753	26.302
250	5.886	33.622	26.478
300	3.652	33.576	26.688
400	3.267	33.749	26.862
500	3.453	33.933	26.991

STATION	US15495		
LATITUDE	41-30.0	N	
LONGITUDE	141-34.8	E	
DEPTH (m)	111		
Press.	Temp.	Salinity	Sigma-T
5	15.872	33.764	24.826
10	15.875	33.761	24.823
20	15.869	33.759	24.823
30	15.779	33.771	24.852
40	15.595	33.775	24.897
50	15.519	33.776	24.914
75	15.472	33.770	24.920
100	15.340	33.773	24.951

STATION	US15496		
LATITUDE	41-27.5	N	
LONGITUDE	141-24.1	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	15.879	33.767	24.827
10	15.881	33.765	24.825
20	15.857	33.767	24.831
30	15.770	33.770	24.853
40	15.408	33.790	24.950

STATION		US15497	
LATITUDE	41-28.7	N	
LONGITUDE	141-23.4	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	16.003	33.740	24.778
10	15.956	33.748	24.795
20	15.857	33.765	24.830
30	15.822	33.768	24.840
40	15.764	33.770	24.855
50	15.641	33.780	24.890
75	14.704	33.898	25.186

STATION		US15498	
LATITUDE	41-31.9	N	
LONGITUDE	141-22.0	E	
DEPTH (m)	252		
Press.	Temp.	Salinity	Sigma-T
5	15.996	33.753	24.790
10	15.999	33.753	24.789
20	15.995	33.754	24.790
30	15.958	33.756	24.800
40	15.966	33.756	24.799
50	15.882	33.763	24.823
75	15.613	33.794	24.907
100	15.397	33.818	24.973
125	14.610	33.877	25.190
150	12.917	33.918	25.571
175	12.384	33.962	25.709
200	11.777	33.898	25.775
240	12.061	34.053	25.842

STATION		US15499	
LATITUDE	41-34.8	N	
LONGITUDE	141-20.6	E	
DEPTH (m)	321		
Press.	Temp.	Salinity	Sigma-T
5	15.437	33.799	24.950
10	15.294	33.823	25.000
20	15.256	33.831	25.015
30	15.151	33.849	25.051
40	15.141	33.852	25.056
50	15.117	33.857	25.065
75	15.104	33.860	25.070
100	15.051	33.865	25.086
125	14.805	33.887	25.157
150	13.357	33.980	25.531
175	12.788	33.940	25.614
200	11.103	33.888	25.891
250	7.267	33.742	26.391
300	3.638	33.626	26.729
310	3.411	33.662	26.779

STATION		US15500	
LATITUDE	41-37.6	N	
LONGITUDE	141-19.3	E	
DEPTH (m)	216		
Press.	Temp.	Salinity	Sigma-T
5	15.332	33.826	24.994
10	14.968	33.851	25.093
20	14.410	33.901	25.251
30	14.243	33.916	25.299
40	14.179	33.923	25.317
50	14.054	33.927	25.347
75	13.967	33.943	25.377
100	13.956	33.961	25.394
125	13.933	33.966	25.402
150	11.164	33.901	25.890
175	7.919	33.774	26.323
200	7.168	33.762	26.421
205	7.121	33.760	26.426

STATION		US15501	
LATITUDE	41-40.9	N	
LONGITUDE	141-17.4	E	
DEPTH (m)	229		
Press.	Temp.	Salinity	Sigma-T
5	15.707	33.804	24.894
10	15.605	33.816	24.926
20	14.810	33.895	25.161
30	14.538	33.921	25.240
40	13.772	33.931	25.409
50	13.557	33.952	25.469
75	12.654	33.951	25.649
100	11.412	33.905	25.848
125	10.530	33.969	26.056
150	8.437	33.816	26.278
175	6.727	33.658	26.398
200	5.790	33.570	26.449
215	5.111	33.530	26.498

STATION		US15502	
LATITUDE	41-43.8	N	
LONGITUDE	141-16.1	E	
DEPTH (m)	229		
Press.	Temp.	Salinity	Sigma-T
5	15.071	33.812	25.040
10	15.053	33.814	25.047
20	14.467	33.874	25.219
30	14.155	33.922	25.322
40	14.000	33.946	25.373
50	13.917	33.947	25.391
75	12.364	33.997	25.740
100	10.367	33.901	26.031
125	9.525	33.861	26.142
150	8.168	33.775	26.287
175	6.144	33.577	26.410
200	5.163	33.522	26.485
215	4.848	33.538	26.533

STATION		US15503	
LATITUDE	41-46.9	N	
LONGITUDE	141-15.1	E	
DEPTH (m)	209		
Press.	Temp.	Salinity	Sigma-T
5	15.124	33.823	25.038
10	15.042	33.827	25.059
20	14.791	33.876	25.151
30	14.641	33.903	25.204
40	14.393	33.904	25.257
50	13.904	33.919	25.371
75	12.640	33.968	25.665
100	11.428	33.986	25.908
125	9.330	33.802	26.127
150	7.743	33.722	26.307
175	6.155	33.609	26.434
200	5.207	33.548	26.500

STATION		US15504	
LATITUDE	41-49.2	N	
LONGITUDE	141-13.6	E	
DEPTH (m)	181		
Press.	Temp.	Salinity	Sigma-T
5	15.063	33.828	25.055
10	14.729	33.874	25.163
20	14.520	33.912	25.236
30	14.369	33.915	25.271
40	13.332	33.833	25.422
50	13.527	33.926	25.455
75	13.050	33.932	25.556
100	11.381	33.938	25.879
125	9.116	33.811	26.169
150	7.424	33.697	26.334

STATION		US15504-2	
LATITUDE	41-49.8	N	
LONGITUDE	141-13.7	E	
DEPTH (m)	198		
Press.	Temp.	Salinity	Sigma-T
5	15.042	33.828	25.059
10	14.964	33.837	25.083
20	14.890	33.853	25.111
30	14.650	33.891	25.192
40	14.457	33.901	25.242
50	13.358	33.826	25.412
75	12.914	33.843	25.514
100	12.106	33.896	25.712
125	10.748	33.916	25.977
150	7.888	33.735	26.297
175	6.410	33.605	26.398
185	5.973	33.597	26.447

STATION US15505			
LATITUDE 42-16.4 N			
LONGITUDE 140-36.5 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	11.266	33.655	25.680
10	11.267	33.657	25.681
20	11.276	33.663	25.685
30	11.288	33.679	25.695
40	11.266	33.685	25.704
50	11.266	33.692	25.709
75	9.338	33.778	26.107

STATION US15508			
LATITUDE 42-11.4 N			
LONGITUDE 140-34.9 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	11.018	33.578	25.665
10	11.030	33.582	25.666
20	11.187	33.636	25.680
30	11.194	33.637	25.679
40	11.205	33.639	25.679
50	11.219	33.644	25.680
75	8.453	33.707	26.191

STATION US15511			
LATITUDE 42-21.1 N			
LONGITUDE 140-36.6 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	9.746	33.686	25.968
10	9.749	33.686	25.968
20	9.755	33.686	25.967
30	9.753	33.683	25.965
40	9.754	33.681	25.963
50	9.759	33.684	25.964
75	9.768	33.686	25.965
85	9.150	33.678	26.059

STATION US15514			
LATITUDE 42-10.2 N			
LONGITUDE 140-36.0 E			
DEPTH (m) 75			
Press.	Temp.	Salinity	Sigma-T
5	9.763	33.679	25.960
10	9.766	33.679	25.959
20	9.753	33.675	25.959
30	9.758	33.676	25.959
40	9.743	33.672	25.958
50	9.727	33.669	25.958

STATION US15506			
LATITUDE 42-18.7 N			
LONGITUDE 140-25.6 E			
DEPTH (m) 68			
Press.	Temp.	Salinity	Sigma-T
5	11.352	33.708	25.706
10	11.358	33.708	25.705
20	11.361	33.708	25.705
30	11.354	33.707	25.705
40	11.337	33.703	25.705
50	11.333	33.702	25.705
65	11.319	33.714	25.717

STATION US15509			
LATITUDE 42-31.3 N			
LONGITUDE 140-37.6 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	9.512	33.585	25.928
10	9.712	33.641	25.939
20	9.766	33.656	25.942
30	9.770	33.664	25.947
40	9.775	33.667	25.949
50	9.764	33.673	25.955

STATION US15512			
LATITUDE 42-16.7 N			
LONGITUDE 140-35.6 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	9.809	33.713	25.979
10	9.810	33.713	25.979
20	9.814	33.713	25.978
30	9.821	33.715	25.978
40	9.824	33.716	25.979
50	9.826	33.716	25.979
75	9.868	33.729	25.981

STATION US15515			
LATITUDE 42-13.9 N			
LONGITUDE 140-30.2 E			
DEPTH (m) 77			
Press.	Temp.	Salinity	Sigma-T
5	8.923	33.369	25.853
10	9.788	33.681	25.958
20	10.002	33.727	25.958
30	10.022	33.730	25.957
40	10.044	33.738	25.959
50	9.896	33.706	25.960

STATION US15507			
LATITUDE 42-14.0 N			
LONGITUDE 140-29.8 E			
DEPTH (m) 77			
Press.	Temp.	Salinity	Sigma-T
5	11.285	33.703	25.714
10	11.284	33.702	25.714
20	11.287	33.702	25.713
30	11.290	33.702	25.713
40	11.268	33.697	25.713
50	11.253	33.695	25.713

STATION US15510			
LATITUDE 42-26.1 N			
LONGITUDE 140-37.3 E			
DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T
5	9.726	33.860	25.913
10	9.727	33.860	25.914
20	9.729	33.862	25.916
30	9.743	33.863	25.917
40	9.746	33.863	25.919
50	9.738	33.860	25.921
75	9.734	33.687	25.971

STATION US15513			
LATITUDE 42-11.1 N			
LONGITUDE 140-35.6 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	9.717	33.676	25.966
10	9.730	33.677	25.964
20	9.732	33.676	25.963
30	9.728	33.674	25.962
40	9.734	33.676	25.962
50	9.735	33.676	25.963
70	9.874	33.732	25.983

STATION US15516			
LATITUDE 42-13.4 N			
LONGITUDE 140-41.5 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	9.814	33.720	25.983
10	9.825	33.730	25.989
20	9.825	33.727	25.988
30	9.866	33.739	25.990
40	9.867	33.739	25.990
50	9.859	33.738	25.990
75	9.696	33.819	26.081
85	9.516	33.844	26.130

STATION	US15517		
LATITUDE	42-18.4	N	
LONGITUDE	140-42.1	E	
DEPTH (m)	65		
Press.	Temp.	Salinity	Sigma-T
5	10.242	33.820	25.989
10	10.244	33.820	25.989
20	10.241	33.818	25.988
30	10.236	33.816	25.988
40	10.212	33.812	25.988
50	10.167	33.802	25.988

STATION	US15520		
LATITUDE	42-23.7	N	
LONGITUDE	140-30.9	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	9.723	33.690	25.975
10	9.721	33.690	25.976
20	9.724	33.691	25.976
30	9.725	33.691	25.976
40	9.724	33.691	25.976
50	9.725	33.692	25.976
75	9.729	33.692	25.976

STATION	US15518		
LATITUDE	42-18.9	N	
LONGITUDE	140-30.8	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	9.864	33.712	25.969
10	9.868	33.712	25.968
20	9.872	33.712	25.967
30	9.887	33.713	25.966
40	9.885	33.712	25.966
50	9.885	33.711	25.965
75	9.883	33.715	25.968

STATION	US15521		
LATITUDE	42-23.3	N	
LONGITUDE	140-42.7	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	9.856	33.720	25.976
10	9.854	33.721	25.978
20	9.843	33.724	25.982
30	9.844	33.725	25.983
40	9.850	33.728	25.984
50	9.876	33.736	25.986

STATION	US15519		
LATITUDE	42-19.1	N	
LONGITUDE	140-23.6	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	9.326	33.584	25.958
10	9.318	33.584	25.958
20	9.314	33.582	25.958
30	9.327	33.584	25.957
40	9.315	33.581	25.957
50	9.409	33.607	25.962
55	9.424	33.610	25.962

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