



HOKKAIDO UNIVERSITY

Title	PART II -3. THE " USHIO MARU " CRUISE 385, CRUISE 386, CRUISE 387 IN MARCH - APRIL 2017
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THE " USHIO MARU "

CRUISE 385

CRUISE 386

CRUISE 387

IN MARCH 2017

IN APRIL 2017

1. Cruise Itinerary

Cruise 385

Departure from Hakodate	Mar.	21, 2017
Start hydrographic research (US17169)		21
Finish hydrographic research (US17171)		21
Return to Hakodate		22
Total coverage 150.9 miles		

Cruise 386

Departure from Hakodate	Apr.	11, 2017
Start hydrographic research (US17172)		11
Arrival at Usujiri		11
Depart from Usujiri		14
Towing frame trawl net		14
Towing frame trawl net		15
Arrival at Usujiri		15
Depart from Usujiri		16
Towing frame trawl net		16
Finish hydrographic research (US17199)		16
Arrival at Usujiri		16
Depart from Usujiri		17
Observation by underwater camera		17
Return to Hakodate		17
Total coverage 306.7 miles		

Cruise 387

Departure from Hakodate	Apr.	24, 2017
Start hydrographic research (US17200)		24
Calibration of echo sounder ER-60		24
Hook and line jigging research for pinthead flounder		25
Echo sounding research by ER-60		25
Towing frame trawl net		26
Hook and line jigging research for pinthead flounder		26
Echo sounding research by ER-60		26
Finish hydrographic research (US17203)		26
Echo sounding research by ER-60		27
Return to Hakodate		27
Total coverage 377.8 mile		

2. Data on Temperature, Salinity and Pressure

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the “Ushio Maru”. Temperature, salinity and pressure were measured by CTD (Seabird SBE-19Plus and SBE-19).

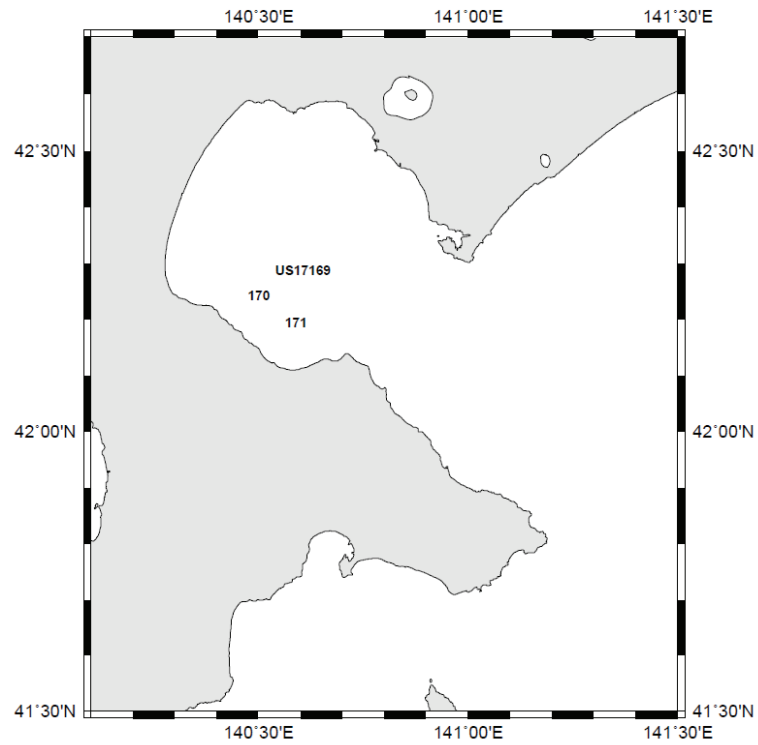


Figure 1. Oceanographic stations (Cruise 385)

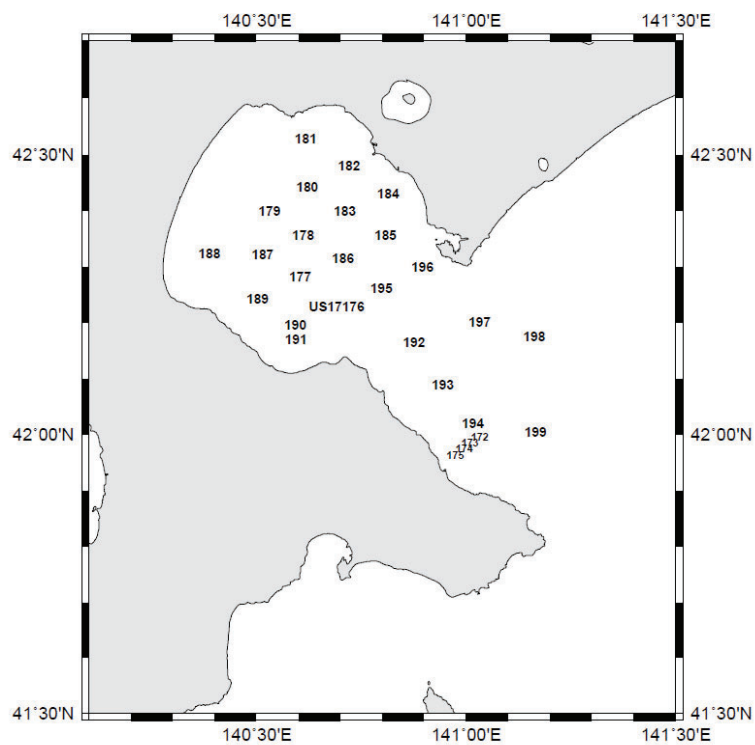


Figure 2. Oceanographic stations (Cruise 386)

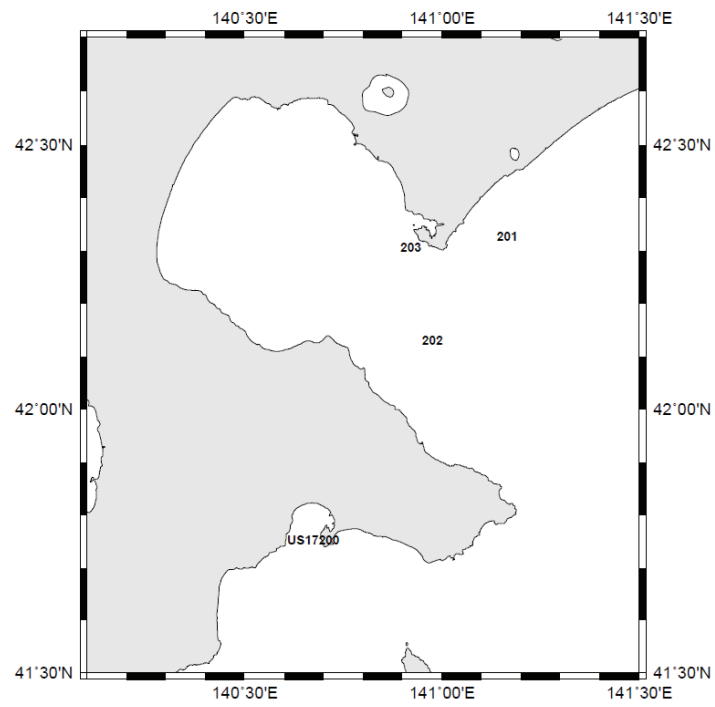


Figure 3. Oceanographic stations (Cruise 387)

Table 1. List of Oceanographic Station

Crs385												
station	Lat. (N)°	Long. (E)°	Date	Hour (JST)	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US17169	42-16.7	140-36.3	3/21	1433-1440	91	ESE-4	ESE-1	ESE-6	4.8	4.3	o	1007.7
US17170	42-14.0	140-30.0	3/21	1541-1548	78	ESE-4	ESE-1	ESE-6	5.1	4.8	o	1007.3
US17171	42-11.1	140-35.3	3/21	1641-1647	80	East-4	East-1	East-6	4.4	4.8	o	1007.0

Crs386												
station	Lat. (N)°	Long. (E)°	Date	Hour (JST)	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US17172	41-59.4	141-01.9	4/11	1230-1236	101	East-3	East-1	East-5	5.2	2.0	o	1010.6
US17173	41-58.7	141-00.5	4/11	1246-1253	93	East-3	East-1	East-4	5.7	2.0	o	1010.4
US17174	41-58.1	140-59.7	4/11	1301-1306	88	ESE-2	East-1	ESE-4	5.7	1.6	o	1010.1
US17175	41-57.4	140-58.4	4/11	1316-1322	80	ESE-2	East-1	ESE-4	5.9	1.9	o	1009.7
US17176	42-13.2	140-41.4	4/14	0711-0718	90	WSW-3	West-1	WSW-4	7.7	2.6	bc	1010.3
US17177	42-16.4	140-36.2	4/14	0815-0825	91	WSW-3	West-1	WSW-5	8.3	2.6	bc	1010.0
US17178	42-20.9	140-36.6	4/14	0932-0939	87	WSW-3	WSW-1	WSW-4	9.4	3.2	bc	1009.8
US17179	42-23.4	140-31.8	4/14	1032-1040	95	WSW-3	WSW-1	WSW-4	9.1	3.0	bc	1009.1
US17180	42-26.0	140-37.2	4/14	1136-1143	84	WSW-3	WSW-1	WSW-6	8.7	2.8	bc	1007.7
US17181	42-31.1	140-37.0	4/14	1210-1226	62	WSW-3	WSW-1	WSW-6	9.9	2.5	bc	1007.1
US17182	42-28.3	140-43.2	4/14	1325-1330	61	SSW-3	SW-1	SSW-5	9.5	2.8	bc	1007.7
US17183	42-23.4	140-42.6	4/14	1508-1513	62	SSW-3	SW-1	SSW-4	10.0	2.9	bc	1007.0
US17184	42-25.3	140-48.8	4/14	1604-1608	43	WSW-2	SW-1	WSW-3	10.2	3.2	bc	1007.1
US17185	42-20.8	140-48.4	4/14	1640-1645	53	WNW-2	SW-1	WNW-3	8.5	2.8	bc	1006.8
US17186	42-18.4	140-42.3	4/15	0456-0502	65	SSW-2	WSW-1	SSW-4	7.8	2.9	c	1006.2
US17187	42-18.8	140-30.8	4/15	0700-0708	94	SW-2	WSW-1	SW-4	7.9	3.0	c	1006.3
US17188	42-18.9	140-23.2	4/15	0753-0758	54	SSW-3	SW-1	SSW-4	10.8	3.3	c	1006.5
US17189	42-14.0	140-30.1	4/15	0904-0911	79	SSW-3	SSW-1	SSW-5	10.8	3.6	bc	1007.1
US17190	42-11.3	140-35.5	4/15	1005-1011	81	SSW-2	SSW-1	SSW-3	9.6	3.9	c	1007.8
US17191	42-09.7	140-35.6	4/15	1029-1038	71	SW-3	SSW-1	SW-4	10.7	3.8	bc	1007.6
US17192	42-09.4	140-52.5	4/15	1240-1246	77	NNE-1	SE-1	NNE-3	8.4	3.6	c	1007.3
US17193	42-04.8	140-56.6	4/15	1347-1352	84	West-2	SE-1	West-3	11.4	3.3	c	1007.1
US17194	42-00.7	141-00.9	4/15	1452-1458	91	NW-1	SE-1	NW-2	11.9	3.9	c	1006.6
US17195	42-15.2	140-47.8	4/16	0856-0902	72	SSW-2	WSW-1	SSW-3	12.7	4.1	c	1004.5
US17196	42-17.4	140-53.7	4/16	0959-1004	57	West-3	WSW-1	West-4	12	3.9	c	1005.1
US17197	42-11.6	141-01.9	4/16	1111-1118	80	SSW-2	WNW-1	SSW-4	9.2	2.5	bc	1003.8
US17198	42-10.0	141-09.7	4/16	1220-1228	121	NNW-1	SW-1	NNW-3	10.9	1.7	c	1003.6
US17199	41-59.8	141-09.9	4/16	1419-1428	138	SW-3	SW-1	SW-5	7.6	1.8	bc	1004.1

Crs387												
station	Lat. (N)°	Long. (E)°	Date	Hour (JST)	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US17200	41-44.6	140-40.4	4/24	1043-1049	57	ESE-1	SE-1	ESE-3	8.4	9.1	bc	1029
US17201	42-19.1	141-09.9	4/25	0753-0800	78	ENE-3	ESE-1	ENE-3	5.1	3.8	o	1026
US17202	42-07.3	140-58.5	4/25	1620-1625	86	ENE-3	ESE-1	ENE-4	5.2	4.6	o	1020.2
US17203	42-17.9	140-55.2	4/26	1106-1111	56	East-2	East-2	East-3	8	4.8	o	1014.6

Table 2. Oceanographic data

STATION US17169			
LATITUDE 42-16.7 N			
LONGITUI 140-36.3 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	4.6551	33.2206	26.3026
10	4.6578	33.2293	26.3092
20	4.9116	33.3971	26.4145
30	4.6831	33.5808	26.5854
40	4.6611	33.5961	26.5999
50	4.6501	33.61	26.6121
75	4.6068	33.6157	26.6213
86	4.649	33.659	26.651

STATION US17172			
LATITUDE 41-59.4 N			
LONGITUI 141-01.9 E			
DEPTH (m) 101			
Press.	Temp.	Salinity	Sigma-T
5	2.3462	32.532	25.9686
10	2.4366	32.6565	26.0611
20	2.6765	32.9686	26.2912
30	3.6835	33.1786	26.3684
40	4.7163	33.3685	26.4134
50	5.834	33.5708	26.4438
75	6.0093	33.5603	26.4139
97	5.7017	33.5493	26.443

STATION US17175			
LATITUDE 41-57.4 N			
LONGITUI 140-58.4 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	5.0886	32.6311	25.7877
10	4.9783	32.6073	25.781
20	4.6404	32.7447	25.9266
30	1.5499	32.4438	25.9554
40	2.2387	32.8791	26.2546
50	4.4388	33.4586	26.5146
75	5.3994	33.5431	26.4742
77	5.306	33.535	26.478

STATION US17178			
LATITUDE 42-20.9 N			
LONGITUI 140-36.6 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	3.1675	32.5924	25.9489
10	3.155	32.5964	25.9532
20	3.1291	32.5976	25.9564
30	2.7016	32.8335	26.1812
40	3.6463	33.1168	26.3228
50	4.4354	33.3161	26.4018
75	4.756	33.6283	26.6151
85	4.7578	33.6271	26.6139

STATION US17181			
LATITUDE 42-31.1 N			
LONGITUI 140-37.0 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	2.7626	32.3972	25.8277
10	2.7487	32.3994	25.8306
20	2.637	32.4319	25.8656
30	2.4348	32.534	25.9633
40	2.6136	32.724	26.1009
50	4.4919	33.2211	26.3205
55	4.5719	33.5569	26.5784

STATION US17184			
LATITUDE 42-25.3 N			
LONGITUI 140-48.8 E			
DEPTH (m) 43			
Press.	Temp.	Salinity	Sigma-T
5	3.3081	32.2637	25.6745
10	2.8702	32.214	25.6725
20	2.6119	32.2942	25.7577
30	3.2985	32.934	26.2094
40	3.8809	33.1942	26.3617
41	4.0152	33.2523	26.3945

STATION US17170			
LATITUDE 42-14.0 N			
LONGITUI 140-30.0 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	4.9981	33.5928	26.5599
10	4.9992	33.5926	26.5596
20	4.959	33.5917	26.5634
30	4.7645	33.6152	26.6037
40	4.7343	33.6183	26.6095
50	4.7364	33.6195	26.6103
75	4.7409	33.622	26.6117
76	4.741	33.622	26.612

STATION US17173			
LATITUDE 41-58.7 N			
LONGITUI 141-00.5 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	1.8876	32.3721	25.8748
10	2.1828	32.7421	26.1492
20	3.0191	32.9715	26.2643
30	4.2321	33.378	26.4724
40	5.155	33.4302	26.4132
50	5.6799	33.5217	26.4239
75	6.0959	33.6213	26.4512
89	6.1745	33.6162	26.4372

STATION US17176			
LATITUDE 42-13.2 N			
LONGITUI 140-41.4 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	2.8043	32.4731	25.8848
10	2.7891	32.4738	25.8866
20	2.776	32.4838	25.8957
30	2.9045	32.5435	25.9326
40	3.6577	32.9378	26.1792
50	4.0295	33.0608	26.2408
75	4.8645	33.4564	26.4667
88	4.7644	33.5693	26.5673

STATION US17179			
LATITUDE 42-23.4 N			
LONGITUI 140-31.8 E			
DEPTH (m) 95			
Press.	Temp.	Salinity	Sigma-T
5	3.0267	32.3938	25.8027
10	3.0867	32.4488	25.8414
20	3.3052	32.5784	25.9255
30	3.0989	32.6916	26.0341
40	4.364	33.2474	26.3548
50	4.827	33.4595	26.4733
75	4.7726	33.624	26.6098
92	4.7532	33.6331	26.6191

STATION US17182			
LATITUDE 42-28.3 N			
LONGITUI 140-43.2 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	2.9191	32.3168	25.7504
10	2.8512	32.3151	25.7548
20	2.5916	32.322	25.7814
30	2.6073	32.5879	25.9927
40	3.2577	33.0795	26.3291
50	4.6199	33.4441	26.4838
59	4.8927	33.4751	26.4784

STATION US17185			
LATITUDE 42-20.8 N			
LONGITUI 140-48.4 E			
DEPTH (m) 53			
Press.	Temp.	Salinity	Sigma-T
5	3.0132	32.3787	25.7918
10	2.898	32.3712	25.7956
20	2.6016	32.4082	25.8496
30	2.5042	32.4436	25.8856
40	1.8377	32.7144	26.1525
50	3.3357	33.1557	26.3828
52	3.4814	33.1342	26.3523

STATION US17171			
LATITUDE 42-11.1 N			
LONGITUI 140-35.3 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	4.9498	33.6092	26.5783
10	4.9497	33.6105	26.5793
20	4.929	33.6156	26.5857
30	4.793	33.6208	26.6051
40	4.7872	33.6227	26.6072
50	4.7242	33.6199	26.6118
75	4.6767	33.6204	26.6175
78	4.671	33.622	26.619

STATION US17174			
LATITUDE 41-58.1 N			
LONGITUI 140-59.7 E			
DEPTH (m) 88			
Press.	Temp.	Salinity	Sigma-T
5	1.9853	32.3074	25.8159
10	1.9185	32.3052	25.8189
20	2.4973	32.7834	26.1578
30	1.977	32.874	26.2702
40	2.8653	33.1015	26.3814
50	5.7069	33.5428	26.4372
75	5.9819	33.5797	26.4326
84	5.978	33.6001	26.4492

STATION US17177			
LATITUDE 42-16.4 N			
LONGITUI 140-36.2 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	2.9923	32.5447	25.926
10	2.9591	32.5473	25.931
20	2.9237	32.5497	25.9359
30	2.803	32.5545	25.9499
40	3.1249	32.778	26.1007
50	4.5459	33.1561	26.2632
75	4.8688	33.4615	26.4703
85	4.8053	33.5757	26.5679

STATION US17180			
LATITUDE 42-26.0 N			
LONGITUI 140-37.2 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	3.0878	32.4043	25.8059
10	2.9894	32.4061	25.8158
20	2.8221	32.4165	25.8381
30	3.2476	32.6009	25.9486
40	2.9613	32.6929	26.047
50	3.6314	33.0764	26.292
75	4.8245	33.5217	26.5229
81	4.7998	33.5581	26.5545

STATION US17183			
LATITUDE 42-23.4 N			
LONGITUI 140-42.6 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	3.4301	32.4853	25.84
10	3.3852	32.4867	25.8452
20	3.412	32.4959	25.8501
30	3.0774	32.6568	26.0081
40	4.1105	33.1976	26.3413
50	4.3829	33.2113	26.3242
61	4.3715	33.298	26.3942

STATION US17186			
LATITUDE 42-18.4 N			
LONGITUI 140-42.3 E			
DEPTH (m) 65			
Press.	Temp.	Salinity	Sigma-T
5	3.1593	32.4664	25.8491
10	3.2651	32.5684	25.9211
20	3.4922	32.5796	25.9095
30	3.2492	32.6136	25.9585
40	4.3511	33.1138	26.2501
50	4.5478	33.2265	26.3188
63	4.6003	33.2914	26.3647

STATION US17187			
LATITUDE 42-18.8 N			
LONGITUI 140-30.8 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	3.2332	32.3739	25.7689
10	3.2214	32.3779	25.7732
20	3.1827	32.4457	25.8306
30	3.4411	32.6212	25.9473
40	3.7359	32.9597	26.1891
50	4.4775	33.3262	26.4054
75	4.8054	33.5959	26.5839
91	4.7532	33.6227	26.6109

STATION US17190			
LATITUDE 42-11.3 N			
LONGITUI 140-35.5 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	3.7316	32.3249	25.6844
10	3.6589	32.3256	25.6917
20	2.9574	32.4698	25.8693
30	3.006	32.5271	25.9108
40	3.0282	32.5864	25.9563
50	3.3721	32.7792	26.0795
75	4.8003	33.5279	26.5305
78	4.8046	33.5481	26.5462

STATION US17193			
LATITUDE 42-04.8 N			
LONGITUI 140-56.6 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	3.2608	32.3504	25.7478
10	3.1127	32.3657	25.7729
20	2.6902	32.3828	25.8221
30	2.205	32.4113	25.8829
40	2.0288	32.4807	25.9515
50	3.8044	33.0998	26.2939
75	5.2464	33.5415	26.4908
82	5.2527	33.541	26.4897

STATION US17196			
LATITUDE 42-17.4 N			
LONGITUI 140-53.7 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	3.8273	32.2714	25.6328
10	3.306	32.296	25.7004
20	2.8736	32.3316	25.7661
30	2.5601	32.4071	25.852
40	2.4768	32.5948	26.0086
50	3.7213	33.3051	26.4654
54	4.784	33.430	26.454

STATION US17199			
LATITUDE 41-59.8 N			
LONGITUI 141-09.9 E			
DEPTH (m) 138			
Press.	Temp.	Salinity	Sigma-T
5	1.8605	32.3586	25.8658
10	1.8335	32.364	25.8721
20	0.9179	32.3601	25.9278
30	0.7803	32.4373	25.9978
40	2.3067	32.8883	26.2567
50	2.6987	32.9323	26.2603
75	3.8305	33.2425	26.405
100	5.2303	33.4843	26.4474
125	5.477	33.5374	26.4605
134	5.2052	33.5176	26.4766

STATION US17188			
LATITUDE 42-18.9 N			
LONGITUI 140-23.2 E			
DEPTH (m) 54			
Press.	Temp.	Salinity	Sigma-T
5	3.4188	32.3312	25.7183
10	3.3201	32.3553	25.7464
20	3.1296	32.348	25.7573
30	2.7367	32.5006	25.9124
40	4.0921	33.2117	26.3544
50	4.5528	33.3819	26.4417
53	4.7274	33.5191	26.5316

STATION US17191			
LATITUDE 42-09.7 N			
LONGITUI 140-35.6 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	4.003	32.2267	25.5802
10	3.7506	32.2846	25.6505
20	3.1506	32.4408	25.8295
30	3.0136	32.4995	25.8882
40	3.0275	32.545	25.9233
50	3.5437	32.7971	26.0779
65	4.7548	33.4832	26.5001

STATION US17194			
LATITUDE 42-00.7 N			
LONGITUI 141-00.9 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	3.163	32.3226	25.7342
10	2.5112	32.4034	25.8529
20	2.502	32.5238	25.9499
30	2.4306	32.6223	26.0343
40	2.5927	33.0261	26.344
50	5.963	33.6178	26.465
75	5.894	33.567	26.433
88	4.968	33.530	26.513

STATION US17197			
LATITUDE 42-11.6 N			
LONGITUI 141-01.9 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	2.2186	32.4086	25.8797
10	1.8969	32.4579	25.9428
20	2.1837	32.5996	26.0352
30	2.048	32.7606	26.1742
40	2.7149	33.0237	26.3319
50	4.1622	33.2699	26.3936
75	5.4051	33.544	26.4742
78	5.4065	33.5406	26.4713

STATION US17200			
LATITUDE 41-44.6 N			
LONGITUI 140-40.4 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	9.1713	33.8429	26.1848
10	9.0622	33.8562	26.2126
20	8.9578	33.8583	26.2308
30	8.8888	33.875	26.2547
40	8.7971	33.8796	26.2727
50	8.8004	33.9191	26.3031
54	8.7655	33.9268	26.3147

STATION US17189			
LATITUDE 42-14.0 N			
LONGITUI 140-30.1 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	3.6542	32.3039	25.6749
10	3.2893	32.3494	25.7444
20	2.8927	32.4889	25.8901
30	2.8309	32.5037	25.9071
40	2.8118	32.6661	26.0383
50	3.574	33.1628	26.3662
75	4.7637	33.6268	26.613
76	4.764	33.6266	26.6128

STATION US17192			
LATITUDE 42-09.4 N			
LONGITUI 140-52.5 E			
DEPTH (m) 77			
Press.	Temp.	Salinity	Sigma-T
5	3.5237	32.3951	25.7597
10	3.5156	32.4656	25.8165
20	3.3531	32.4978	25.857
30	3.3656	32.4999	25.8575
40	3.1393	32.6204	25.9737
50	4.21	33.283	26.3991
74	5.2547	33.5041	26.4602

STATION US17195			
LATITUDE 42-15.2 N			
LONGITUI 140-47.8 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	3.672	32.24	25.6224
10	3.4106	32.2782	25.6768
20	2.9044	32.2966	25.7356
30	1.6197	32.3622	25.8854
40	2.6189	32.672	26.0589
50	3.8587	33.0614	26.2582
70	4.692	33.354	26.404

STATION US17198			
LATITUDE 42-10.0 N			
LONGITUI 141-09.7 E			
DEPTH (m) 121			
Press.	Temp.	Salinity	Sigma-T
5	3.279	32.4165	25.7988
10	2.3697	32.377	25.8429
20	1.796	32.4258	25.9242
30	1.7107	32.4647	25.9613
40	1.44	32.5091	26.0151
50	0.8872	32.5827	26.1085
75	4.3507	33.2693	26.3736
100	5.6795	33.5445	26.4419
117	5.5081	33.5533	26.4694

STATION US17201			
LATITUDE 42-19.1 N			
LONGITUI 141-09.9 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	3.8011	32.2515	25.6194
10	3.6932	32.2516	25.6296
20	3.0261	32.3181	25.7424
30	2.7249	32.3924	25.8269
40	2.8439	32.6887	26.0536
50	3.7746	32.9548	26.1815
71	3.8641	33.0345	26.2362

STATION US17202			
LATITUDE 42-07.3 N			
LONGITUDE 140-58.5 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	4.2744	32.2815	25.5969
10	3.6831	32.2108	25.598
20	2.2291	32.4905	25.9445
30	2.4599	32.6653	26.0663
40	3.6463	33.1413	26.3423
50	4.9346	33.5631	26.5434
75	4.9612	33.4622	26.4605
80	4.9577	33.463	26.4615

STATION US17203			
LATITUDE 42-17.9 N			
LONGITUDE 140-55.2 E			
DEPTH (m) 56			
Press.	Temp.	Salinity	Sigma-T
5	4.8615	32.0649	25.3639
10	4.6341	32.1098	25.4237
20	4.6511	32.1714	25.4707
30	4.1628	32.1828	25.5297
40	3.4472	32.3423	25.7245
50	3.2822	32.623	25.9631
50	3.2822	32.623	25.9631