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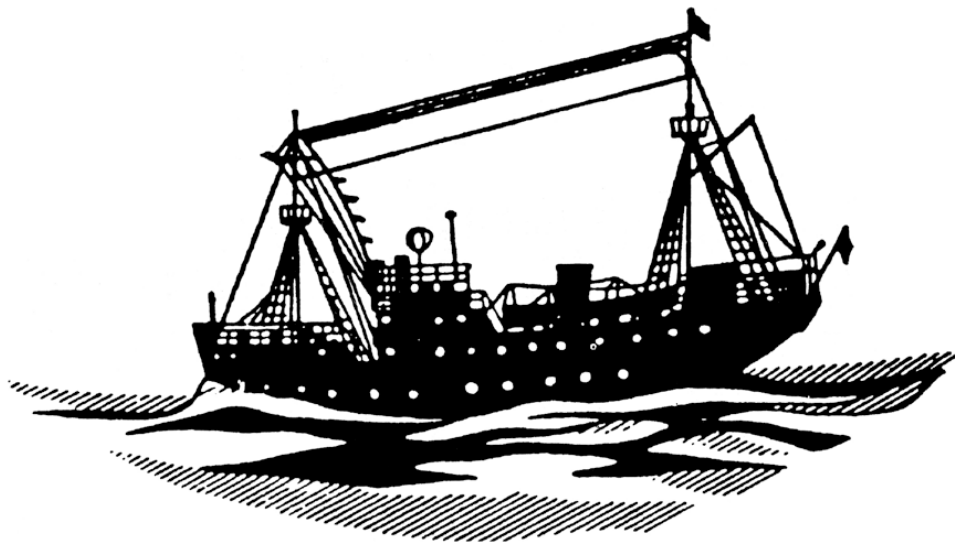


DATA RECORD
OF
OCEANOGRAPHIC OBSERVATIONS AND
EXPLORATORY FISHING

No.60

海 洋 調 査 漁 業 試 験 要 報

第 60 号



GRADUATE SCHOOL OF FISHERIES SCIENCES
AND
FACULTY OF FISHERIES SCIENCES
HOKKAIDO UNIVERSITY
HAKODATE, JAPAN
MARCH 2020

北海道大学大学院水産科学研究院・水産学部
函館市
令和2年3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

OSHORO MARU CRUISES FROM MARCH TO
DECEMBER 2016

**THE "OSHORO MARU" CRUISE 023
TO EAST OF THE TSUGARU STRAIT
(IBURI / HIDAKA OFFING)**

IN MARCH 2016

1. Cruise Itinerary

Cruise 023

Departure from Hakodate

Mar. 03, 2016

Start of oceanographic research

04

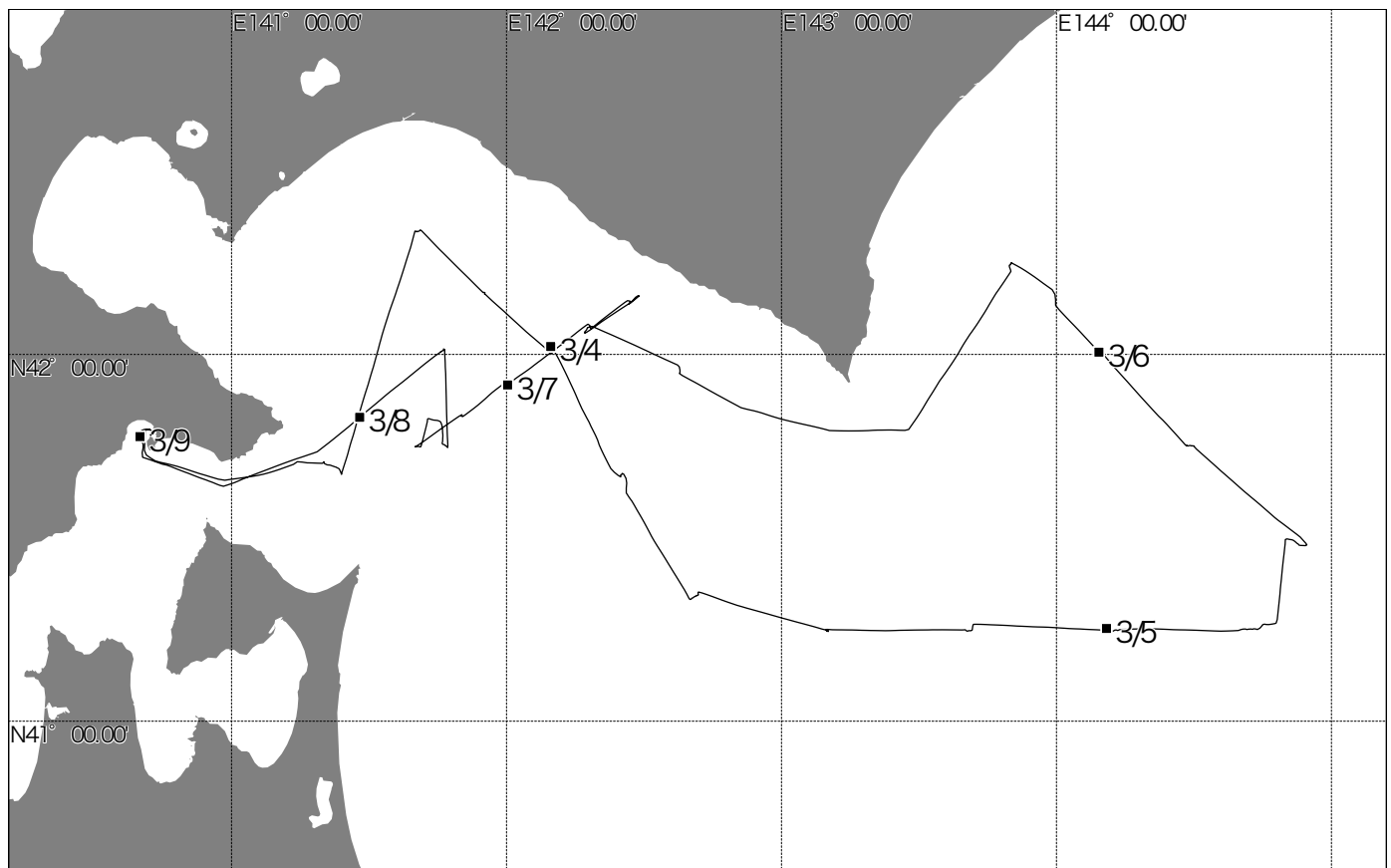
End of oceanographic research

08

Return to Hakodate

10

Total coverage 553.8 miles



■ 正午位置

Fig.1: Noon Position

2. Vessel Personnel

Crew: Captain: Associate Professor Shogo Takagi
And 30 persons

Under Graduate instructor: Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)
Yutaka Isoda
Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)
Hiromichi Ueno
Assistant Professor (Laboratory of Marine Environmental Science, Hokkaido University)
Hiroji Oonishi

Teaching Assistant: 4 persons

Under Graduate Student: 33 persons

**THE "OSHORO MARU" CRUISE 024
TO WAKASA BAY**

IN APRIL 2016

1. Cruise Itinerary

Cruise 024

Departure from Hakodate (Leg1)	Apr. 18, 2016
Arrival at Tsuruga	20
Departure from Tsuruga (Leg2)	21
Start of oceanographic research (OS16025)	22
End of oceanographic research	23
Return to Tsuruga	23
Departure from Tsuruga (Leg3)	23
Return to Tsuruga	24
Departure from Tsuruga (Leg4)	25
Return to Hakodate	27

Total coverage 989.2 miles

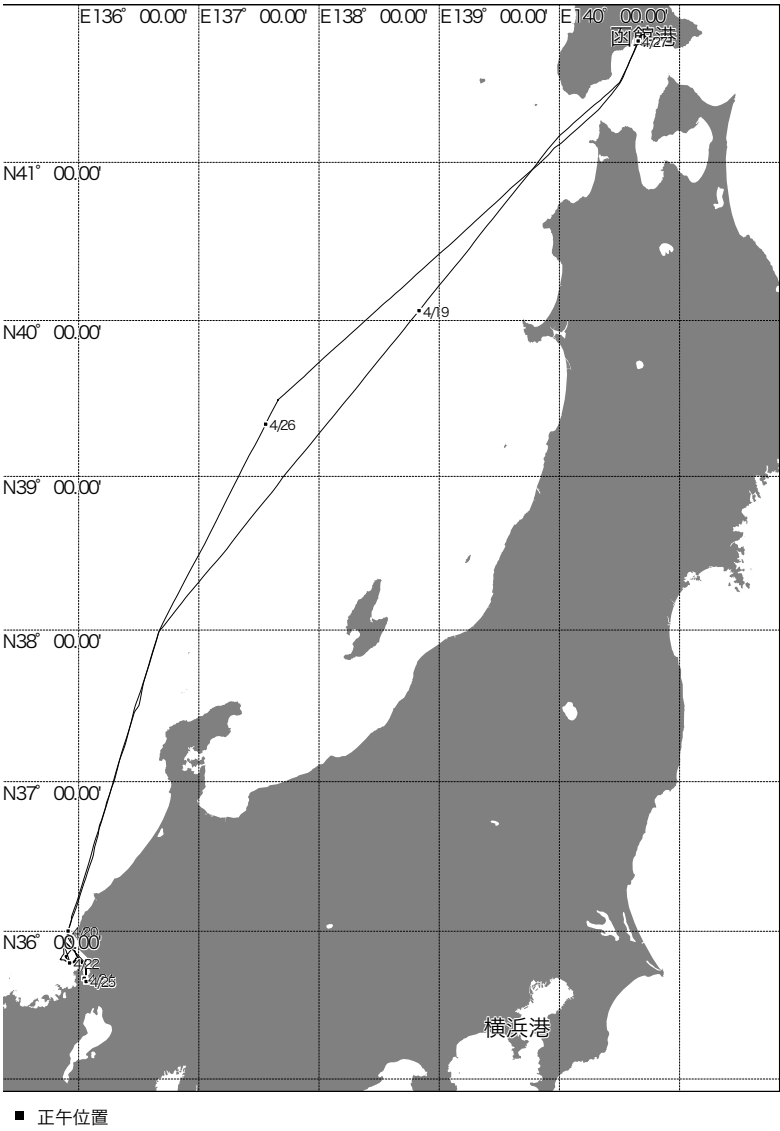


Fig.1.1: Noon Position(1)

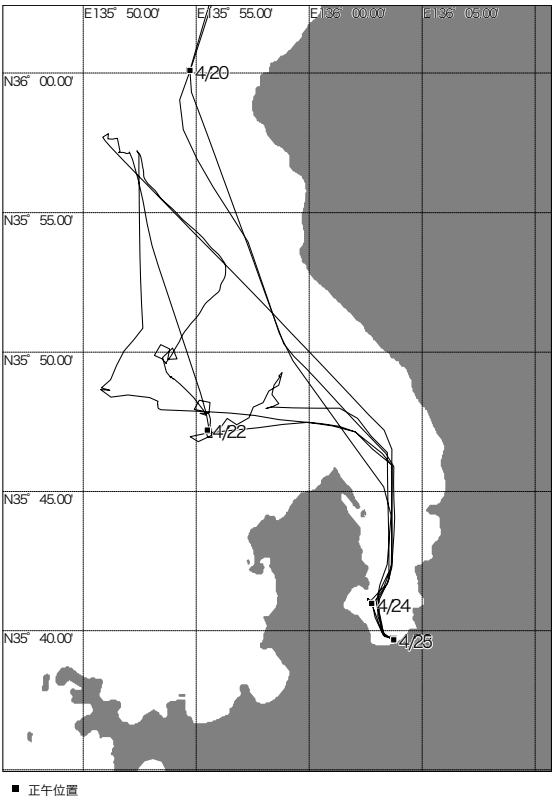


Fig.1.2: Noon Position(2)

2. Vessel Personnel

Crew: Captain: Associate Professor Shogo Takagi
And 32 persons

Under Graduate instructor: Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Ryuji Kondo
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Atsushi Kaneda
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Yoshitake Takao
Associate Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Masatomi Hosoi
Lecturer (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg2 Takafumi Kataoka

Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Tadahisa Oume
Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Norio Tsukahara
Professor (Faculty of Marine Bioscience, Fukui Prefectural University)
Leg3 Yuji Kuroda
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 (Leg2)
5 persons (Leg3)

Under Graduate Student: 56 persons (Leg2)
33 persons (Leg3)

**THE "OSHORO MARU" CRUISE 025
TO THE WESTERN NORTH PACIFIC OCEAN
IN MAY 2016**

2. Cruise Itinerary

Cruise 025

Departure from Hakodate	May. 12, 2016
Start of oceanographic research	14
Start of long-line research (OSSL1601) and gillnet research (OSG1601)	15
End of long-line research (OSSL1603)	16
End of gillnet research (OSG1603)	19
End of oceanographic research	20
Return to Hakodate	23

Total coverage 1886.4miles

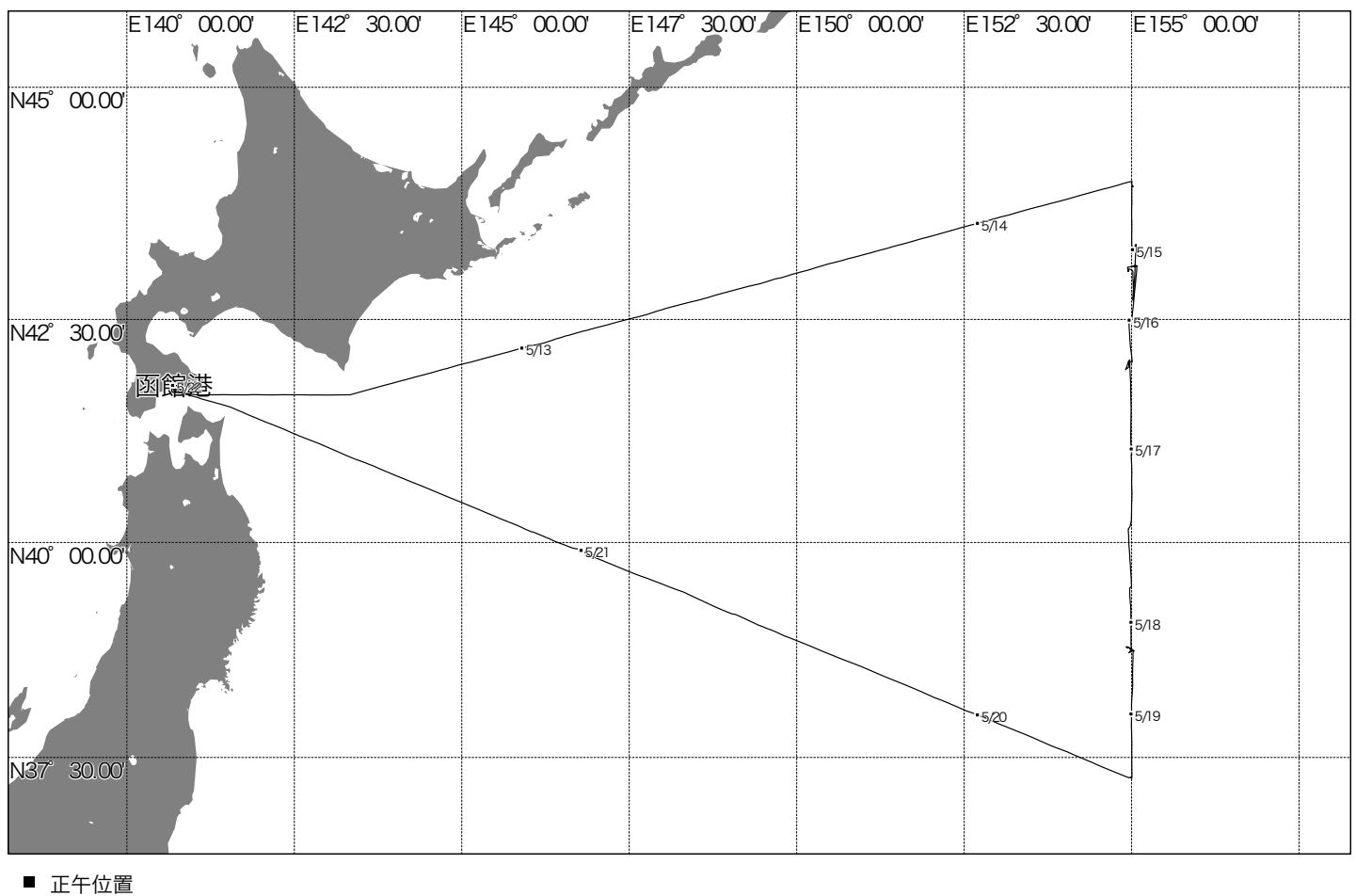


Fig.1: Noon Position

2. Vessel Personnel

Crew: Captain: Associate Professor Shogo Takagi
And 32 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: 53 persons

Research stuff: Associate Professor (Laboratory of Marine Biodiversity, Hokkaido University) Atsushi Yamaguchi
Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University) Atsushi Ooki
Associate Professor (Laboratory of Marine Bioresource Science, Hokkaido University) Orio Yamamura

Under Graduate Student: 3 persons

3. Items of Research

Biological research for fishes caught by non-selective drift gillnets, surface longline and Hook-and-Line:

Gillnet, surface longline and Hook-and-Line researches were performed during this cruise. The operations were supervised by the captain, and were conducted by deck officers, crews, research staff and cadets.

Fig.2 Table 1,2,3,4

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-9).

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 Table 5,6

4. Result of Gillnet and Longline Research

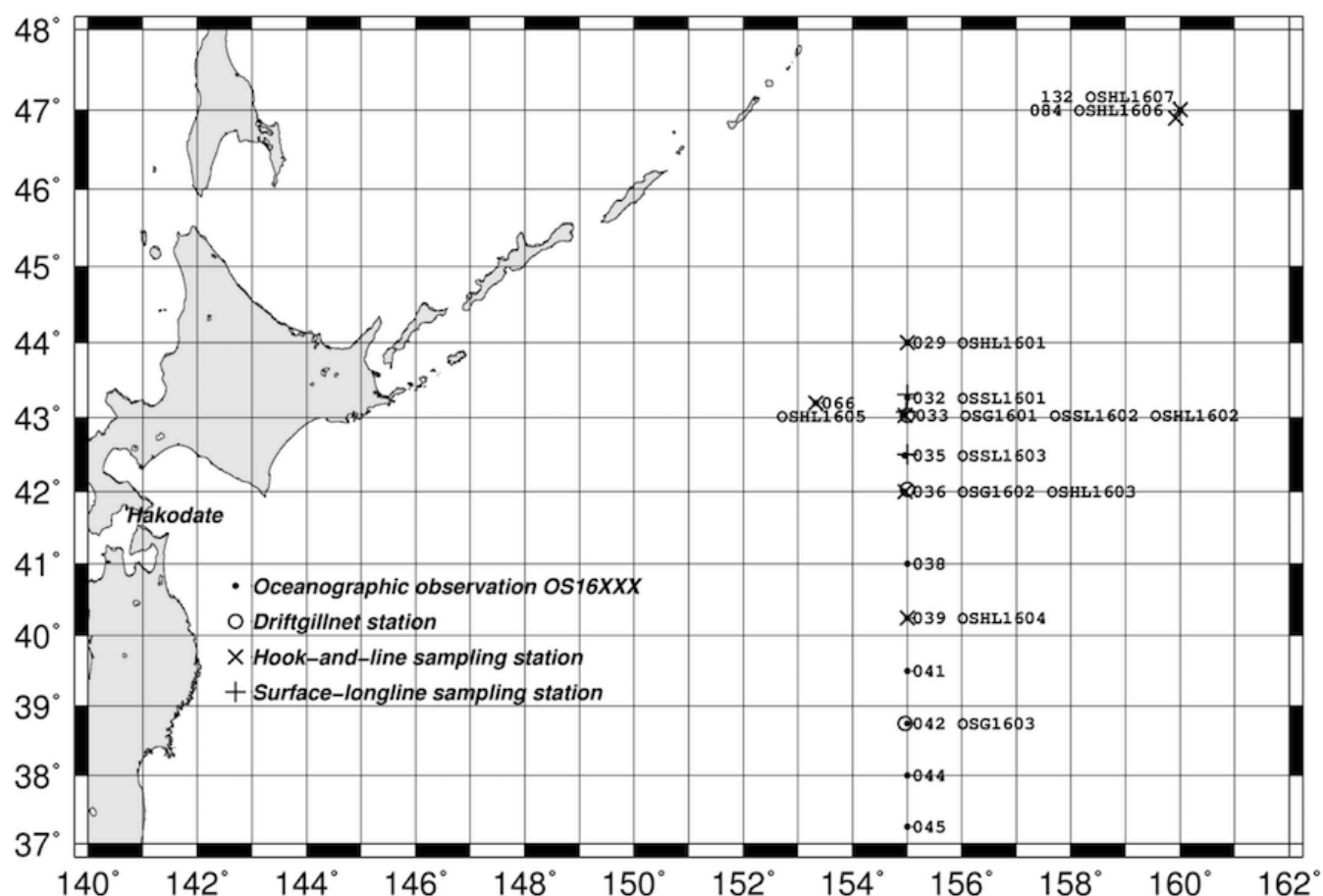


Fig.2: research stations

Table 1. Position and research conditions of surface drift gillnet sampling at each station during the *Oshoro maru* Cruise #025, 2016.

Station	Date and Time (S.M.T.*1)				T.D.*2	Set Position		D.S.*3	bottom depth(m)	Wr*4	Wind (Force)	S.T.*5 (°C)
	Net set		Net haul			Lat.	Long.					
OSG 1601	May 15	1939-2000	May 16	0533-0647	+10h	43-01.9N	155-00.7 E	290	5345	o	East-4	7.4
OSG 1602	May 16	1903-1925	May 17	0453-0553	+10h	42-01.7N	154-59.6 E	290	5400	o	SE-4	7.6
OSG 1603	May 18	1812-1832	May 19	0458-0620	+10h	38-44.7N	154-57.6 E	215	5740	bc	SSE-5	14.4

Table 2. Position and research conditions of surface drift gillnet sampling at each station during the *Oshoro maru* Cruise #025, 2016.

Station	Date and Time (S.M.T.*1)				T.D.*2	Set Position		D.S.*3	Number of baskets	bottom depth(m)	Wr*4	Wind S.T.*5	
	Line set		Line haul			Lat.	Long.					(Force)	(°C)
OSSL1601	May 15	1023-1040	May 15	1356-1450	+10h	43-18.7N	155-00.1N	180	20	5445	f	ENE-3	5
OSSL1602	May 16	0440-0505	May 16	0726-0845	+10h	43-04.5N	154-58.6E	80	30	5353	c	ENE-4	7.3
OSSL1603	May 16	1222-1240	May 16	1534-1615	+10h	42-30.5N	155-00.2E	270	20	5140	o	East-5	8.2

*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 or line set.

*4 Wr. : Weather (bc:25-74%clouded, c: 75-99% clouded, o: 100% clouded, f: fog).

*5 S.T. : Surface temperature

Table 3. The number of organisms caught by drift gillnet during the Oshoro maru Cruise # 025, in May, 2016. CPUE and (%) indicate numerical catch per tan and percentage of total catch by C-gear gillnet at the station, respectively.

Station		OSG 1601					OSG 1602					OSG 1603				
Common name	Scientific name	C			A	Total	C			A	Total	C			A	Total
		CPUE	(%)				CPUE	(%)				CPUE	(%)			
Sockeye salmon	<i>Oncorhynchus nerka</i>	1	0.0	(0.5)	0	1	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Chum salmon	<i>Oncorhynchus keta</i>	1	0.0	(0.5)	2	3	12	0.4	(4.7)	17	29	0	0.0	(0.0)	0	0
Pink salmon	<i>Oncorhynchus gorbuscha</i>	204	6.8	(96.2)	0	204	234	7.8	(91.4)	1	235	0	0.0	(0.0)	0	0
Coho salmon	<i>Oncorhynchus kisutch</i>	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Steelhead	<i>Oncorhynchus mykiss</i>	0	0.0	(0.0)	0	0	2	0.1	(0.8)	0	2	0	0.0	(0.0)	0	0
Tufted Puffin	<i>Fratercula cirrhata</i>	0	0.0	(0.0)	0	0	1	0.0	(0.4)	0	1	0	0.0	(0.0)	0	0
Boreal clubhook squid	<i>Onychoteuthis borealijaponica</i>	4	0.1	(1.9)	0	4	5	0.2	(2.0)	0	5	2	0.1	(1.0)	0	2
Boreopacific gonate squid	<i>Gonatopsis borealis</i>	2	0.067	(0.9)	0	2	1	0.0	(0.4)	0	1	0	0.0	(0.0)	0	0
Horned puffin	<i>Fratercula corniculata</i>	0	0.0	(0.0)	0	0	1	0.033	(0.4)	0	1	0	0	(0.0)	0	0
Neon flying squid	<i>Ommastrephes bartramii</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	11	0.367	(5.7)	14	25
Pacific pomfret	<i>Brama japonica</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	172	5.733	(89.6)	109	281
Albacore tuna	<i>Thunnus alalunga</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	0	0	(0.0)	1	1
Blue shark	<i>Prionace glauca</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	6	0.2	(3.1)	2	8
Shortfin mako shark	<i>Isurus oxyrinchus</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	0	0	(0.0)	1	1
Salmon shark	<i>Lamna ditropis</i>	0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	1	0.033	(0.5)	0	1

Table 4. The catch number of each salmonid at each station where salmonids were collected by hook-and-line gear, surface longline in the Oshoro maru Cruise # 025, 2016.

Station Name	Sampling gear	Species name									Total
		Sockeye	Chum	Pink	Coho	Chinook	Stellhead	D.immutabilis	B.J.Hilgendorf	Scomber	
Cruise #025											
OSSL 1601	Surface longline	0	8	23	0	0	0	0	0	0	31
OSSL 1602	Surface longline	0	4	159	0	0	0	2	0	0	165
OSSL 1603	Surface longline	0	1	17	0	0	0	0	0	0	18
OSHL 1601	Hook-and-line	0	1	9	0	0	0	0	0	0	10
OSHL 1602	Hook-and-line	0	2	100	0	0	0	0	0	0	102
OSHL 1603	Hook-and-line	0	0	226	0	0	0	0	0	0	226
OSHL 1604	Hook-and-line	0	0	3	0	0	0	0	3	4	10

Table 5. List of oceanographic station during the Oshoro maru Cruise #025, 2016.

Station	Date and Time (S.M.T.*1)		T.D.*2	Set Position		Remark CTD	CTD depth(db)
				Lat.	Long.		
Cruise #025							
OS 16029	May 14	2000	+9h	43-59.9N	155-00.2E	Sea-Bird SBE 9	5300
OS 16032	May 15	1055	+10h	43-16.0N	155-00.3E	Sea-Bird SBE 9	5500
OS 16033	May 15	2100	+10h	43-01.7N	154-57.3E	Sea-Bird SBE 9	5300
OS 16035	May 16	1302	+10h	42-29.6N	154-57.7E	Sea-Bird SBE 9	5200
OS 16036	May 16	2027	+10h	41-59.5N	154-57.8E	Sea-Bird SBE 9	5400
OS 16038	May 17	1333	+10h	41-00.0N	155-00.2E	Sea-Bird SBE 9	5500
OS 16039	May 17	2038	+10h	40-14.9N	154-59.8E	Sea-Bird SBE 9	5500
OS 16041	May 18	0810	+10h	39-29.9N	154-59.9E	Sea-Bird SBE 9	5600
OS 16042	May 18	1533	+10h	38-45.0N	155-00.0E	Sea-Bird SBE 9	5700
OS 16044	May 19	1204	+10h	38-00.2N	154-59.9E	Sea-Bird SBE 9	6000
OS 16045	May 19	1922	+10h	37-15.0N	155-00.0E	Sea-Bird SBE 9	5700

Table 6. Oceanographic data

STATION OS16029				STATION OS16032				STATION OS16033			
LATITUDE 43-59. 8		N		LATITUDE 43-15. 9		N		LATITUDE 43-01. 7		N	
LONGITUDE 155-00. 2		E		LONGITUDE 155-00. 3		E		LONGITUDE 154-57. 3		E	
DEPTH (m) 5300				DEPTH (m) 5500				DEPTH (m) 5300			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	3. 9084	33. 0129	26. 2147	5	4. 9942	33. 0621	26. 1397	5	7. 5456	33. 6118	26. 2494
10	3. 6221	33. 0066	26. 2373	10	4. 9641	33. 0636	26. 1442	10	7. 5478	33. 6116	26. 2489
20	3. 5745	33. 0054	26. 2409	20	4. 7951	33. 0535	26. 1549	20	7. 2216	33. 5788	26. 2689
30	3. 5687	33. 0081	26. 2436	30	4. 5042	33. 0296	26. 1671	30	7. 0884	33. 577	26. 2858
40	3. 5577	33. 007	26. 2438	40	4. 5893	33. 0552	26. 1785	40	7. 1095	33. 5839	26. 2883
50	3. 5446	33. 0063	26. 2444	50	4. 566	33. 0974	26. 2144	50	7. 1424	33. 5922	26. 2904
75	3. 3634	33. 0093	26. 2636	75	4. 7542	33. 2792	26. 3383	75	7. 2382	33. 6227	26. 3011
100	3. 0182	33. 0632	26. 3376	100	5. 062	33. 3831	26. 3865	100	7. 0673	33. 6253	26. 3267
125	3. 5846	33. 4017	26. 5555	125	3. 1179	33. 3066	26. 5229	125	5. 2837	33. 4893	26. 4452
150	3. 4628	33. 4814	26. 6306	150	3. 4905	33. 4049	26. 567	150	3. 4174	33. 3248	26. 51
175	3. 0416	33. 5336	26. 7109	175	4. 0629	33. 5401	26. 6185	175	3. 1359	33. 3314	26. 5411
200	2. 9084	33. 5739	26. 7547	200	3. 4843	33. 5156	26. 6558	200	3. 2492	33. 4145	26. 5971
250	3. 0205	33. 6839	26. 8327	250	4. 1778	33. 7417	26. 767	250	5. 1946	33. 8192	26. 7168
300	3. 236	33. 8272	26. 9274	300	4. 4142	33. 874	26. 8472	300	4. 3884	33. 8154	26. 8034
400	3. 4751	34. 028	27. 065	400	4. 5124	34. 0642	26. 9877	400	3. 7114	33. 9075	26. 946
500	3. 386	34. 1264	27. 1519	500	3. 8026	34. 1032	27. 0928	500	3. 9779	34. 0791	27. 0559
600	3. 2363	34. 2114	27. 2338	600	3. 436	34. 1597	27. 1737	600	3. 8273	34. 1715	27. 1447
700	3. 1716	34. 2839	27. 2977	700	3. 2323	34. 2355	27. 2534	700	3. 3978	34. 2085	27. 2162
800	3. 0112	34. 3232	27. 3438	800	3. 1467	34. 3039	27. 316	800	3. 205	34. 2816	27. 2927
900	2. 8685	34. 3783	27. 4007	900	2. 9612	34. 3502	27. 3699	900	3. 1679	34. 3521	27. 3525
1000	2. 6319	34. 4041	27. 4421	1000	2. 8244	34. 3875	27. 4119	1000	2. 8812	34. 3736	27. 3957
1200	2. 4211	34. 4594	27. 5043	1200	2. 4969	34. 4437	27. 4853	1200	2. 5881	34. 4418	27. 476
1500	2. 1742	34. 5286	27. 58	1500	2. 2377	34. 5126	27. 562	1500	2. 2749	34. 5056	27. 5534
2000	1. 845	34. 603	27. 6657					2000	1. 9461	34. 5912	27. 6484
2500	1. 6425	34. 6444	27. 7143					2500	1. 7039	34. 6359	27. 7028
3000	1. 528	34. 6654	27. 7396					3000	1. 5586	34. 6612	27. 734
3500	1. 4727	34. 6772	27. 7531								
4000	1. 4592	34. 6843	27. 7598								
4500	1. 4725	34. 6888	27. 7625								
5000	1. 5154	34. 6906	27. 7607								

STATION OS16035				STATION OS16036				STATION OS16038			
LATITUDE 42-29. 6		N		LATITUDE 41-59. 5		N		LATITUDE 41-00. 0		N	
LONGITUDE 154-57. 7		E		LONGITUDE 154-57. 8		E		LONGITUDE 155-00. 0		E	
DEPTH (m) 5200				DEPTH (m) 5400				DEPTH (m) 5500			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	7. 5188	33. 6202	26. 2598	5	7. 7017	33. 6265	26. 2386	10	12. 2065	34. 2348	25. 9553
10	7. 5174	33. 6204	26. 2601	10	7. 6959	33. 6266	26. 2395	20	12. 1617	34. 239	25. 9672
20	8. 0393	33. 8221	26. 343	20	7. 3963	33. 6267	26. 2822	30	12. 1114	34. 2401	25. 9777
30	8. 0574	33. 828	26. 3449	30	7. 2652	33. 6295	26. 3027	40	12. 0372	34. 2306	25. 9844
40	8. 3036	33. 885	26. 3528	40	7. 2478	33. 6298	26. 3054	50	11. 716	34. 183	26. 008
50	8. 2774	33. 8827	26. 355	50	7. 1261	33. 6388	26. 3293	75	9. 9801	34. 0148	26. 186
75	8. 2785	33. 8891	26. 3598	75	6. 6961	33. 6667	26. 4094	100	9. 9426	34. 1418	26. 2915
100	8. 0653	33. 8845	26. 3881	100	6. 7065	33. 6696	26. 4103	125	8. 5935	33. 9232	26. 3385
125	7. 4994	33. 8122	26. 4135	125	6. 7303	33. 6759	26. 4121	150	8. 0176	33. 8896	26. 3991
150	7. 0848	33. 7732	26. 4407	150	6. 1128	33. 6847	26. 4992	175	5. 4745	33. 5407	26. 4634
175	6. 5236	33. 7142	26. 4696	175	4. 6108	33. 6093	26. 6158	200	3. 8224	33. 3674	26. 5052
200	5. 8137	33. 6867	26. 538	200	4. 0447	33. 6261	26. 6887	250	5. 756	33. 7429	26. 5895
250	5. 312	33. 7064	26. 6138	250	3. 1599	33. 6491	26. 7924	300	4. 0489	33. 607	26. 6731
300	5. 3019	33. 8315	26. 714	300	3. 2064	33. 7432	26. 8631	400	3. 7829	33. 754	26. 8168
400	4. 4803	33. 9274	26. 8825	400	3. 7696	33. 9736	26. 9929	500	3. 9557	33. 9842	26. 9826
500	3. 7308	33. 9869	27. 0073	500	3. 532	34. 0766	27. 0982	600	4. 1799	34. 1776	27. 1132
600	3. 5651	34. 083	27. 1001	600	3. 6076	34. 1903	27. 1815	700	3. 5536	34. 1878	27. 1847
700	3. 4869	34. 193	27. 1953	700	3. 4611	34. 2776	27. 2652	800	3. 3342	34. 2613	27. 2644
800	3. 3245	34. 2669	27. 2698	800	3. 2527	34. 3238	27. 3219	900	3. 1086	34. 309	27. 3235
900	3. 1599	34. 3151	27. 3236	900	3. 0203	34. 3597	27. 3721	1000	2. 9685	34. 355	27. 373
1000	2. 9709	34. 3554	27. 3731	1000	2. 8509	34. 3862	27. 4085	1200	2. 6623	34. 4266	27. 4574
1200	2. 7091	34. 4217	27. 4494	1200	2. 5701	34. 4557	27. 4887	1500	2. 3207	34. 5082	27. 5517
1500	2. 372	34. 4992	27. 5403	1500	2. 2803	34. 5175	27. 5625				
				2000	1. 954	34. 5919	27. 6483				
				2500	1. 7065	34. 6362	27. 7029				
				3000	1. 5775	34. 6592	27. 731				

STATION OS16038			
LATITUDE 41-00. 0		N	
LONGITUDE 155-00. 0		E	
DEPTH (m) 5500			
Press.	Temp.	Salinity	Sigma-T
10	12. 2065	34. 2348	25. 9553
20	12. 1617	34. 239	25. 9672
30	12. 1114	34. 2401	25. 9777
40	12. 0372	34. 2306	25. 9844
50	11. 716	34. 183	26. 008
75	9. 9801	34. 0148	26. 186
100	9. 9426	34. 1418	26. 2915
125	8. 5935	33. 9232	26. 3385
150	8. 0176	33. 8896	26. 3991
175	5. 4745	33. 5407	26. 4634
200	3. 8224	33. 3674	26. 5052
250	5. 756	33. 7429	26. 5895
300	4. 0489	33. 607	26. 6731
400	3. 7829	33. 754	26. 8168
500	3. 9557	33. 9842	26. 9826
600	4. 1799	34. 1776	27. 1132
700	3. 5536	34. 1878	27. 1847
800	3. 3342	34. 2613	27. 2644
900	3. 1086	34. 309	27. 3235
1000	2. 9685	34. 355	27. 373
1200	2. 6623	34. 4266	27. 4574
1500	2. 3207	34. 5082	27. 5517

STATION OS16039				STATION OS16041				STATION OS16042			
LATITUDE 40-14. 9 N				LATITUDE 38-45. 0 N				LATITUDE 41-00. 0 N			
LONGITUDE 154-59. 8 E				LONGITUDE 155-00. 0 E				LONGITUDE 155-00. 0 E			
DEPTH (m) 5500				DEPTH (m) 5600				DEPTH (m) 5700			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	13. 0144	34. 3855	25. 9139	5	11. 1669	34. 0266	25. 9875	5	14. 3595	34. 4165	25. 6603
10	13. 0162	34. 3853	25. 9134	10	11. 1109	34. 0248	25. 9962	10	14. 3497	34. 4161	25. 662
20	13. 0016	34. 385	25. 9161	20	10. 9515	34. 0256	26. 0254	20	12. 9512	34. 3257	25. 8801
30	12. 9643	34. 384	25. 9228	30	10. 6486	34. 0304	26. 0829	30	11. 9701	34. 2912	26. 0442
40	12. 7479	34. 3733	25. 9574	40	10. 4303	34. 0185	26. 1118	40	11. 714	34. 2753	26. 0801
50	12. 4751	34. 3456	25. 9894	50	10. 26	34. 0059	26. 1313	50	11. 5719	34. 3215	26. 1425
75	12. 1615	34. 3515	26. 0546	75	9. 7514	33. 9895	26. 2046	75	10. 9786	34. 3051	26. 2382
100	10. 9639	34. 2573	26. 2036	100	8. 7822	33. 9388	26. 3215	100	10. 9235	34. 3038	26. 2471
125	10. 3113	34. 1914	26. 2672	125	8. 5463	33. 944	26. 3621	125	10. 8738	34. 2969	26. 2507
150	9. 3883	34. 0538	26. 3147	150	8. 5139	33. 9493	26. 3712	150	10. 698	34. 2754	26. 2651
175	8. 6989	33. 9611	26. 3519	175	7. 804	33. 8351	26. 3877	175	10. 4835	34. 2485	26. 2819
200	8. 0354	33. 8902	26. 397	200	7. 1727	33. 7595	26. 4179	200	10. 3224	34. 2244	26. 291
250	4. 397	33. 4325	26. 4984	250	5. 9572	33. 6827	26. 5171	250	8. 9387	34. 0298	26. 3681
300	5. 4947	33. 6993	26. 5866	300	5. 1686	33. 6732	26. 6041	300	7. 6106	33. 9027	26. 4688
400	5. 7881	33. 9612	26. 7581	400	4. 5277	33. 811	26. 785	400	6. 1017	33. 9942	26. 745
500	4. 9563	34. 0492	26. 9264	500	4. 0544	33. 9072	26. 9113	500	4. 9926	34. 0479	26. 9212
600	4. 3294	34. 1029	27. 0381	600	3. 7905	34. 0369	27. 0412	600	4. 4707	34. 1394	27. 0519
700	3. 9394	34. 1892	27. 1473	700	3. 6627	34. 1572	27. 1496	700	4. 3291	34. 2505	27. 1554
800	3. 6536	34. 2542	27. 2278	800	3. 6025	34. 2503	27. 2297	800	3. 7605	34. 2882	27. 2442
900	3. 4123	34. 3209	27. 3045	900	3. 2694	34. 3046	27. 305	900	3. 4402	34. 3348	27. 3128
1000	3. 053	34. 3499	27. 3612	1000	3. 0402	34. 3531	27. 365	1000	3. 1986	34. 3704	27. 3642
1200	2. 7251	34. 4169	27. 4442	1200	2. 7217	34. 4213	27. 448	1200	2. 7964	34. 4426	27. 4584
1500	2. 3791	34. 4928	27. 5345	1500	2. 3699	34. 5045	27. 5447	1500	2. 4114	34. 5084	27. 5443
2000	1. 9927	34. 5849	27. 6397					2000	1. 9773	34. 5898	27. 6448
2500	1. 7455	34. 6309	27. 6957					2500	1. 7153	34. 6347	27. 701
3000	1. 5986	34. 6569	27. 7276					3000	1. 5712	34. 66	27. 7321

STATION OS16044				STATION OS16045			
LATITUDE 38-00. 2 N				LATITUDE 37-15. 0 N			
LONGITUDE 154-59. 9 E				LONGITUDE 155-00. 0 E			
DEPTH (m) 6000				DEPTH (m) 5700			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	17. 2854	34. 6727	25. 195	5	18. 0883	34. 7379	25. 0495
10	17. 287	34. 673	25. 1948	10	18. 0828	34. 738	25. 051
20	17. 2714	34. 6733	25. 1988	20	16. 5684	34. 6838	25. 3731
30	17. 094	34. 6745	25. 2421	30	16. 3045	34. 6818	25. 4329
40	16. 1323	34. 6483	25. 4468	40	15. 9618	34. 6587	25. 4938
50	15. 6026	34. 6263	25. 5501	50	15. 3546	34. 6299	25. 6083
75	14. 5492	34. 5597	25. 7302	75	14. 6204	34. 5798	25. 7304
100	13. 5773	34. 485	25. 8768	100	13. 4374	34. 4798	25. 9014
125	12. 8829	34. 4405	25. 9827	125	12. 5517	34. 3892	26. 0083
150	12. 1796	34. 3721	26. 0671	150	11. 7568	34. 3302	26. 1148
175	11. 4927	34. 3055	26. 1447	175	10. 7226	34. 2153	26. 2139
200	10. 7224	34. 2326	26. 2274	200	9. 9747	34. 1304	26. 2772
250	8. 2378	33. 9298	26. 3979	250	8. 2699	33. 9198	26. 3852
300	8. 0757	34. 0643	26. 5277	300	5. 1116	33. 542	26. 5067
400	6. 6687	34. 0617	26. 7245	400	6. 652	34. 079	26. 7403
500	4. 7566	34. 0122	26. 9196	500	5. 0828	34. 0556	26. 917
600	4. 5228	34. 1522	27. 0564	600	4. 8613	34. 202	27. 0584
700	4. 0984	34. 2244	27. 159	700	4. 0325	34. 2359	27. 175
800	3. 6858	34. 2962	27. 2581	800	3. 7638	34. 2948	27. 2492
900	3. 4111	34. 3416	27. 321	900	3. 4318	34. 345	27. 3218
1000	3. 1753	34. 393	27. 3844	1000	3. 164	34. 3803	27. 3753
1200	2. 7362	34. 4507	27. 4703	1200	2. 7793	34. 4464	27. 463
1500	2. 3531	34. 5178	27. 5567	1500	2. 365	34. 5144	27. 553
				2000	1. 9454	34. 5949	27. 6514
				2500	1. 7091	34. 6374	27. 7037
				3000	1. 5819	34. 6599	27. 7312

**THE "OSHO RO MARU" CRUISE 026
TO THE WESTERN NORTH PACIFIC OCEAN
IN JULY AND AUGUST 2016**

1. Cruise Itinerary

Cruise 026

Departure from Hakodate (Leg1)	Jun.	01, 2016
Start of oceanographic research		02
Arrival at Shiogama		07
Departure from Shiogama (Leg2)		08
Arrival at Tokyo		15
Departure from Tokyo (Leg3)		19
Arrival at Hachinohe	Jul.	13
Departure from Hachinohe (Leg4)		18
Arrival at Hakodate		19
Departure from Hakodate (Leg5)		20
End of oceanographic research		26
Arrival at Akita		27
Departure from Akita (Leg6)		28
Arrival at Hakodate		29

Total coverage 5019.0miles

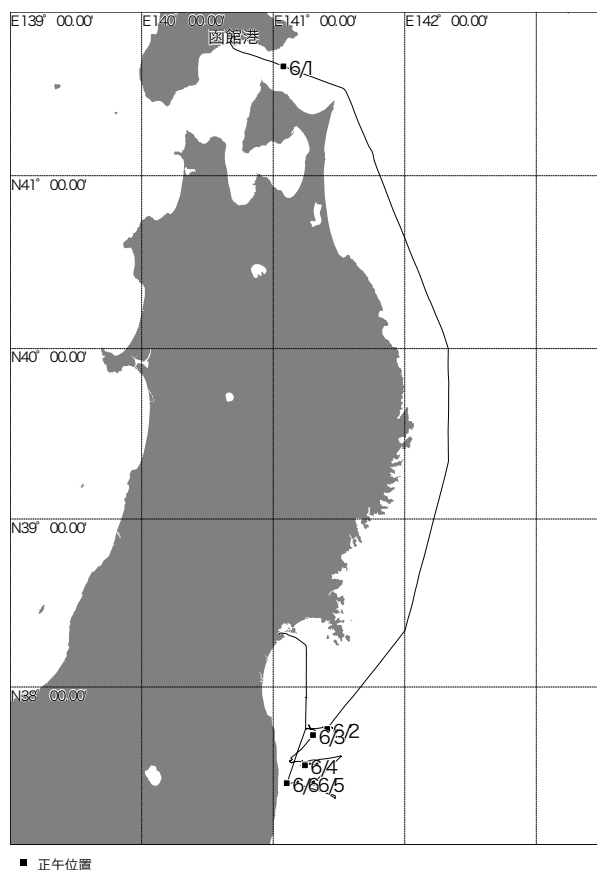


Fig.1.1: Noon Position (Leg1)

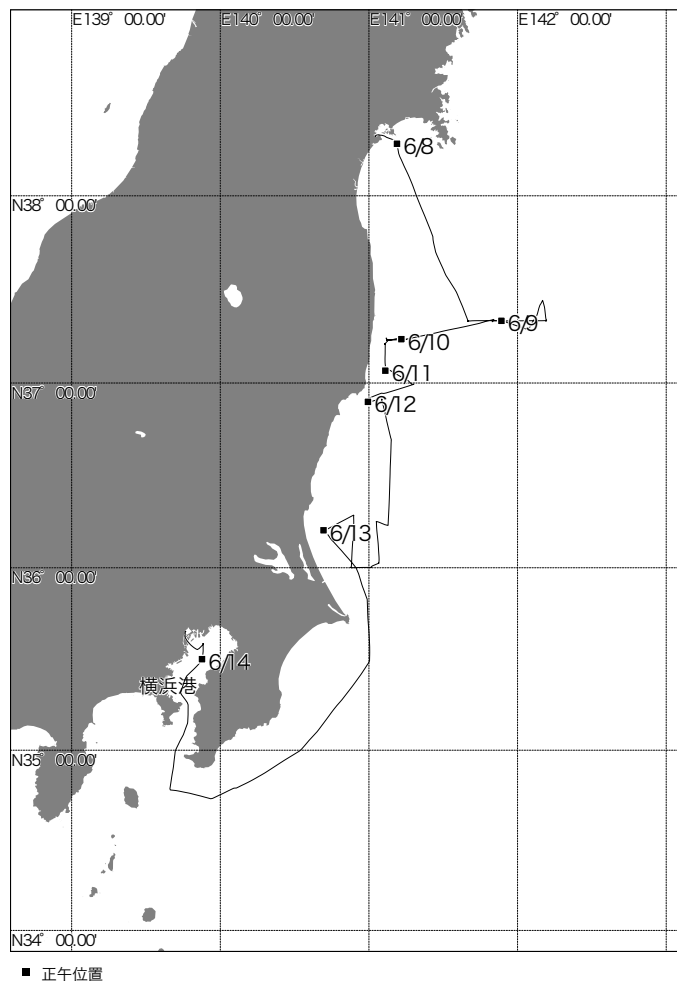


Fig.1.2: Noon Position (Leg2)

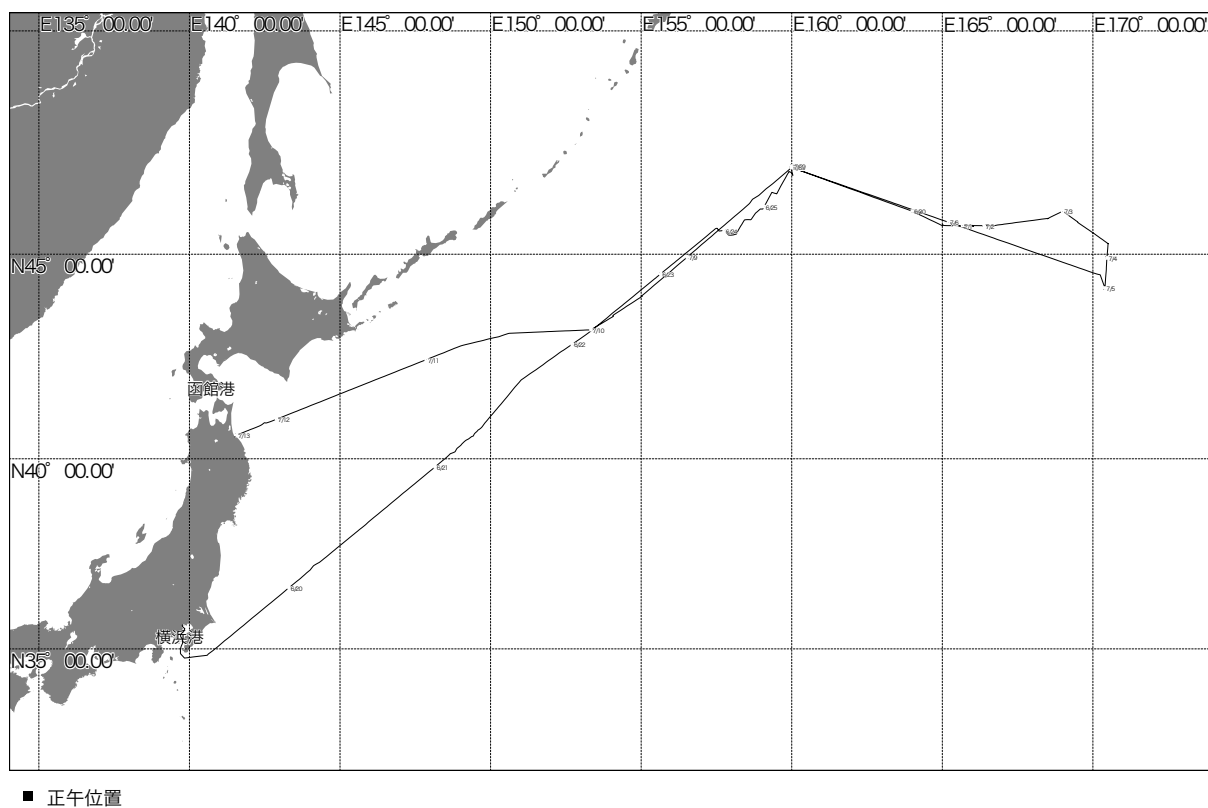
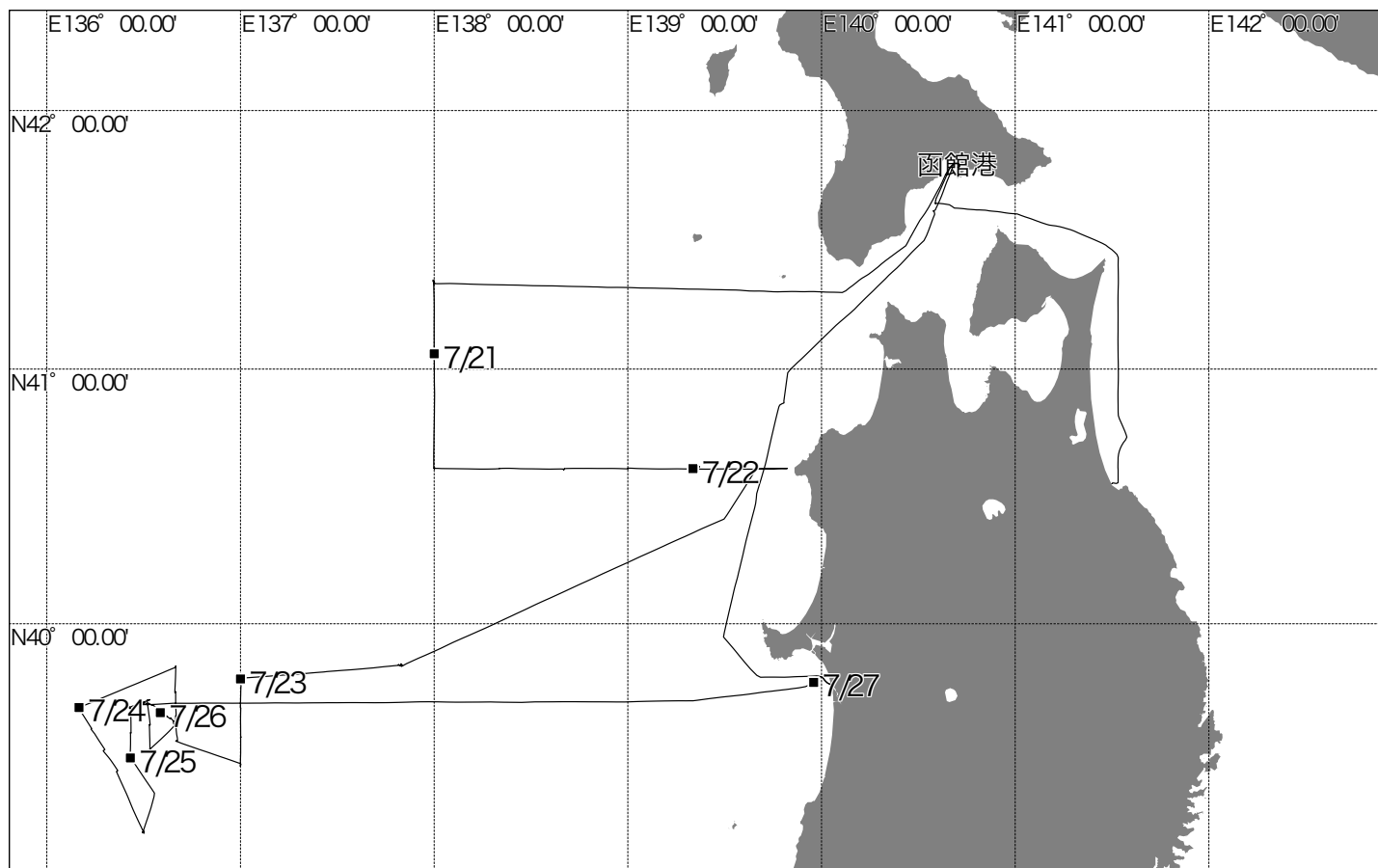


Fig.1.3: Noon Position (Leg3)



■ 正午位置

Fig.1.4: Noon Position (Leg4,5,6)

2. Vessel Personnel

Crew:	Captain: Associate Professor Shogo Takagi	And 31 persons
Leg1		
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 Matsumoto
	Postdoctoral Fellow (Tokyo University of Marine Science and Technology)	Atsushi Kubo
	Technical staff (Tokyo University of Marine Science and Technology)	Yukari Ito
	Visiting Professor (Tokai University)	Yoshihisa Kato
	Associate Professor (Fukushima University)	Toshihiro Wada
	Researcher (National Institute of Radiological Sciences)	Miho Fukuda

Graduate Student: 10 persons

Under Graduate Student: 7 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 Matsumoto

Assistant Professor (Tokyo University of Marine Science and Technology)

Naho Miyazaki

Visiting Professor (Tokai University)

Yoshihisa Kato

Associate Professor (Nagoya University)

Yoshihisa Mino

Publicist (Fukushima University)

Kouji Keitoku

Graduate Student: 3 persons

Under Graduate Student: 2 persons

Leg3

Research Staff: Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)

Hiromichi Ueno

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

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

Atsushi Ooki

Associate Professor (Institute of low temperature Science, Hokkaido University)

Jun Nishioka

Technical Assistant (Institute of low temperature Science, Hokkaido University)

Aiko Murayama

Associate Professor (Nagoya University)

Yoshihisa Mino

Researcher (The University of Tokyo)

Yudai Tanaka

Researcher (Japan Agency for Marine-Earth Science and Technology)

Tetsuichi Fujiki

Researcher (Japan Agency for Marine-Earth Science and Technology)

Kimoto Katsunori

Researcher (Japan Agency for Marine-Earth Science and Technology)

Minoru Kitamura

Researcher (Japan Agency for Marine-Earth Science and Technology)

Masahide Wakita

Researcher (Japan Agency for Marine-Earth Science and Technology)

Yoshiyuki Nakano

Researcher (Japan Agency for Marine-Earth Science and Technology)

Keisuke Shimizu

Researcher (Japan Agency for Marine-Earth Science and Technology)

Bingzhang Chen

Technician (Marin Works Japan LTD)

Masaki Furuhata

Technician (Marin Works Japan LTD)

Daiki Atomura

Postdoctoral Fellow: 1 person

Graduate Student: 5 persons

Under Graduate Student: 6 persons

Leg4

Research Staff: Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)

Hiromichi Ueno

Associate Professor (Laboratory of Marine Environment and Resource Sensing, Hokkaido University)

Toru Hirawake

Associate Professor (Kyushu University)

Tomoharu Senjyu

Researcher (Japan Agency for Marine-Earth Science and Technology)

Yuishiro Kumamoto

Researcher (Japan Agency for Marine-Earth Science and Technology)

Kazuhiko Matsumoto

Researcher (Japan Agency for Marine-Earth Science and Technology)

Kosei Sasaoka

Researcher (National Institute for Environmental Studies)

Takafumi Aramaki

Researcher (National Institute for Environmental Studies)

Shinichiro Nakaoka

Postdoctoral Fellow: 1 person

Graduate Student: 3 persons

Under Graduate Student: 6 persons

Leg5

Research Staff: Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)

Yutaka Isoda

Associate Professor (Kyushu University)

Tomoharu Senjyu

Researcher (Japan Agency for Marine-Earth Science and Technology)

Yuishiro Kumamoto

Researcher (Japan Agency for Marine-Earth Science and Technology)

Kazuhiko Matsumoto

Researcher (Japan Agency for Marine-Earth Science and Technology)

Kosei Sasaoka

Researcher (National Institute for Environmental Studies)

Takafumi Aramaki

Under Graduate Student: 3 persons

Leg6

Research Staff: Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)

Yutaka Isoda

Under Graduate Student: 3 persons

**THE "OSHORO MARU" CRUISE 030
TO EAST OF THE TSUGARU STRAIT
(IBURI / HIDAKA OFFING)
IN SEPTEMBER 2016**

1. Cruise Itinerary

Cruise 030

Departure from Hakodate and start of oceanographic research	Sep. 26, 2016
Start of bottom trawl research (OST1601)	27
End of bottom trawl research (OST1604)	28
End of oceanographic research	30
Return to Hakodate	Oct. 01

Total coverage 567.2 miles

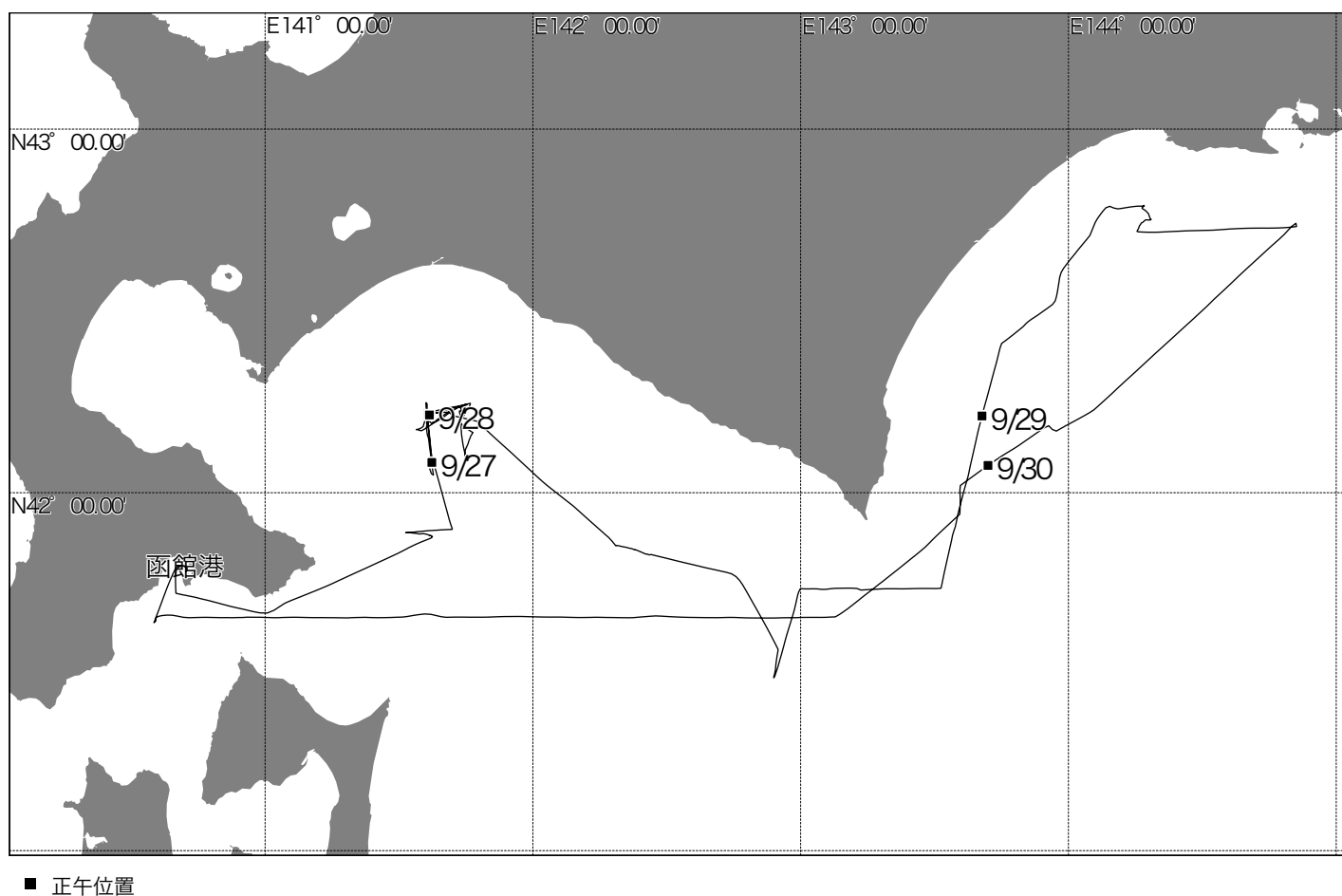


Fig.1 Noon Position

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 30 persons
Under Graduate instructor:	Associate Professor (Laboratory of Marine Biology and Biodiversity, Hokkaido University)		Hisashi Imamura
	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 Biodiversity, Hokkaido University)		Atsushi Yamaguchi
	Associate Professor (Laboratory of Marine Bioresource Science, Hokkaido University)		Orio Yamamura
Teaching Assistant:	10 persons		
Under Graduate Student:	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 observantions:

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.

4. Result of Bottom Trawl Research

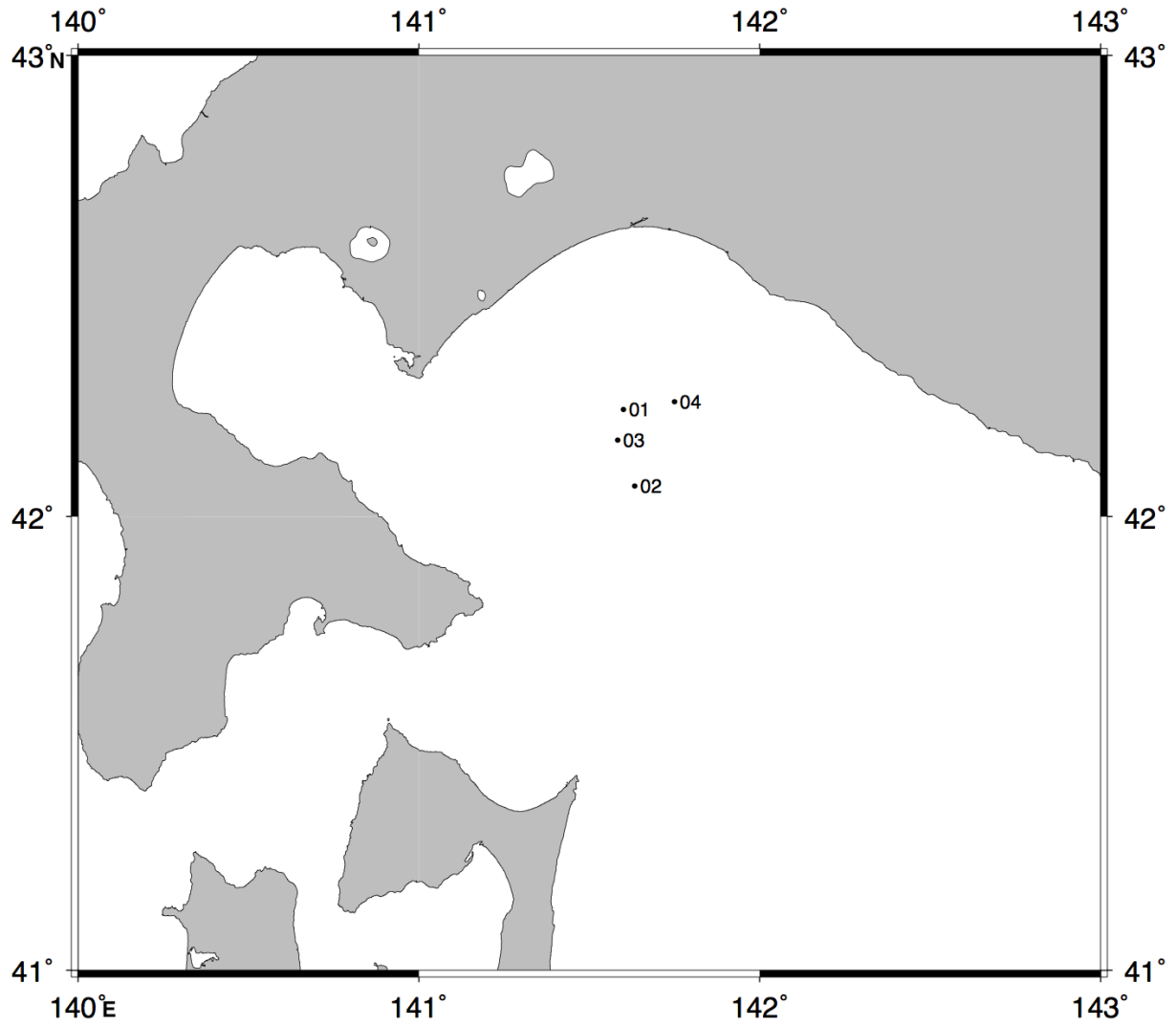


Fig.2 Trawl Research Positions

Table1. Data on bottom trawl research

Station	Date and Time of new tow (S.M.T.*1)	T.D.*2	Set Position		D.S.*3	Speed of tow (knot)	bottom depth(m)	Wr*4	Wind (Force)	S.S.T.*5 (°C)
			Lat.	Long.						
OST1601	Sep 27 0900 - 1000	+09h	42-14.0N	141-36.0E	175°	3	710	bc	East-3	20.3
OST1602	Sep 27 1220 - 1320	+09h	42-03.7N	141-37.6E	355°	3	750	c	SSE-2	20.5
OST1603	Sep 28 0715 - 0815	+09h	42-10.3N	141-35.1E	055°	3	690	c	SSW-6	20.4
OST1604	Sep 28 1030 - 1130	+09h	42-14.7N	141-45.1E	255°	3	715	c	ESE-3	20.5

*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 tow.

*4 Wr. : Weather (bc:25-74%clouded, c: 75-99% clouded).

*5 S.S.T. : Sea Surface temperature

Table 2. Catches by bottom trawl research

Japanese name	Scientific name	OST1601		OST1602		OST1603		OST1604	
		Number	Weight(kg)	Number	Weight(kg)	Number	Weight(kg)	Number	Weight(kg)
Kichiji	<i>Sebastolobus macrochir</i>	115	18.5	209	44.9	84	17	100	16
Shirogenge	<i>Bothrocara molle</i>	393	161.85	475	146	23	15.05	83	46.5
Itohikidara	<i>Laemonema longipes</i>	66	42.02	38	26.1	14	5.19	24	16.5
Tako-ru	<i>Octopuses spp.</i>		34.06	68	24	91	31	79	26.55
Karafutosokodara	<i>Coryphaenoides cinereus</i>	43	12.02	16	3.81	21	4.05	85	20.5
Kanadadara	<i>Antimora microlepis</i>	16	4.25	16	5.19	6	20.55	19	2.77
Kantengenge	<i>Bothrocara tanakae</i>	5	3.55	13	9	3	1.4	7	4.7
Ganko	<i>Dasycottus setiger</i>	13	1.39	14	1.985	17	1.505	12	1.91
Kobushikajika	<i>Malacocottus zonurus</i>	1	0.126					5	0.465
Nezumiginpo	<i>Lumpenella longirostris</i>	21	1.3	14	0.36				
Irakonanago	<i>Synaphobranchus kaupii</i>	6	2.75	17	8.25	1	0.015	11	9
Kurosokoiwashi	<i>Pseudobathylagus milleri</i>	1	0.095	3	0.15	2	0.15		
Mamehadaka	<i>Lampanyctus jordani</i>	15	0.32	24	0.52	16	0.32	21	6.455
Sekkihadaka	<i>Stenobrachius nannochir</i>	1	0.006					2	0.025
Hirainkio	<i>Paraliparis grandis</i>	1	0.46					7	2.4
Yokoeso	<i>Gonostoma gracile</i>	8	0.034	6	0.32	3	0.015	2	0.01
Togariichimonjiwashi	<i>Leuroglossus schmidtii</i>	17	0.055	3	0.01	17	0.085	4	0.015
Benizuwaigani	<i>Chionoecetes japonicus</i>	13	5.5	10	9	22	9.5		
Yasesokoiwashi	<i>Bathylagus pacificus</i>	8	0.26			12	0.35	5	0.18
Demeeso	<i>Benthalbella linguidens</i>	1	0.82						
Sokogangiei-zoku	<i>Bathyraja sp</i>	3	0.988	7	0.62	2	0.105	5	0.295
Higashihouraieso	<i>Chauliodus macouni</i>	1	0.012	1	0.015			2	0.015
Dosuika	<i>Beryteuthis magister</i>	3	0.94	3	0.95	3	0.415	2	0.58
Fujikujira	<i>Etmopterus lucifer</i>	1	0.18						
Tsubu-ru	<i>Buccinidae spp.</i>	192	11.05	1850	109.5				
Samegarei	<i>Clidoderma asperrimum</i>			1	0.69			1.00	0.64
Ogurokonnyakuuo	<i>Careproctus furcellus</i>			1	0.63				
Kusauo	<i>Liparidae</i>			1	0.1				
Norogenge	<i>Bothrocara hollandi</i>			5	0.117			27	1.78
Kuromedai	<i>Ichthyos lockingtoni</i>			1	0.59				
Karasudara	<i>Halargyreus Johnsonii</i>			2	0.62				
Onikinme	<i>Anoplogaster cornuta</i>			1	0.1				
Akadonko	<i>Ebinania vermiculata</i>			1	1.51				
Shigiunagi	<i>Nemichthys scolopaceus</i>			1	0.02	2	0.02	1	0.015
Hiregurokonnyakuuo	<i>Careproctus marginatus</i>							1	0.155
Arasukabiginin	<i>Careproctus colletti</i>							1	0.14
Himeezobora	<i>Neptunea artbritica</i>							95	6.5
Kumogani	<i>Majidae</i>							16	6.7
Mikadohadaka	<i>Nannobrachium regale</i>							2	0.135
Gokouhadaka	<i>Ceratoscopelus townsendi</i>							2	0.015
Kuroshigiunagi	<i>Avocettina infans</i>					1	0.015	1	0.01
Hadakahoteieso	<i>Tactostoma macropus</i>							1	0.02
Kokonohoshiginzame	<i>Hydrolagus barbouri</i>							1	2
Ika-ru	<i>Squids spp.</i>					5	0.15	1	0.02
Kohirehadaka	<i>Stenobrachius leucopsarus</i>					1	0.01		
Ezobaigai-ru	<i>Buccinidae spp.</i>					361	22.26		
Takoika	<i>Gonatopsis borealis</i>					1	0.135		
Tsubu-ru	<i>Buccinidae spp.</i>	192	11.05	1850	109.5				
Yadokari-ru						7	0.105		
Isoginchaku-ru		32	9.5	55	6.75	20	2.6		
Namako-ru		9	1.63	17	2.11	426	38.85	3	0.375

**THE "OSHORU MARU" CRUISE 031
TO SEA OF JAPAN
IN OCTOBER 2016**

1.Cruise Itinerary

Cruise 031

Departure from Hakodate (Leg1)	Oct. 15, 2016
Start of oceanographic research	16
End of oceanographic research	17
Arrival at Niigata	18
Departure from Niigata (Leg2)	20
Return to Hakodate	22

Total coverage 789.7 miles

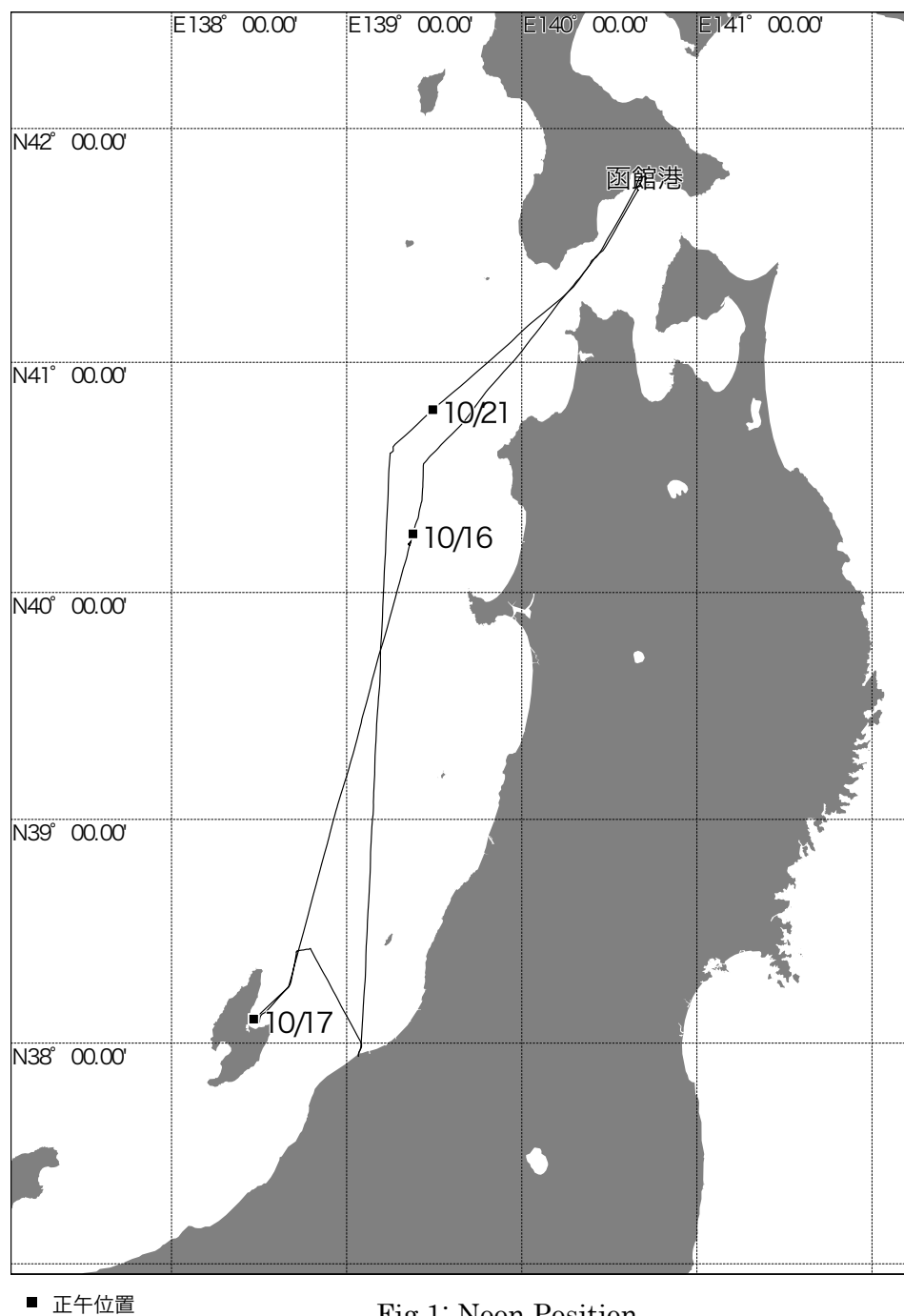


Fig.1: Noon Position

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)
Tohru Mukai
Professor (Laboratory of Marine Environment and Resource Sensing, Hokkaido University)
Yasuzumi Fujimori
Assistant Professor (Field Science Center for Northern Biosphere, Hokkaido University)
Jun Yamamoto

Teaching Assistant: 4 persons

Under Graduate Student: 39 persons

Other: 2 engineers from The Tsurumi Seiki Co.,Ltd.
1 engineer from Mitsui E&S
2 engineers from Nippon Kaiyo Co.,Ltd.

**THE "OSHO RO MARU" CRUISE 032
TO SEA OF OKHOTSK
IN November 2016**

1. Cruise Itinerary

Cruise 032

Departure from Hakodate (Leg1)	Nov. 07, 2016
Start of oceanographic research	09
Arrival at and departure from Abashiri (Leg2)	11
Arrival at Monbetsu	13
Departure from Monbetsu (Leg3)	15
End of oceanographic research	16
Arrival at and departure from Abashiri (Leg4)	17
Return to Hakodate	19

Total coverage 1477.7 miles

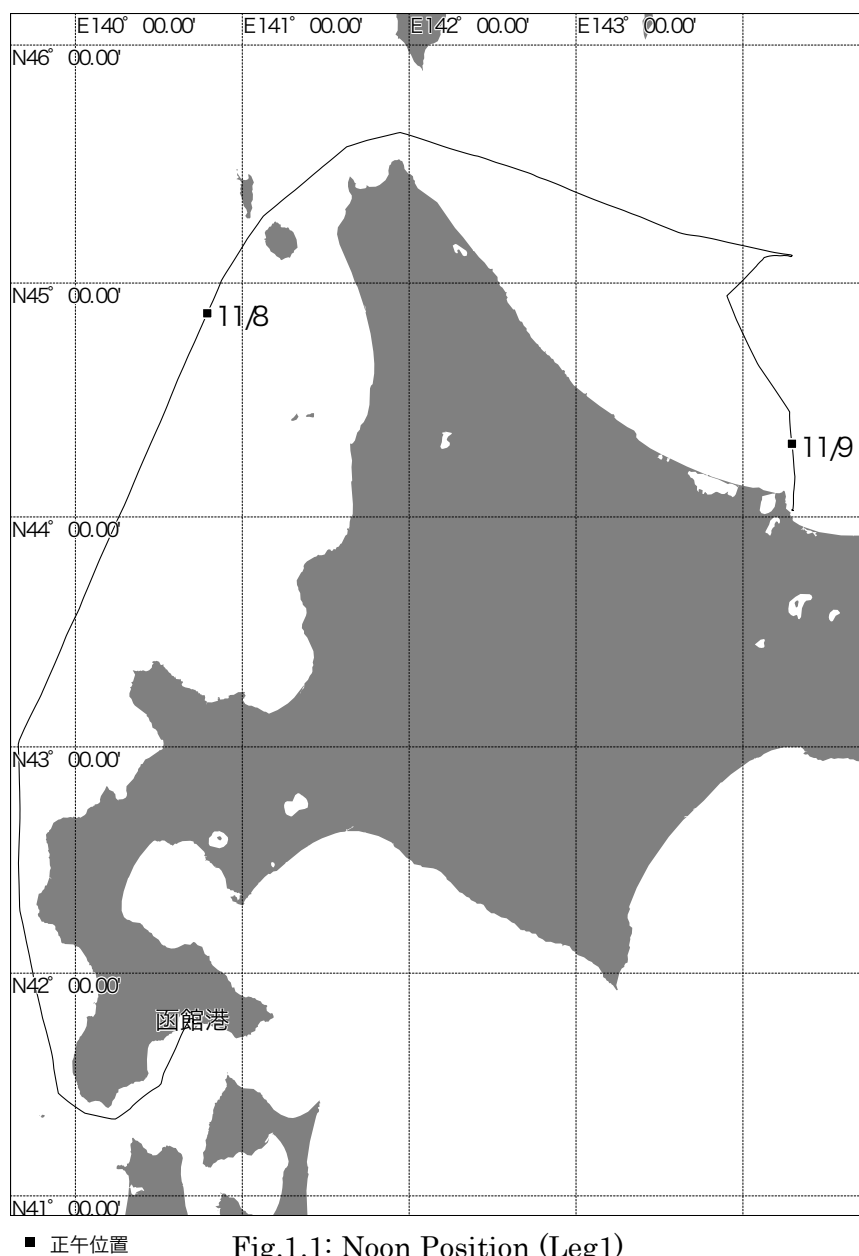
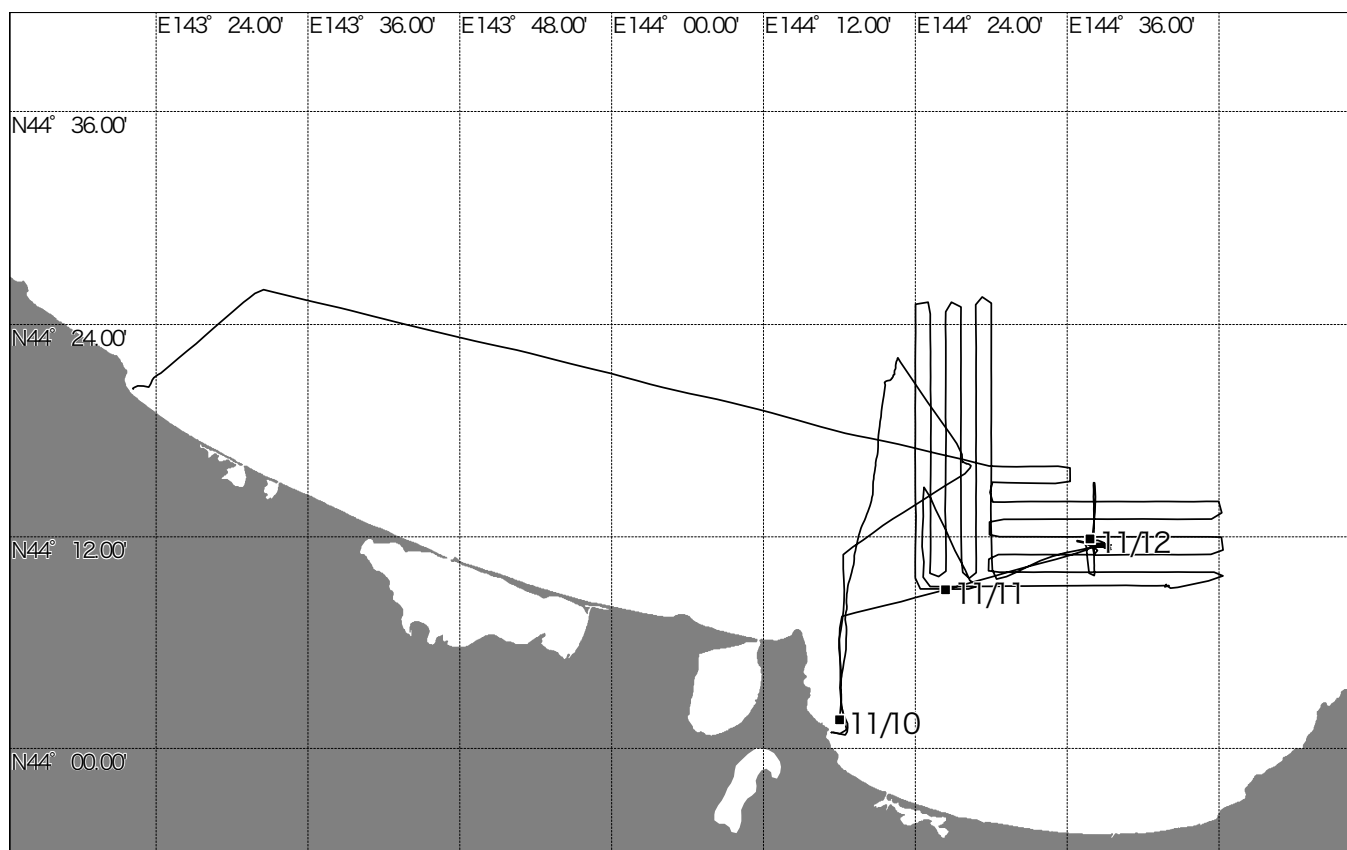
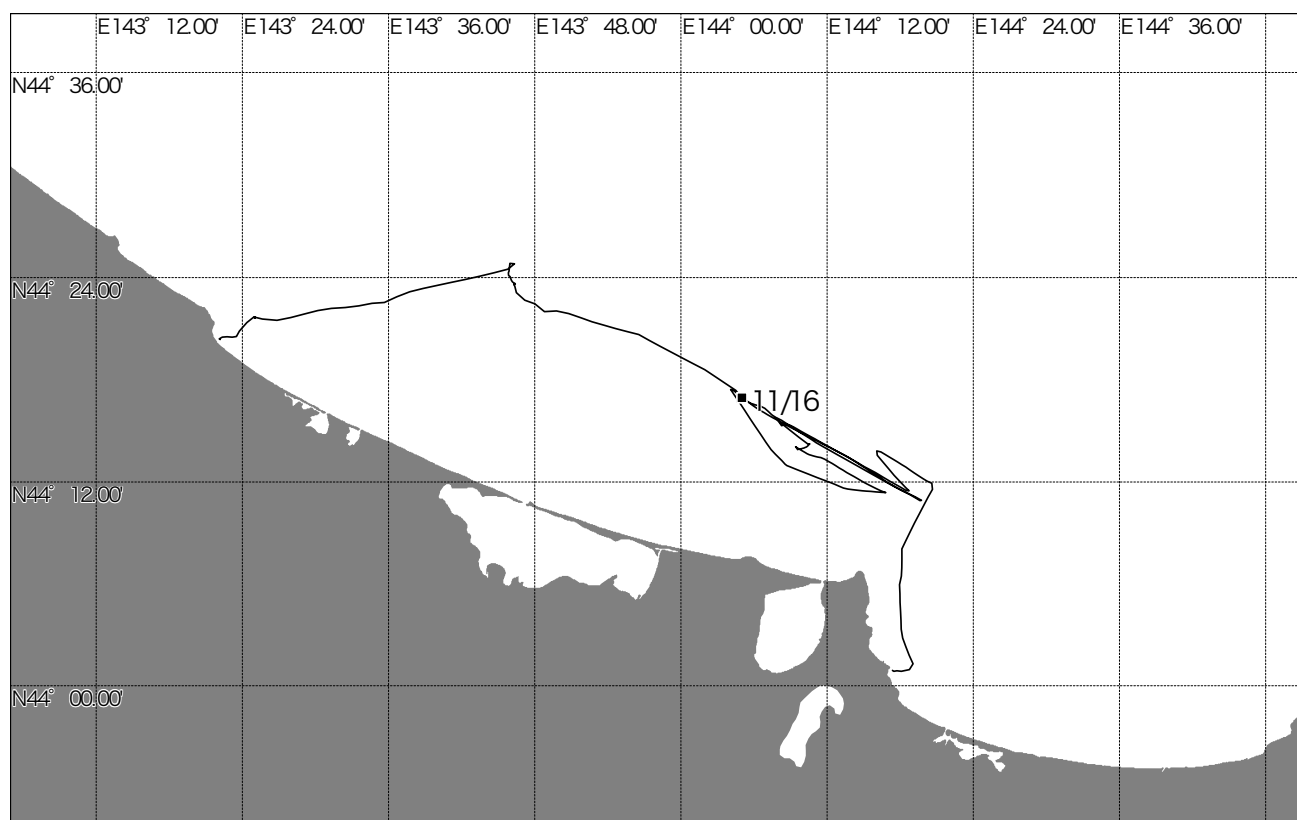


Fig.1.1: Noon Position (Leg1)



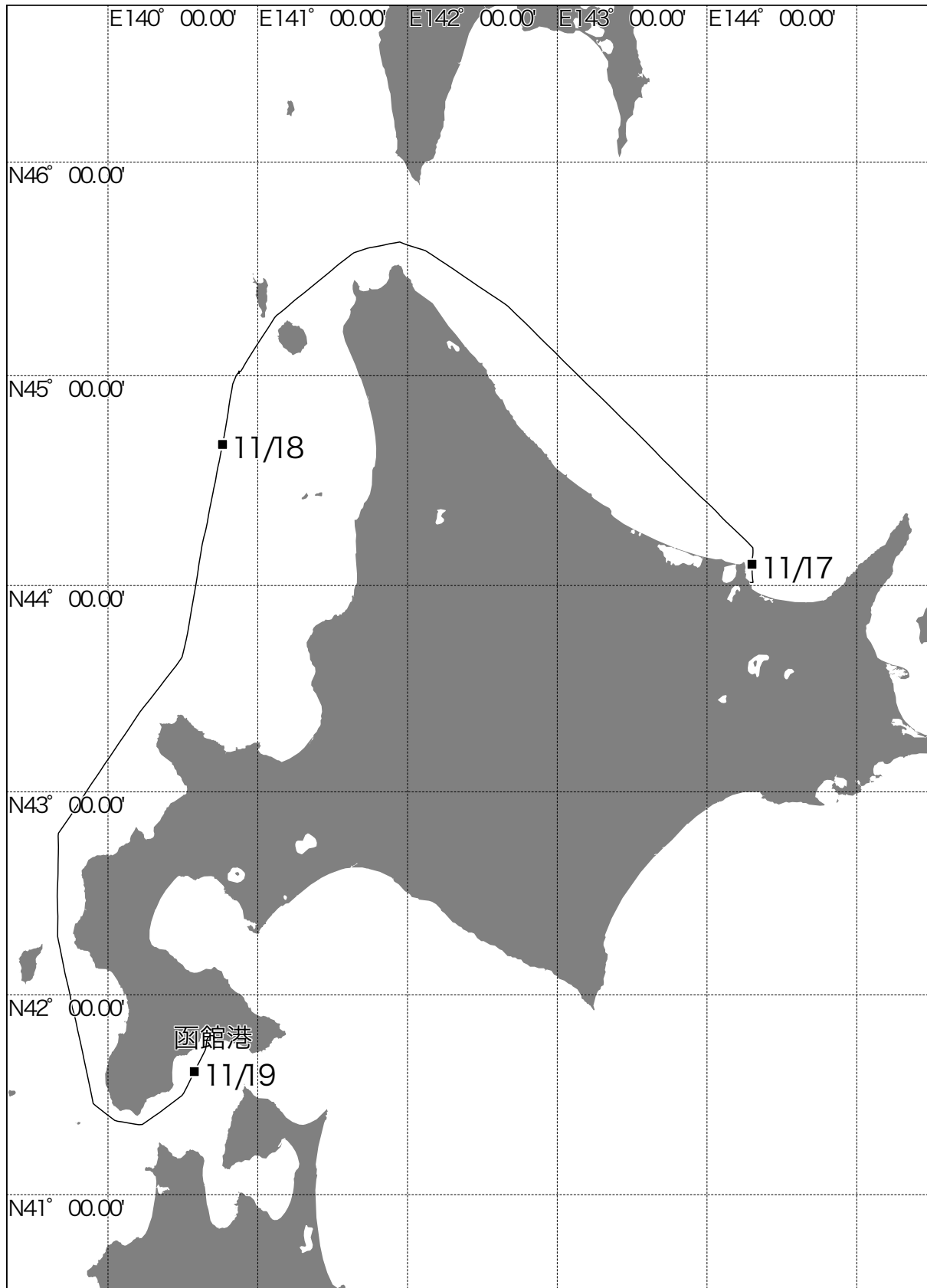
■ 正午位置

Fig.1.2: Noon Position (Leg2)



■ 正午位置

Fig.1.3: Noon Position (Leg3)



■ 正午位置

Fig.1.4: Noon Position (Leg4)

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 Hirotoshi Sakagami
Assistant Professor (Civil and Environmental Engineering, Kitami Institute of Technology)
Leg2 Shintaro Yamasaki
Technical Staff (New Energy Resources Research Center, Kitami Institute of Technology)
Leg2 Kinji Hyakutake
Associate Professor (Civil and Environmental Engineering, Kitami Institute of Technology)
Leg1 Kazutaka Tateyama
Assistant Professor (Graduate School of Advanced Science of Matter, Hiroshima University)
Leg2 Takahisa Tajima
Associate Professor (Institute of low temperature Science, Hokkaido University)
Leg1 Jun Nishioka
Technical Assistant (Institute of low temperature Science, Hokkaido University)
Leg1 Aiko Murayama
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 13 persons Leg3 2 person

Under Graduate Student: Leg1 5 persons Leg2 29 persons Leg3 29 persons

**THE "OSHORO MARU" CRUISE 033
TO THE NANPO ISLANDS
IN DECEMBER 2016**

1. Cruise Itinerary

Cruise 033

Departure from Hakodate (Leg1)	Nov. 29, 2016
Arrival at Tokyo	Dec. 02
Departure from Tokyo (Leg2)	05
Start of vertical long-line research (OSVL1601) and oceanographic research	07
End of vertical long-line research (OSVL 1606)	10
Arrival at Izu Oshima	11
Departure from Izu Oshima (Leg3) and end of oceanographic research	12
Arrival at Yokohama	13

Total coverage 1440.5 miles

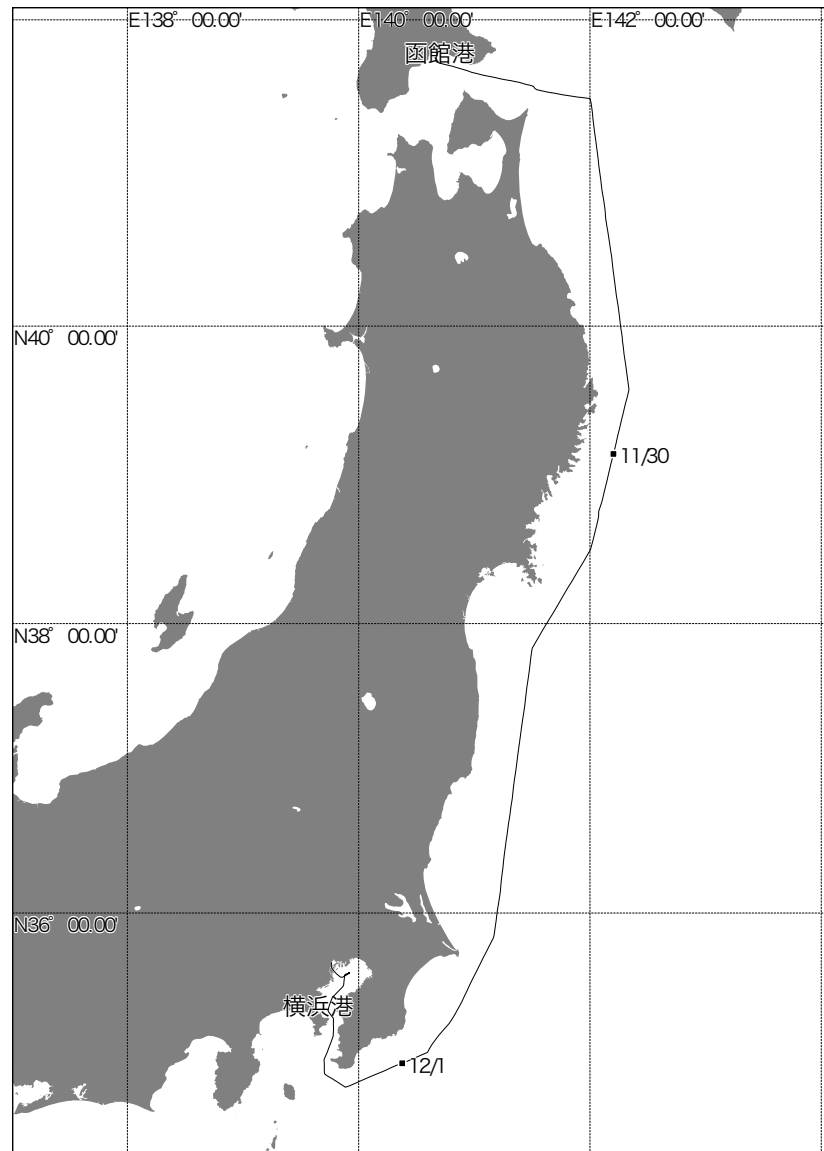
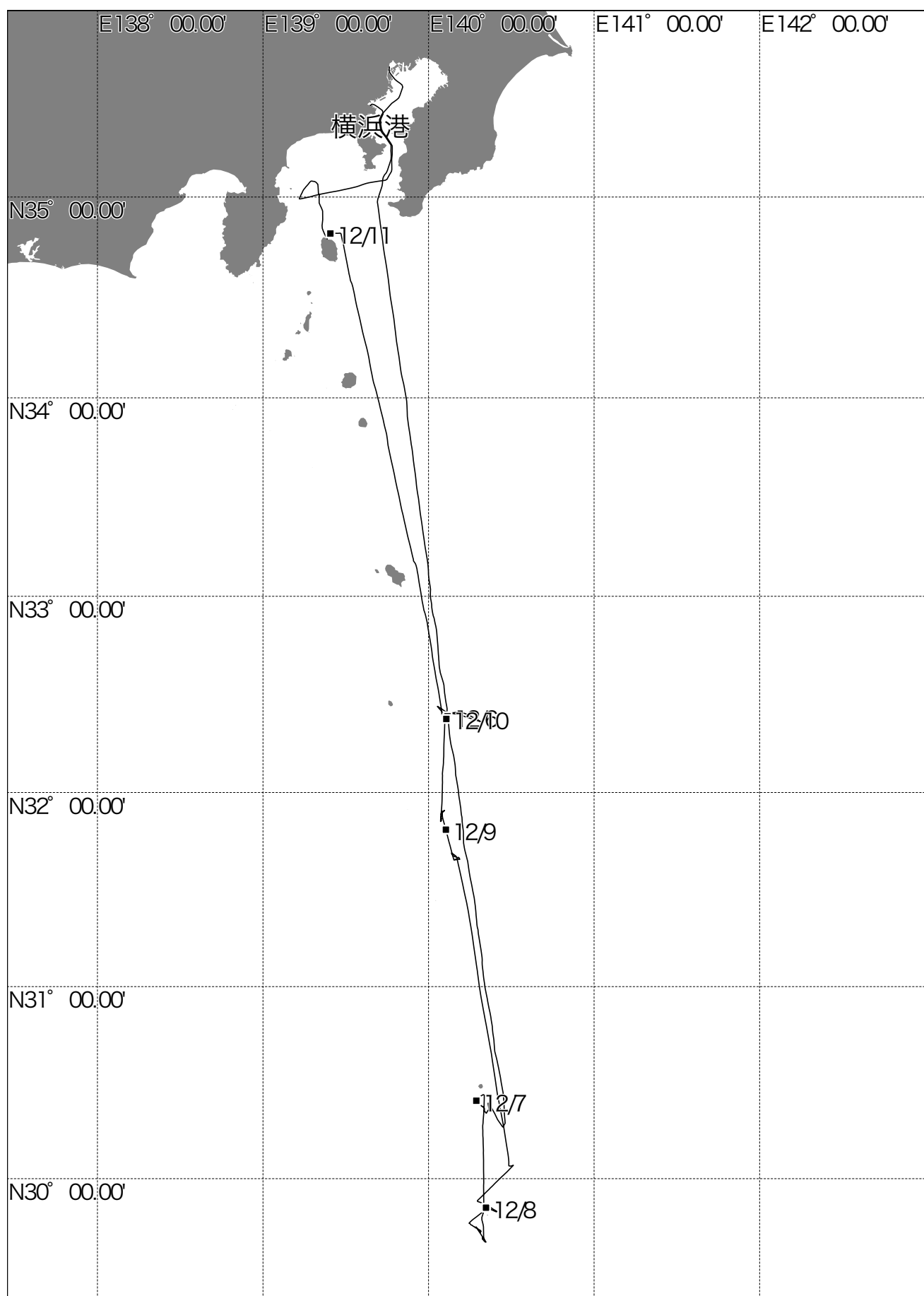


Fig.1.1: Noon Position (Leg1)



■ 正午位置

Fig.1.2: Noon Position (Leg2)

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 31 persons
Research Staff:	Assistant Professor (National Fisheries University)		
		Leg1	Yoichi Shimada
Under Graduate instructor:	Professor (Department of Marine Science and Resources, Nihon University)		
		Leg2,3	Takahito Kojima
	Assistant Professor (Department of Marine Science and Resources, Nihon University)		
		Leg2,3	Yuya Makiguchi
	Professor (Teikyo University of Science and Technology)		
		Leg2,3	Kyoichi Mori
Teaching Assistant:	Leg2,3	1 persons	
Under Graduate Student:	Leg2,3	52 persons	
Other:	4 faculty staffs from Hokkaido University		

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-9).

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

Fig.2 Table 1

4. Result of oceanographic research

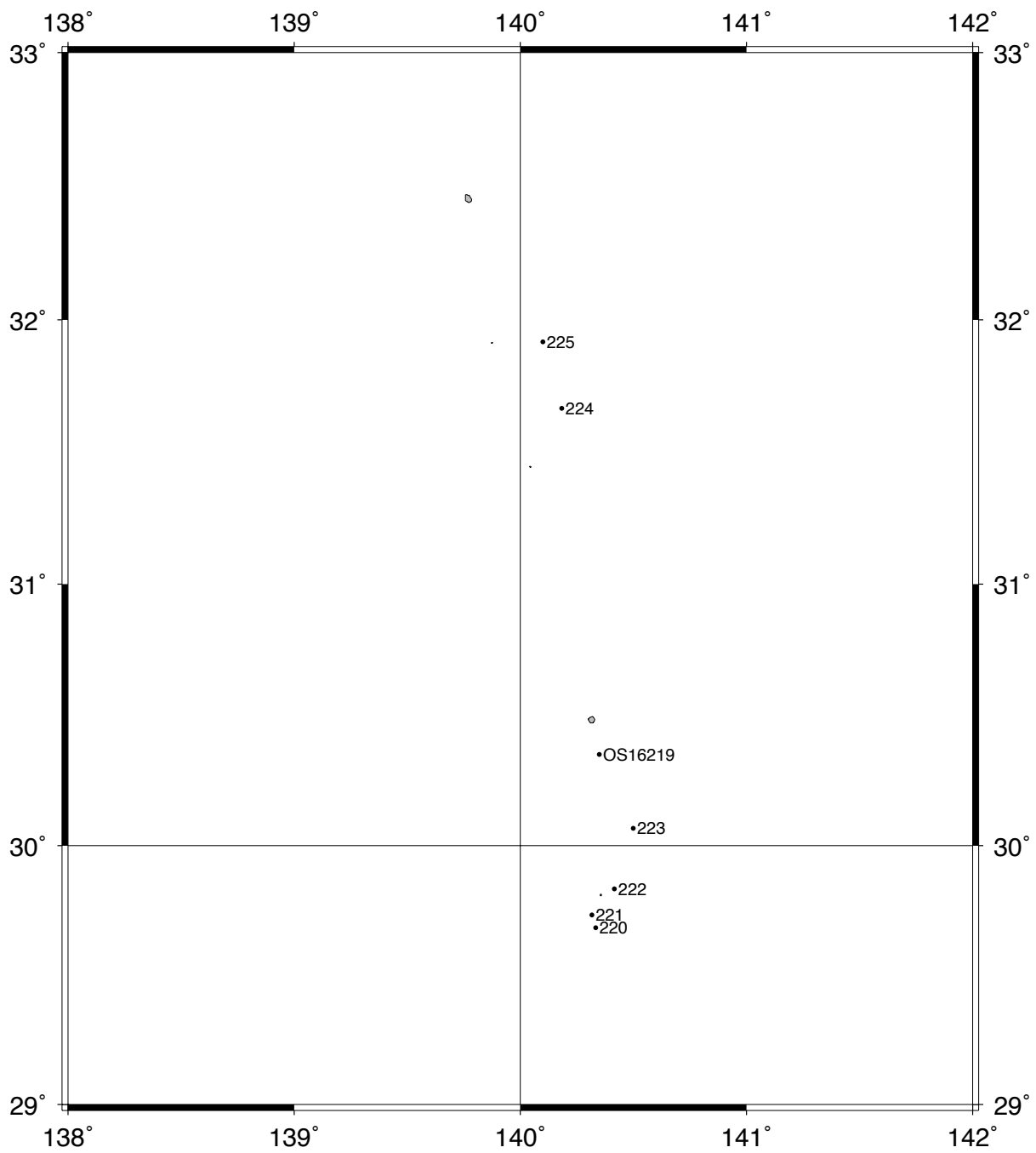


Fig.2: Research stations

Table 1. Oceanographic data

STATION		OS16219	
LATITUDE		30-20. 9	N
LONGITUDE		140-20. 6	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 5295	34. 8354	23. 6551
10	23. 5302	34. 8358	23. 6552
20	23. 5282	34. 8357	23. 6558
30	23. 5358	34. 8351	23. 6531
40	23. 5385	34. 835	23. 6522
50	23. 5392	34. 835	23. 652
75	21. 3581	34. 882	24. 3062
100	19. 3262	34. 869	24. 8374
125	18. 8051	34. 8503	24. 9563
150	18. 4423	34. 8342	25. 0352
175	18. 1111	34. 8158	25. 1035
200	17. 8217	34. 7987	25. 1617
250	17. 2157	34. 7498	25. 2708
300	16. 4932	34. 6922	25. 3971
400	14. 5589	34. 5303	25. 7055
500	11. 8539	34. 3384	26. 1028
600	8. 2029	34. 1411	26. 5689
700	6. 1874	34. 0604	26. 7864
800	4. 9551	34. 1039	26. 9699
900	4. 4073	34. 1842	27. 0943
1000	3. 8603	34. 3013	27. 2446

STATION		OS16222	
LATITUDE		29-49. 7	N
LONGITUDE		140-24. 7	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 7071	34. 8201	23. 5915
10	23. 7064	34. 8207	23. 5922
20	23. 7085	34. 8202	23. 5911
30	23. 708	34. 8201	23. 5912
40	23. 7033	34. 8197	23. 5923
50	23. 7037	34. 8197	23. 5922
75	23. 1971	34. 831	23. 7485
100	19. 1956	34. 8412	24. 8498
125	18. 4818	34. 8219	25. 016
150	18. 0448	34. 8024	25. 1097
175	17. 5256	34. 7681	25. 2102
200	17. 0761	34. 733	25. 2912
250	16. 6161	34. 7051	25. 3784
300	15. 8933	34. 6375	25. 4931
400	13. 1688	34. 4362	25. 9222
500	9. 8936	34. 1951	26. 3414
600	7. 0962	34. 0638	26. 668
700	5. 7926	34. 07	26. 8436
800	4. 8996	34. 1307	26. 9975
900	4. 1843	34. 2303	27. 1547
1000	3. 8521	34. 3135	27. 2552

STATION		OS16225	
LATITUDE		31-54. 4	N
LONGITUDE		140-05. 7	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 9304	34. 7549	23. 4764
10	23. 935	34. 7544	23. 4747
20	23. 9354	34. 7546	23. 4747
30	23. 9364	34. 7547	23. 4745
40	23. 9383	34. 7547	23. 4739
50	23. 9399	34. 7548	23. 4735
75	23. 9283	34. 7556	23. 4775
100	22. 9099	34. 8476	23. 8439
125	21. 6723	34. 9441	24. 2667
150	21. 1297	34. 9231	24. 4
175	20. 3146	34. 8889	24. 5937
200	18. 7473	34. 8317	24. 9566
250	18. 3437	34. 8111	25. 0422
300	17. 7464	34. 7893	25. 1728
400	15. 2541	34. 5829	25. 5944
500	12. 5595	34. 399	26. 0144
600	9. 8764	34. 2707	26. 4033
700	7. 8391	34. 218	26. 6835
800	6. 2979	34. 2344	26. 9095
900	4. 8957	34. 2853	27. 1206
1000	4. 0913	34. 3423	27. 2534

STATION		OS16220	
LATITUDE		29-41. 0	N
LONGITUDE		140-19. 7	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 7469	34. 812	23. 5737
10	23. 7489	34. 812	23. 5731
20	23. 7495	34. 8118	23. 5727
30	23. 7489	34. 8117	23. 5729
40	23. 7433	34. 8118	23. 5746
50	23. 7485	34. 8121	23. 5733
75	23. 7462	34. 812	23. 5739
100	20. 4647	34. 8372	24. 5142
125	18. 5787	34. 7972	24. 9728
150	17. 6739	34. 7651	25. 172
175	17. 0539	34. 7279	25. 2926
200	16. 6415	34. 7049	25. 3722
250	15. 743	34. 6232	25. 5161
300	14. 9104	34. 5581	25. 6508
400	12. 535	34. 3918	26. 0135
500	9. 7646	34. 1851	26. 3552
600	7. 2609	34. 0706	26. 6504
700	5. 648	34. 0589	26. 8526
800	4. 8832	34. 1787	27. 0374
900	4. 1731	34. 2755	27. 1918
1000	3. 8439	34. 315	27. 2572

STATION		OS16223	
LATITUDE		30-04. 0	N
LONGITUDE		140-30. 0	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 6296	34. 8731	23. 6544
10	23. 6264	34. 8732	23. 6554
20	23. 6356	34. 8726	23. 6522
30	23. 6354	34. 8731	23. 6527
40	23. 6346	34. 8733	23. 6531
50	23. 635	34. 8736	23. 6532
75	22. 9387	34. 8836	23. 863
100	19. 6027	34. 8876	24. 78
125	19. 1342	34. 8728	24. 8896
150	18. 5555	34. 8412	25. 0123
175	18. 0477	34. 8092	25. 1142
200	17. 7078	34. 7851	25. 179
250	16. 8378	34. 7211	25. 3386
300	16. 1651	34. 6606	25. 4487
400	14. 1013	34. 5021	25. 781
500	11. 0236	34. 2735	26. 2055
600	8. 6239	34. 1339	26. 4989
700	6. 3695	34. 106	26. 7988
800	5. 0644	34. 1221	26. 9718
900	4. 3508	34. 1951	27. 109
1000	3. 9054	34. 2651	27. 2112

STATION		OS16221	
LATITUDE		29-43. 5	N
LONGITUDE		140-18. 9	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 6947	34. 8164	23. 5923
10	23. 6969	34. 8161	23. 5915
20	23. 6984	34. 8162	23. 5912
30	23. 7019	34. 8169	23. 5906
40	23. 7019	34. 8167	23. 5905
50	23. 7037	34. 8161	23. 5895
75	23. 5633	34. 8296	23. 6409
100	20. 3003	34. 8411	24. 5611
125	18. 5748	34. 8033	24. 9784
150	17. 6678	34. 7715	25. 1784
175	17. 0631	34. 7344	25. 2954
200	16. 724	34. 7117	25. 3581
250	16. 0578	34. 6512	25. 4661
300	14. 9408	34. 5617	25. 6469
400	12. 6823	34. 4017	25. 9923
500	9. 49	34. 1705	26. 3894
600	7. 2139	34. 0682	26. 6551
700	5. 568	34. 0619	26. 8647
800	4. 8249	34. 142	27. 0149
900	4. 1018	34. 2838	27. 2059
1000	3. 6995	34. 3316	27. 2849

STATION		OS16224	
LATITUDE		31-39. 9	N
LONGITUDE		140-10. 9	E
DEPTH (m)			
Press.	Temp.	Salinity	Sigma-T
5	23. 1753	34. 8565	23. 7741
10	23. 1801	34. 8562	23. 7726
20	23. 181	34. 8563	23. 7723
30	23. 1836	34. 8563	23. 7715
40	23. 1837	34. 8562	23. 7715
50	23. 1849	34. 8563	23. 7712
75	23. 1885	34. 8561	23. 77
100	23. 0946	34. 8518	23. 7939
125	19. 8845	34. 8715	24. 6941
150	18. 85	34. 8471	24. 9424
175	18. 5034	34. 8256	25. 0134
200	18. 1684	34. 8047	25. 0808
250	17. 2208	34. 7344	25. 2577
300	16. 7884	34. 7063	25. 3388
400	15. 8593	34. 6304	25. 4953
500	13. 3256	34. 4467	25. 8986
600	10. 4012	34. 2858	26. 3253
700	8. 0722	34. 1922	26. 6287
800	6. 405	34. 232	26. 8937
900	4. 8948	34. 2741	27. 1118
1000	4. 1887	34. 3391	27. 2407

**THE "OSHORO MARU" CRUISE 034
TO TATEYAMA-BAY and SAGAMI-NADA
IN DECEMBER 2016**

1. Cruise Itinerary

Cruise 034

Departure from Yokohama (Leg1)	Dec. 15, 2016
Start and end of oceanographic research	16
Arrival at Yokohama	17
Departure from Yokohama (Leg2)	19
Return to Hakodate	22

Total coverage 721.2 miles

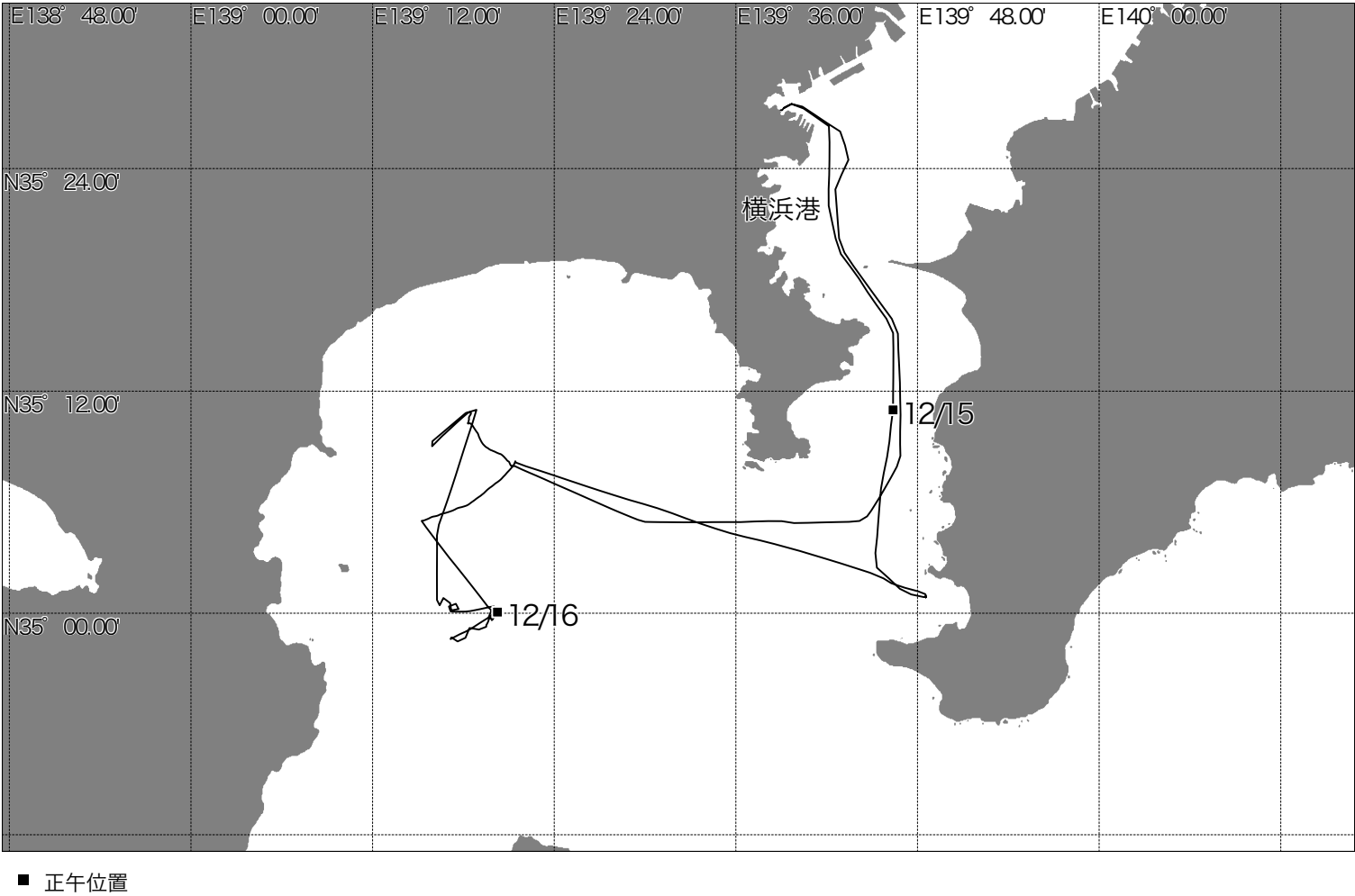
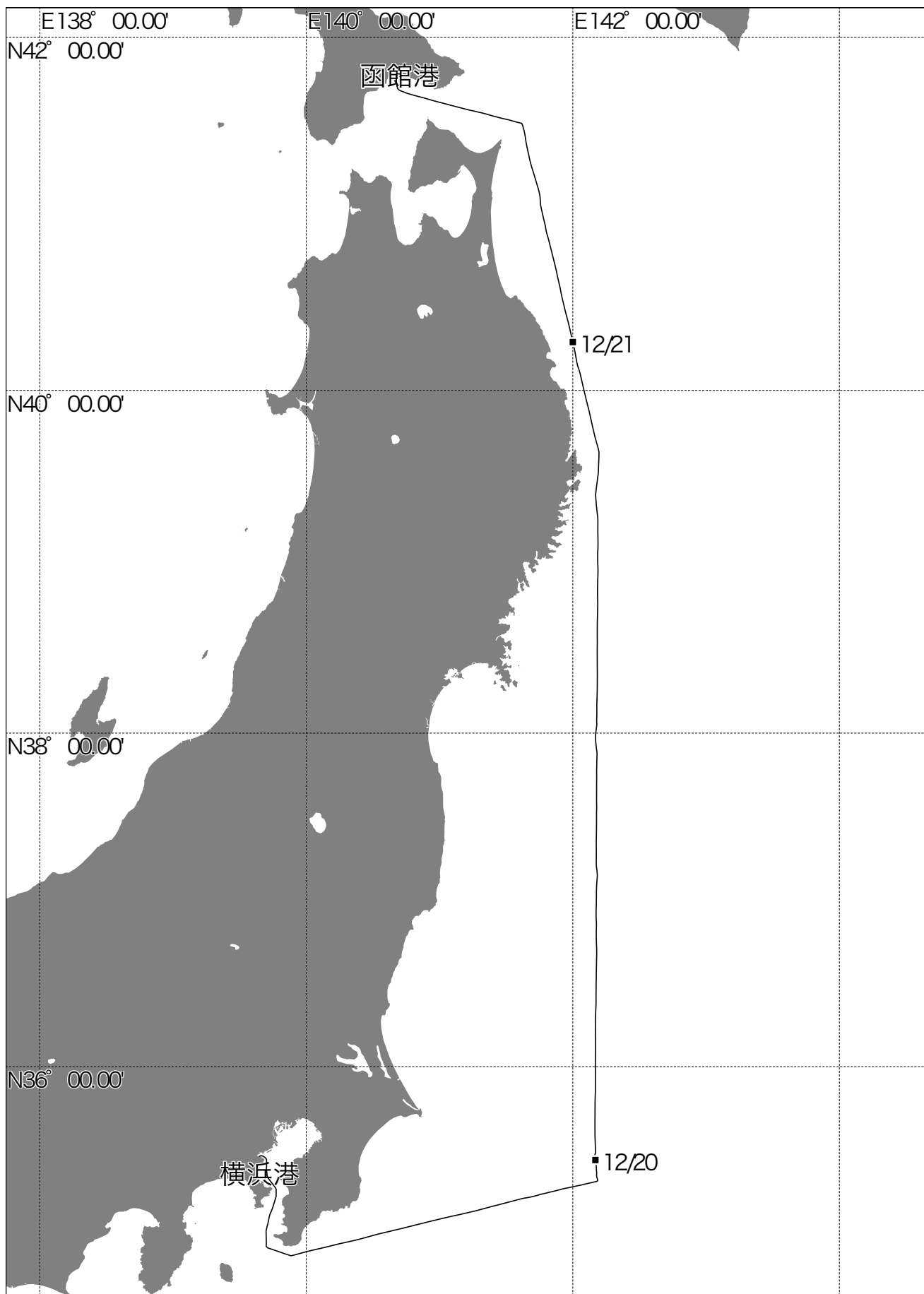


Fig.-1.1: Noon Position (Leg1)



■ 正午位置

Fig.-1.2: Noon Position (Leg2)

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 31 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 Marime Bioscience, Kitasato University)		
		Leg1	Noriko Amiya
	Lecturer (School of Marime Bioscience, Kitasato University)		
		Leg1	Ko Yasumoto
	Assistant Professor (School of Marime Bioscience, Kitasato University)		
		Leg1	Fumiya Furukawa
Teaching Assistant:	Leg1	3 persons	
Under Graduate Student:	Leg1	39persons	
Other:	2 engineers from The Tsurumi Seiki Co.,Ltd.		
	1 engineer from Mitsui E&S		

PART II

USHIO MARU CRUISES FROM JANUARY TO DECEMBER IN 2016

I . Crew's List

Captain :

Yoshihiko Kamei

Crew :

Chief Officer

Naoto Kobayashi

Second Officer

(- Cruise 357)

Taichi Sato

(Cruise 358 -)

Takahiro Iida

Chief Engineer

Fumio Fujimoto

First Engineer

Junpei Shimura

Second Engineer

(- Cruise 357)

Akira Sugihara

(Cruise 358 -)

Yutaka Yokokawa

Chief Radio Officer

Nagahide Yamane

Boatswain

Sen Sunakoma

Jr. Boatswain

Yutaka Takeda

Quartermaster

(- Cruise 357)

Naoyuki Eda

(Cruise 358 -)

Tadashi Mishima

Sailor

Taishi Hama

No.1 Oiler

Nobuyuki Sawada

No.2 Oiler

Takuya Takano

Oiler

(Cruise 358 -)

Yasuhiro Yamamoto

Chief Steward

Kazuo Ishikawa

Head Steward

Fumiya Honma

II . Particulars

Length (R.L.)

33.74 m

Length (O.L.)

39.39 m

Breadth (mid)

6.50 m

Depth (mid)

3.00 m

Gross Tonnage (Domestic)

179 tons

International Gross Tonnage

286 tons

Main engine

735 kw

Call Sign

JD2672

THE " USHIO MARU "

CRUISE 351

CRUISE 352

CRUISE 353

IN JANUARY 2016

IN FEBRUARY 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 351

Departure from Hakodate	Jan.	10, 2016
Start hydrographic research (US16001)		10
Arrival at Fukushima		10
Depart from Fukushima		11
Arrival at Hakodate		11
Depart from Hakodate		12
Arrival at Muroran		12
Depart from Muroran		13
Arrival at Muroran		13
Depart from Muroran		14
Finish hydrographic research (US16029)		14
Return to Hakodate		15
Total coverage 335.2 miles		

Cruise 352

Departure from Hakodate	Jan.	25, 2016
Start hydrographic research (US16030)		25
Arrival at Fukushima		25
Depart from Fukushima		26
Arrival at Usujiri		27
Depart from Usujiri		29
Finish hydrographic research (US16064)		30
Return to Hakodate		31
Total coverage 367.1 miles		

Cruise 353

Departure from Hakodate	Feb.	5, 2016
Arrival at Usujiri		5
Start hydrographic research (US16065)		6
Retrieval ADCP mooring system		6
Arrival at Muroran		6
Depart from Muroran		7
Set ADCP mooring system		7
Arrival at Usujiri		7
Depart from Usujiri		8
Arrival at and departure from Usujiri		8
Finish hydrographic research (US16091)		8
Return to Hakodate		8
Total coverage 305.5 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

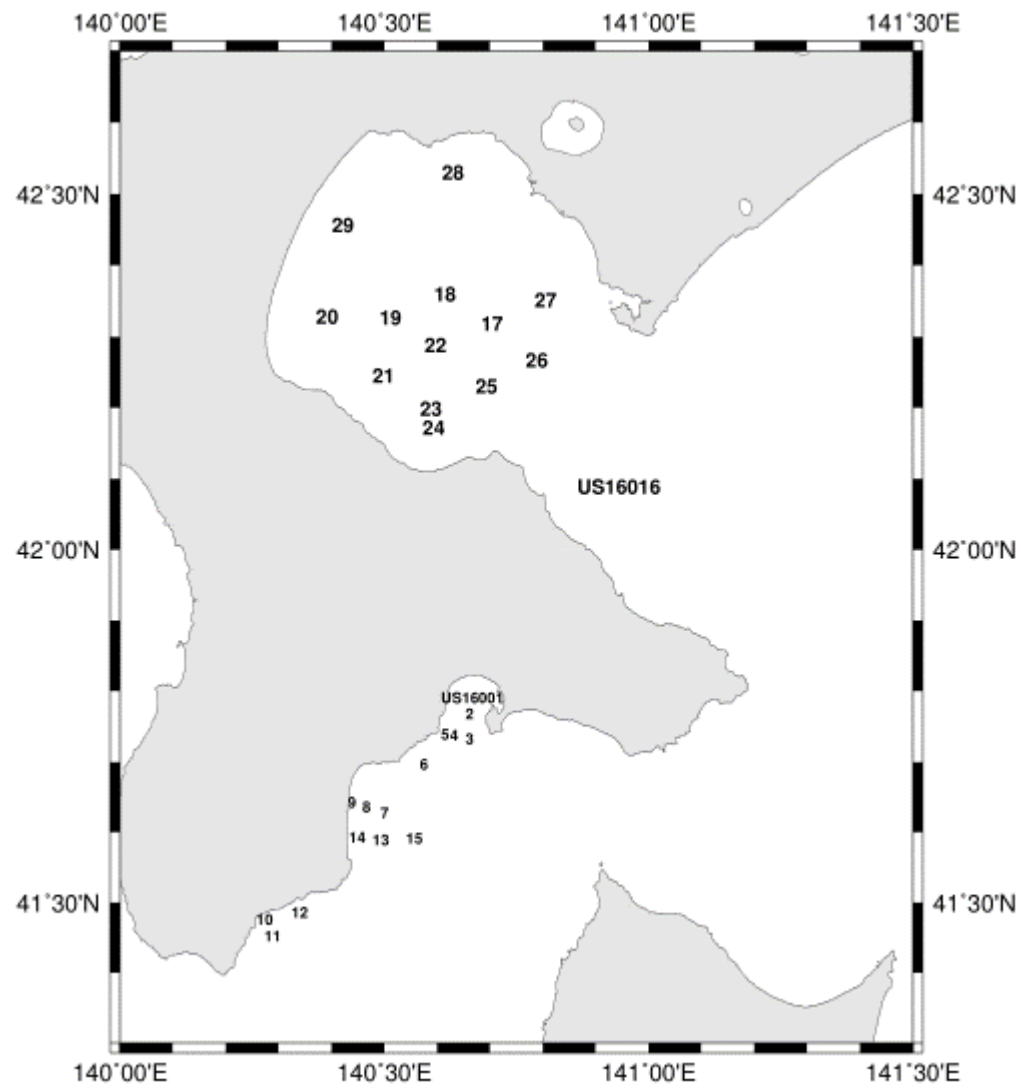


Figure 1. Oceanographic stations (Cruise 351)

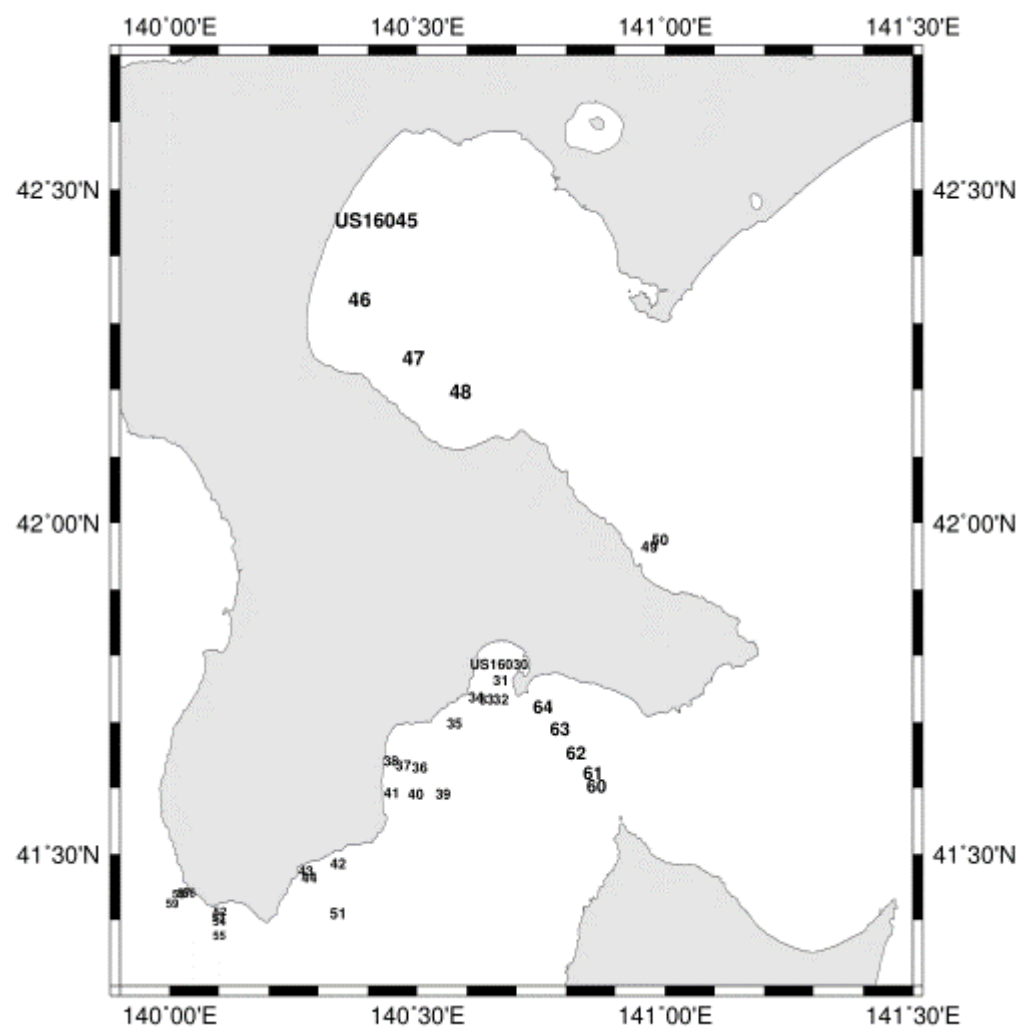


Figure 2. Oceanographic stations (Cruise 352)

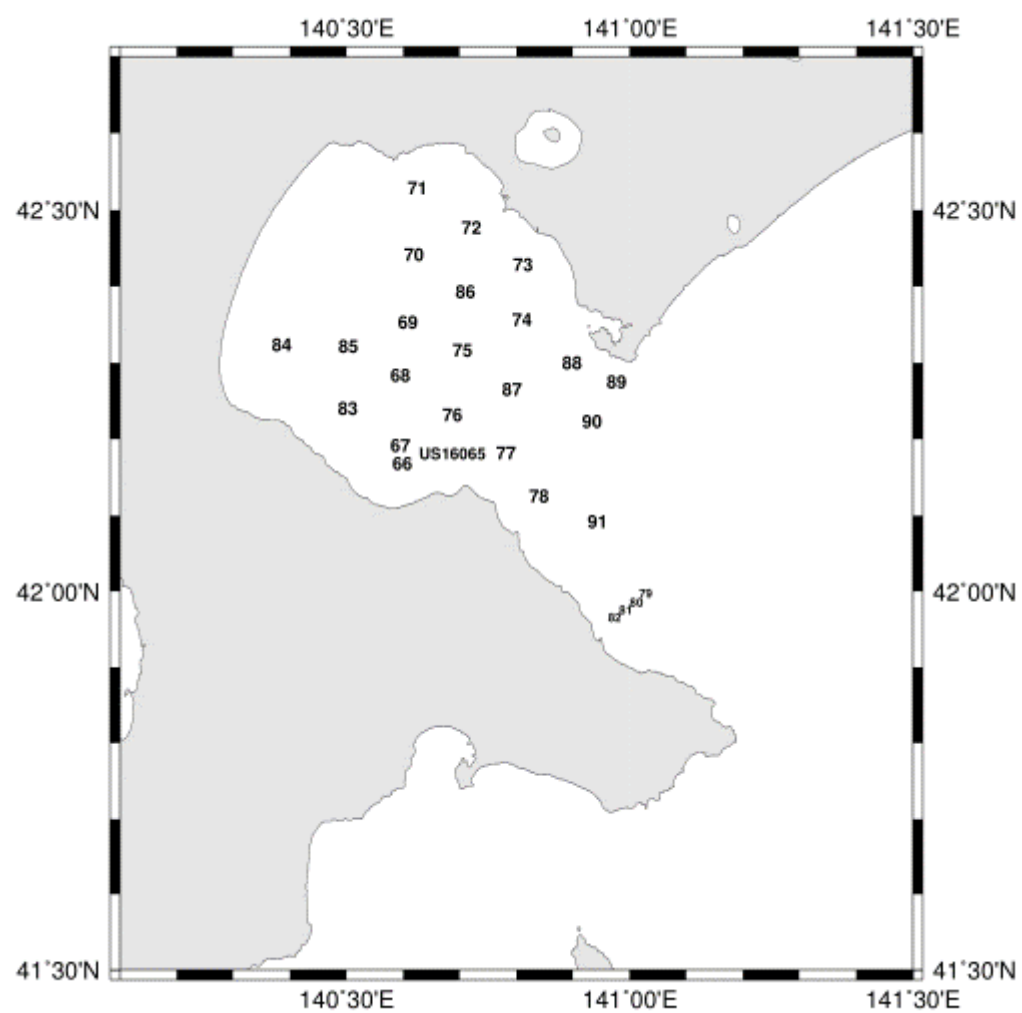


Figure 3. Oceanographic stations (Cruise 353)

Table 1. List of Oceanographic Station

station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16001	41-47.0	140-40.0	1/10	0825-0826	20	NNW-1	NNW-1	NNW-4	-1.3	7.7	c	1014.6
US16002	41-45.6	140-39.7	1/10	0848-0852	38	NNW-1	NNW-1	NNW-2	-1.0	7.7	c	1014.7
US16003	41-43.5	140-39.7	1/10	0916-0922	62	NNW-1	NNW-1	NNW-3	-0.7	10.0	s	1015.1
US16004	41-43.8	140-37.9	1/10	0942-0948	56	WNW-1	NW-1	WNW-2	-0.2	9.7	s	1015.1
US16005	41-43.9	140-36.9	1/10	0955-0959	38	WNW-1	NW-1	WNW-3	-0.5	9.8	s	1015.0
US16006	41-41.3	140-34.5	1/10	1039-1042	41	West-1	SW-1	West-4	1.4	9.7	bc	1014.5
US16007	41-37.2	140-30.0	1/10	1126-1129	31	West-2	SSW-2	West-5	1.6	9.2	s	1013.7
US16008	41-37.7	140-28.0	1/10	1153-1157	19	West-2	SE-1	West-5	0.6	9.6	s	1014.1
US16009	41-38.1	140-26.3	1/10	1212-1216	13	West-2	SE-1	West-4	1.2	8.3	bc	1013.8
US16010	41-28.1	140-16.4	1/11	0701-0706	25	West-2	South-1	West-4	-4.4	9.6	c	1019.6
US16011	41-26.7	140-17.3	1/11	0728-0734	62	WNW-2	South-1	WNW-4	-3.4	9.6	s	1020.3
US16012	41-28.7	140-20.4	1/11	0818-0824	62	West-2	South-2	West-4	-3.8	9.6	c	1020.3
US16013	41-34.9	140-29.6	1/11	0934-0940	43	WSW-1	South-1	WSW-4	-2.7	9.8	c	1019.8
US16014	41-35.1	140-26.9	1/11	1008-1011	15	West-1	South-1	West-4	-3.9	9.7	c	1019.8
US16015	41-35.0	140-33.4	1/11	1051-1056	58	WSW-2	SW-1	WSW-5	-3.1	9.8	c	1019.6
US16016	42-04.7	140-56.6	1/12	1153-1200	85	WNW-2	WNW-2	WNW-4	-2.6	8.8	s	1014.1
US16017	42-18.5	140-42.2	1/13	0713-0719	65	WNW-3	WNW-1	WNW-4	-2.5	6.6	o	1013.5
US16018	42-21.0	140-36.9	1/13	0801-0807	86	WNW-2	WNW-1	West-4	-2.2	7.0	o	1013.6
US16019	42-19.0	140-30.7	1/13	0853-0900	93	West-2	West-1	West-4	-2.7	6.7	s	1013.9
US16020	42-19.1	140-23.5	1/13	0952-0956	56	WNW-1	West-1	WNW-3	-3.1	6.9	s	1014.0
US16021	42-14.1	140-29.9	1/13	1048-1052	76	NW-1	West-1	NW-3	-2.4	6.6	s	1014.0
US16022	42-16.7	140-35.8	1/13	1141-1150	91	NNW-1	West-1	NNW-3	-1.7	6.9	s	1014.0
US16023	42-11.3	140-35.3	1/13	1244-1251	80	WNW-1	WNW-1	WNW-3	-1.7	6.9	c	1012.6
US16024	42-09.7	140-35.6	1/13	1335-1341	72	West-1	WNW-1	West-2	-1.0	7.1	bc	1012.1
US16025	42-13.2	140-41.6	1/13	1431-1437	89	NW-1	WNW-1	NW-2	-0.6	7.3	bc	1012.3
US16026	42-15.4	140-47.3	1/13	1530-1534	72	West-1	West-1	West-2	-0.1	7.5	bc	1012.1
US16027	42-20.5	140-48.3	1/13	1614-1619	54	WNW-1	West-1	WNW-4	0.0	6.8	c	1011.6
US16028	42-31.2	140-37.8	1/14	0932-0937	60	WNW-3	WNW-2	WNW-6	-2.5	7.1	bc	1012.1
US16029	42-26.8	140-25.3	1/14	1050-1056	61	West-2	West-1	West-4	-3.9	7.2	bc	1012.6

station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16030	41-46.8	140-39.9	1/25	0815-0819	21	NNW-2	NW-1	NNW-5	-1.9	8.2	bc	1010.5
US16031	41-45.3	140-40.1	1/25	0839-0843	45	NNW-2	NW-1	NNW-4	-2.1	9.6	bc	1011.0
US16032	41-43.6	140-40.1	1/25	0903-0910	66	NNW-2	NW-1	NNW-4	-1.7	10.0	bc	1011.4
US16033	41-43.6	140-38.4	1/25	0930-0936	58	NNW-2	NW-1	NNW-4	-1.3	10.0	bc	1012.1
US16034	41-43.8	140-37.1	1/25	0944-0952	45	NNW-1	NW-1	NNW-2	-1.3	10.0	bc	1012.3
US16035	41-41.4	140-34.5	1/25	1018-1034	41	NNW-1	NW-1	NNW-3	-0.8	10.0	bc	1013.1
US16036	41-37.4	140-30.3	1/25	1112-1118	32	NW-1	SE-1	NW-3	-0.2	9.1	bc	1013.5
US16037	41-37.6	140-28.3	1/25	1144-1148	22	NNW-1	SE-1	NNW-2	-0.8	9.9	bc	1013.6
US16038	41-38.0	140-26.8	1/25	1200-1207	15	WNW-1	SE-1	WNW-3	-0.5	8.7	c	1014.1
US16039	41-35.0	140-33.1	1/25	1302-1309	58	WNW-1	SE-1	WNW-3	-1.0	10.6	s	1014.3
US16040	41-35.0	140-29.8	1/25	1341-1347	44	WNW-1	ESE-1	WNW-3	-1.6	10.5	s	1014.5
US16041	41-35.1	140-26.9	1/25	1406-1412	16	NW-1	SE-1	NW-3	-1.4	10.2	s	1014.6
US16042	41-28.7	140-20.4	1/25	1531-1539	61	West-3	SW-2	West-5	-0.4	10.7	s	1016.2
US16043	41-28.0	140-16.5	1/26	0708-0713	29	West-2	South-2	West-4	2.3	10.4	c	1020.7
US16044	41-27.4	140-16.9	1/26	0747-0755	44	West-2	South-2	West-4	2.5	10.5	c	1021.1
US16045	42-26.6	140-25.0	1/27	0646-0652	60	WNW-2	NW-1	NW-4	0.5	6.0	bc	1019.1
US16046	42-19.5	140-23.0	1/27	0747-0754	53	WNW-2	NW-1	WNW-4	-0.3	6.0	bc	1020.3
US16047	42-14.2	140-29.5	1/27	0853-0900	75	West-2	WNW-1	West-5	0.1	5.5	bc	1020.7
US16048	42-11.2	140-35.2	1/27	0949-0955	80	West-3	WNW-1	West-5	0.7	6.0	bc	1021.6
US16049	41-57.4	140-58.1	1/29	0703-0707	78	West-2	NW-1	West-4	-3.0	3.8	bc	1029.5
US16050	41-58.0	140-59.4	1/29	0718-0723	87	West-2	NW-1	West-4	-2.7	3.8	bc	1029.6
US16051	41-24.1	140-20.4	1/29	1340-1352	93	NW-1	SW-2	NW-4	-0.6	10.2	c	1028.8
US16052	41-24.4	140-06.1	1/30	0658-0705	55	NNE-1	WSW-1	NNE-3	-2.1	9.5	c	1025.1
US16053	41-23.9	140-05.9	1/30	0720-0730	85	NE-1	West-1	NE-3	-1.9	9.4	o	1025.1
US16054	41-23.5	140-06.0	1/30	0743-0754	95	NNE-1	West-1	NNE-2	-1.4	9.5	o	1025.5
US16055	41-22.2	140-06.0	1/30	0820-0827	119	East-1	West-1	East-2	-1.2	9.5	c	1025.4
US16056	41-26.1	140-02.4	1/30	0904-0911	38	North-1	West-1	North-2	-1.3	9.5	bc	1025.5
US16057	41-26.1	140-01.7	1/30	0923-0930	57	NW-1	West-1	NW-2	-0.8	9.3	bc	1025.5
US16058	41-26.0	140-01.1	1/30	0943-0949	80	NW-1	West-1	NW-2	-0.6	9.4	bc	1025.5
US16059	41-25.1	140-00.3	1/30	1008-1019	105	NW-1	West-1	NW-1	0.1	9.7	bc	1025.5
US16060	41-35.6	140-51.7	1/30	1416-1424	54	Calm	East-1	Calm	-0.7	10.5	c	1023.7
US16061	41-36.8	140-51.3	1/30	1434-1443	85	Calm	East-1	Calm	-0.2	10.5	bc	1023.6
US16062	41-38.6	140-49.2	1/30	1502-1516	325	Calm	East-1	Calm	-0.2	10.4	bc	1023.6
US16063	41-40.8	140-47.3	1/30	1536-1546	222	West-1	East-1	West-3	0.1	10.3	bc	1023.1
US16064	41-28.8	140-45.2	1/30	1605-1610	84	SW-1	East-1	SW-1	0.0	10.4	bc	1022.6

Table 1. List of Oceanographic Station (continued)

Cruise 353												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16065	42-10.4	140-41.2	2/6	0646-0651	86	WNW-2	NW-1	WNW-5	-2.2	4.8	c	1014.8
US16066	42-09.6	140-35.9	2/6	0742-0745	72	West-2	NW-1	West-5	-2.1	4.3	c	1014.8
US16067	42-11.0	140-35.7	2/6	0827-0831	79	WNW-2	NW-1	WNW-5	-2.7	5.3	c	1015.5
US16068	42-16.5	140-35.7	2/6	0940-0945	91	WNW-3	WNW-1	WNW-5	-2.9	5.5	bc	1015.6
US16069	42-20.7	140-36.5	2/6	1104-1109	88	WNW-3	WNW-1	WNW-6	-1.0	5.2	bc	1014.6
US16070	42-26.0	140-37.1	2/6	1156-1202	84	WSW-3	West-1	WSW-6	-0.6	5.0	bc	1014.5
US16071	42-31.2	140-37.5	2/6	1249-1253	61	WNW-3	SW-1	WNW-5	-0.7	4.4	bc	1014.3
US16072	42-28.1	140-43.2	2/6	1349-1353	60	WNW-1	West-2	WNW-3	-2.0	5.0	bc	1014.4
US16073	42-25.2	140-48.7	2/6	1435-1437	43	NW-1	West-2	NW-4	-2.1	4.5	c	1014.3
US16074	42-20.9	140-48.6	2/7	0652-0656	52	WNW-3	WNW-1	NW-6	-3.6	4.3	bc	1016.5
US16075	42-18.5	140-42.3	2/7	0740-0745	64	WNW-3	WNW-1	WNW-5	-4.2	4.5	bc	1016.8
US16076	42-13.4	140-41.2	2/7	0907-0912	88	NW-2	NW-1	NW-4	-3.9	4.5	bc	1017.6
US16077	42-10.4	140-46.9	2/7	1002-1007	94	West-3	NW-1	West-5	-3.5	5.0	s	1017.1
US16078	42-07.0	140-50.4	2/7	1049-1053	68	WNW-3	NW-1	WNW-5	-3.1	5.2	bc	1017.1
US16079	41-59.5	141-01.7	2/7	1209-1215	100	WNW-3	NW-1	WNW-5	-1.6	5.4	bc	1015.6
US16080	41-58.8	141-00.7	2/7	1224-1230	94	NW-3	NW-1	NW-5	-1.4	5.5	bc	1014.8
US16081	41-58.2	140-59.6	2/7	1239-1244	87	NW-3	NW-1	NW-5	-1.3	5.5	bc	1014.6
US16082	41-57.6	140-58.4	2/7	1254-1259	81	WNW-3	NW-1	WNW-5	-1.2	5.3	bc	1014.2
US16083	42-13.9	140-30.1	2/8	0746-0751	78	NW-3	NW-1	NW-5	-1.6	5.1	bc	1020.6
US16084	42-18.9	140-23.1	2/8	0848-0854	53	NW-1	NW-1	NW-2	-1.5	5.0	bc	1020.8
US16085	42-18.8	140-30.2	2/8	0938-0944	92	West-1	NW-1	West-3	-0.6	5.1	bc	1021.1
US16086	42-23.1	140-42.6	2/8	1102-1107	61	NW-1	NW-1	NW-3	-0.4	4.4	b	1020.7
US16087	42-15.4	140-47.5	2/8	1217-1220	72	NNW-1	NW-1	NNW-2	0.1	4.4	b	1020.1
US16088	42-17.5	140-53.9	2/8	1305-1310	57	North-1	NW-1	North-3	0.6	4.4	b	1019.1
US16089	42-16.0	140-58.6	2/8	1345-1350	64	NNW-1	West-1	NNW-2	1.6	4.9	b	1019.0
US16090	42-12.9	140-56.0	2/8	1424-1429	69	NNW-1	WNW-1	NNW-2	0.3	4.5	bc	1018.8
US16091	42-05.0	140-56.6	2/8	1529-1534	84	Calm	WNW-1	Calm	0.6	5.4	bc	1019.0

Table 2. Oceanographic data

STATION US16001			
LATITUDE	41-47.0	N	
LONGITUDE	140-40.0	E	
DEPTH (m)	20		
Press.	Temp.	Salinity	Sigma-T
5	10.1711	33.8988	26.063
10	10.1709	33.8986	26.0629
20	10.1661	33.8977	26.063
30	10.1081	33.8861	26.0638
40	10.0292	33.8726	26.0667
50	9.9676	33.8803	26.0831
55	10.056	33.9164	26.0964

STATION US16002			
LATITUDE	41-45.6	N	
LONGITUDE	140-39.7	E	
DEPTH (m)	38		
Press.	Temp.	Salinity	Sigma-T
5	9.9808	33.8855	26.085
10	9.9839	33.8854	26.0843
20	10.0825	33.9077	26.0851
30	10.0973	33.9094	26.0839
37	10.0945	33.9106	26.0853

STATION US16003			
LATITUDE	41-43.5	N	
LONGITUDE	140-39.7	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	10.2704	33.9278	26.0686
10	10.2543	33.931	26.0739
20	10.2392	33.9325	26.0776
30	10.2354	33.9336	26.0791
40	10.1936	33.9377	26.0895
50	10.073	33.9455	26.1162
62	9.9687	33.9566	26.1425

STATION US16004			
LATITUDE	41-43.8	N	
LONGITUDE	140-37.9	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	6.473	33.534	26.334
10	6.480	33.536	26.335
20	6.488	33.538	26.336
30	6.484	33.539	26.336
40	6.458	33.548	26.347
50	6.432	33.549	26.352

STATION US16005			
LATITUDE	41-43.9	N	
LONGITUDE	140-36.9	E	
DEPTH (m)	38		
Press.	Temp.	Salinity	Sigma-T
5	10.1091	33.9106	26.0828
10	10.1245	33.9137	26.0826
20	10.128	33.9165	26.0842
30	10.1351	33.925	26.0896
37	10.1205	33.924	26.0913

STATION US16006			
LATITUDE	41-41.3	N	
LONGITUDE	140-34.5	E	
DEPTH (m)	41		
Press.	Temp.	Salinity	Sigma-T
5	10.089	33.9279	26.0998
10	10.0947	33.9285	26.0992
20	10.0896	33.9281	26.0998
30	10.0599	33.9267	26.1037
40	9.8761	33.9242	26.1328

STATION US16007			
LATITUDE	41-37.2	N	
LONGITUDE	140-30.0	E	
DEPTH (m)	31		
Press.	Temp.	Salinity	Sigma-T
5	10.7367	33.8989	25.9649
10	10.7381	33.8986	25.9644
20	10.2741	33.9163	26.059
29	9.5313	33.8836	26.1583

STATION US16008			
LATITUDE	41-37.7	N	
LONGITUDE	140-28.0	E	
DEPTH (m)	19		
Press.	Temp.	Salinity	Sigma-T
5	8.8972	33.8184	26.2091
10	8.9111	33.8242	26.2115
18	8.9398	33.8337	26.2144

STATION US16009			
LATITUDE	41-38.1	N	
LONGITUDE	140-26.3	E	
DEPTH (m)	13		
Press.	Temp.	Salinity	Sigma-T
5	8.2844	33.7151	26.2225
10	8.316	33.7306	26.2298
12	8.2697	33.7228	26.2307

STATION US16010			
LATITUDE	41-28.1	N	
LONGITUDE	140-16.4	E	
DEPTH (m)	25		
Press.	Temp.	Salinity	Sigma-T
5	9.9745	33.9353	26.1249
10	9.9552	33.9355	26.1283
20	9.9778	33.9349	26.124
24	9.9702	33.9347	26.1251

STATION US16011			
LATITUDE	41-26.7	N	
LONGITUDE	140-17.3	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	9.9421	33.9722	26.1592
10	9.9527	33.9723	26.1574
20	9.9503	33.9725	26.158
30	9.958	33.9726	26.1567
40	9.9539	33.9726	26.1575
50	9.9515	33.9725	26.1578
57	9.9505	33.9724	26.1579

STATION US16012			
LATITUDE	41-28.7	N	
LONGITUDE	140-20.4	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	10.201	33.9546	26.1014
10	10.2056	33.9542	26.1003
20	10.0852	33.9589	26.1245
30	9.9958	33.9588	26.1397
40	9.8716	33.96	26.1615
50	9.8529	33.9611	26.1655
57	9.8577	33.9611	26.1647

STATION US16013			
LATITUDE	41-34.9	N	
LONGITUDE	140-29.6	E	
DEPTH (m)	43		
Press.	Temp.	Salinity	Sigma-T
5	10.0831	33.9516	26.1192
10	10.0911	33.9508	26.1172
20	10.0869	33.9509	26.118
30	10.0293	33.9551	26.131
40	9.7829	33.9672	26.182
42	9.7767	33.9689	26.1843

STATION US16014			
LATITUDE	41-35.1	N	
LONGITUDE	140-26.9	E	
DEPTH (m)	15		
Press.	Temp.	Salinity	Sigma-T
5	10.1136	33.9262	26.0942
10	10.1217	33.9273	26.0937
14	10.1254	33.9278	26.0934

STATION US16015			
LATITUDE	41-35.0	N	
LONGITUDE	140-33.4	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	10.2454	33.9424	26.0843
10	10.2528	33.9428	26.0833
20	10.2093	33.947	26.0941
30	10.2098	33.9473	26.0943
40	10.2085	33.9469	26.0942
50	10.1472	33.9535	26.1098
56	10.0584	33.9594	26.1294

STATION US16016			
LATITUDE	42-04.7	N	
LONGITUDE	140-56.6	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	9.0123	33.8837	26.2421
10	9.0215	33.8836	26.2405
20	9.0305	33.8834	26.239
30	9.0317	33.8827	26.2382
40	9.0317	33.883	26.2384
50	9.0152	33.8818	26.2401
75	7.8575	33.8126	26.3622
81	7.8041	33.8148	26.3718

STATION US16019			
LATITUDE	42-19.0	N	
LONGITUDE	140-30.7	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	7.0444	33.7386	26.4191
10	7.0287	33.7379	26.4207
20	7.0338	33.7382	26.4202
30	7.0389	33.7381	26.4194
40	7.0504	33.7379	26.4177
50	7.054	33.7375	26.4169
75	7.0554	33.7369	26.4163
91	7.0566	33.7371	26.4162

STATION US16022			
LATITUDE	42-16.7	N	
LONGITUDE	140-35.8	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	7.4623	33.8086	26.416
10	7.461	33.8096	26.4169
20	7.4227	33.8023	26.4166
30	7.3965	33.7975	26.4165
40	7.399	33.7984	26.4168
50	7.3986	33.7978	26.4165
75	7.4796	33.8109	26.4153
87	7.458	33.8066	26.415

STATION US16025			
LATITUDE	42-13.2	N	
LONGITUDE	140-41.6	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	7.5468	33.808	26.4035
10	7.5505	33.8076	26.4026
20	7.5514	33.8074	26.4023
30	7.551	33.8069	26.402
40	7.5498	33.807	26.4023
50	7.5498	33.8074	26.4026
75	7.5378	33.8056	26.4029
86	7.3934	33.793	26.4134

STATION US16028			
LATITUDE	42-31.2	N	
LONGITUDE	140-37.8	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	7.3634	33.7962	26.4201
10	7.3738	33.7972	26.4195
20	7.3942	33.7998	26.4187
30	7.3841	33.7984	26.419
40	7.3838	33.7976	26.4184
50	7.3904	33.799	26.4185
57	7.3924	33.7999	26.419

STATION US16017			
LATITUDE	42-18.5	N	
LONGITUDE	140-42.2	E	
DEPTH (m)	65		
Press.	Temp.	Salinity	Sigma-T
5	7.6521	33.8363	26.4107
10	7.6532	33.8353	26.4097
20	7.5608	33.822	26.4125
30	7.4472	33.8105	26.4196
40	7.1852	33.7839	26.4353
50	7.1421	33.7841	26.4414
62	7.1017	33.7789	26.4429

STATION US16020			
LATITUDE	42-19.1	N	
LONGITUDE	140-23.5	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	7.2239	33.7493	26.4027
10	7.2272	33.7493	26.4023
20	7.2288	33.7486	26.4015
30	7.2285	33.7486	26.4015
40	7.2324	33.7498	26.402
50	7.2349	33.7514	26.4029
53	7.1852	33.748	26.4071

STATION US16023			
LATITUDE	42-11.3	N	
LONGITUDE	140-35.3	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	6.9605	33.7365	26.4289
10	6.9612	33.7357	26.4282
20	6.9623	33.7358	26.4281
30	6.9642	33.7361	26.428
40	6.9558	33.7345	26.4279
50	6.9419	33.7327	26.4284
75	6.8095	33.7178	26.4346
79	6.7739	33.7147	26.4368

STATION US16026			
LATITUDE	42-15.4	N	
LONGITUDE	140-47.3	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	7.9344	33.8513	26.3813
10	7.8898	33.8433	26.3816
20	7.7554	33.8271	26.3885
30	7.7439	33.8262	26.3894
40	7.7294	33.8243	26.3901
50	7.7249	33.8238	26.3903
70	7.6323	33.8134	26.3955

STATION US16029			
LATITUDE	42-26.8	N	
LONGITUDE	140-25.3	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	7.1474	33.7566	26.4191
10	7.1683	33.7592	26.4182
20	7.2252	33.7684	26.4176
30	7.2281	33.769	26.4176
40	7.201	33.7633	26.4169
50	7.1978	33.7637	26.4177
58	7.1993	33.7648	26.4183

STATION US16018			
LATITUDE	42-21.0	N	
LONGITUDE	140-36.9	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	7.498	33.826	26.4246
10	7.5081	33.8258	26.4229
20	7.5097	33.8255	26.4225
30	7.5087	33.8258	26.4229
40	7.5079	33.8256	26.4228
50	7.5083	33.8256	26.4228
75	7.5093	33.8256	26.4227
83	7.5111	33.8255	26.4223

STATION US16021			
LATITUDE	42-14.1	N	
LONGITUDE	140-29.9	E	
DEPTH (m)	76		
Press.	Temp.	Salinity	Sigma-T
5	7.0281	33.7328	26.4167
10	7.0301	33.7318	26.4157
20	7.0457	33.7343	26.4155
30	7.0473	33.7346	26.4155
40	7.0413	33.7337	26.4156
50	7.0427	33.7337	26.4154
73	7.0358	33.7326	26.4156

STATION US16024			
LATITUDE	42-09.7	N	
LONGITUDE	140-35.6	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	7.3285	33.799	26.4273
10	7.329	33.799	26.4272
20	7.3272	33.7988	26.4273
30	7.3233	33.7983	26.4274
40	7.3083	33.7969	26.4284
50	7.2894	33.7941	26.4289
68	7.2631	33.7905	26.4297

STATION US16027			
LATITUDE	42-20.5	N	
LONGITUDE	140-48.3	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	7.1161	33.7569	26.4236
10	7.1257	33.7568	26.4223
20	7.128	33.7554	26.4208
30	7.1338	33.7552	26.4198
40	7.1327	33.7542	26.4192
50	7.1342	33.7543	26.4191
52	7.1325	33.7541	26.4192

STATION US16030			
LATITUDE	41-46.8	N	
LONGITUDE	140-39.9	E	
DEPTH (m)	21		
Press.	Temp.	Salinity	Sigma-T
5	8.7271	33.7212	26.1595
10	8.7383	33.7194	26.1564
20	8.7281	33.7196	26.1582
20	8.7281	33.7196	26.1582

STATION US16031			
LATITUDE	41-45.3	N	
LONGITUDE	140-40.1	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	10.0995	33.9346	26.1031
10	10.0929	33.9349	26.1045
20	10.1055	33.9346	26.1022
30	10.0977	33.9349	26.1037
40	10.1091	33.9349	26.1018
42	10.1072	33.9349	26.102

STATION US16034			
LATITUDE	41-43.8	N	
LONGITUDE	140-37.1	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	10.0848	33.9406	26.1104
10	10.0783	33.9391	26.1103
20	10.0833	33.9396	26.1098
30	10.0762	33.9386	26.1103
40	9.8893	33.9175	26.1253
42	9.8441	33.9131	26.1295

STATION US16037			
LATITUDE	41-37.6	N	
LONGITUDE	140-28.3	E	
DEPTH (m)	22		
Press.	Temp.	Salinity	Sigma-T
5	9.953	33.9168	26.1141
10	9.9332	33.9121	26.1138
20	9.0558	33.8727	26.2265

STATION US16040			
LATITUDE	41-35.0	N	
LONGITUDE	140-29.8	E	
DEPTH (m)	44		
Press.	Temp.	Salinity	Sigma-T
5	10.9805	33.9011	25.9233
10	10.9811	33.9005	25.9227
20	10.957	33.9011	25.9275
30	10.8624	33.9062	25.9483
40	10.7986	33.9188	25.9694
44	10.7993	33.9181	25.9688

STATION US16043			
LATITUDE	41-28.0	N	
LONGITUDE	140-16.5	E	
DEPTH (m)	29		
Press.	Temp.	Salinity	Sigma-T
5	10.7349	33.9091	25.9732
10	10.7484	33.9092	25.9709
20	10.7212	33.9076	25.9744
27	10.7024	33.9068	25.9772

STATION US16032			
LATITUDE	41-43.6	N	
LONGITUDE	140-40.1	E	
DEPTH (m)	66		
Press.	Temp.	Salinity	Sigma-T
5	10.3782	33.9482	26.066
10	10.3755	33.9462	26.0649
20	10.3836	33.9456	26.063
30	10.3825	33.9455	26.0631
40	10.3286	33.9419	26.0696
50	10.2882	33.9415	26.0762
63	10.2583	33.9405	26.0806

STATION US16035			
LATITUDE	41-41.4	N	
LONGITUDE	140-34.5	E	
DEPTH (m)	41		
Press.	Temp.	Salinity	Sigma-T
5	10.2463	33.9489	26.0893
10	10.2383	33.9478	26.0897
20	10.2181	33.946	26.0918
30	10.0223	33.925	26.1088
39	9.737	33.8939	26.1323

STATION US16038			
LATITUDE	41-38.0	N	
LONGITUDE	140-26.8	E	
DEPTH (m)	15		
Press.	Temp.	Salinity	Sigma-T
5	8.4978	33.7858	26.2455
10	8.5308	33.8042	26.2549
14	8.5382	33.806	26.2551

STATION US16041			
LATITUDE	41-35.1	N	
LONGITUDE	140-26.9	E	
DEPTH (m)	16		
Press.	Temp.	Salinity	Sigma-T
5	10.4737	33.9381	26.0415
10	10.432	33.9329	26.0447
14	9.3635	33.8393	26.151

STATION US16044			
LATITUDE	41-27.4	N	
LONGITUDE	140-16.9	E	
DEPTH (m)	44		
Press.	Temp.	Salinity	Sigma-T
5	10.8088	33.9101	25.9609
10	10.817	33.9106	25.9598
20	10.8423	33.9093	25.9543
30	10.8424	33.9086	25.9537
40	10.8414	33.9085	25.9538
41	10.8407	33.9082	25.9538

STATION US16033			
LATITUDE	41-43.6	N	
LONGITUDE	140-38.4	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	10.2819	33.9457	26.0806
10	10.2843	33.9456	26.0801
20	10.2909	33.9456	26.079
30	10.2754	33.9435	26.08
40	10.2605	33.9432	26.0824
50	10.2454	33.9409	26.0832
56	10.2123	33.938	26.0865

STATION US16036			
LATITUDE	41-37.4	N	
LONGITUDE	140-30.3	E	
DEPTH (m)	32		
Press.	Temp.	Salinity	Sigma-T
5	10.4128	33.9369	26.0512
10	10.4182	33.9358	26.0494
20	10.3568	33.9329	26.0577
30	9.3967	33.8947	26.189
30	9.3967	33.8947	26.189

STATION US16039			
LATITUDE	41-35.0	N	
LONGITUDE	140-33.1	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	10.917	33.9133	25.9441
10	10.9234	33.9127	25.9425
20	10.9156	33.9122	25.9436
30	10.8601	33.9165	25.9567
40	10.8139	33.9194	25.9672
50	10.7821	33.9236	25.9761
57	10.7794	33.9243	25.9771

STATION US16042			
LATITUDE	41-28.7	N	
LONGITUDE	140-20.4	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	10.9866	33.8972	25.9191
10	10.9934	33.8969	25.9177
20	10.9778	33.897	25.9205
30	11.0054	33.897	25.9156
40	10.9996	33.8973	25.9169
50	10.9612	33.9037	25.9288
58	10.9514	33.9061	25.9324

STATION US16045			
LATITUDE	42-26.6	N	
LONGITUDE	140-25.0	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	6.329	33.7768	26.5443
10	6.3239	33.7764	26.5446
20	6.3155	33.7765	26.5458
30	6.3211	33.7769	26.5454
40	6.2722	33.7729	26.5485
50	6.262	33.7727	26.5496
58	6.2536	33.7719	26.5501

STATION US16046			
LATITUDE	42-19.5	N	
LONGITUDE	140-23.0	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	6.1819	33.7686	26.5567
10	6.1917	33.769	26.5557
20	6.1931	33.7689	26.5554
30	6.2035	33.77	26.555
40	6.1996	33.7732	26.558
50	6.1302	33.774	26.5675
52	6.1294	33.7741	26.5677

STATION US16047			
LATITUDE	42-14.2	N	
LONGITUDE	140-29.5	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	5.7259	33.717	26.5727
10	5.7159	33.7144	26.5718
20	5.7222	33.7159	26.5723
30	5.7219	33.7154	26.5719
40	5.7302	33.7164	26.5717
50	5.7288	33.7162	26.5717
73	5.8341	33.7356	26.5742

STATION US16048			
LATITUDE	42-11.2	N	
LONGITUDE	140-35.2	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	6.3004	33.7574	26.5326
10	6.31	33.7586	26.5324
20	6.3166	33.7589	26.5318
30	6.2846	33.7555	26.5331
40	6.2764	33.7547	26.5336
50	6.2592	33.7536	26.5349
75	6.1625	33.7435	26.5393
78	6.039	33.73	26.5442

STATION US16049			
LATITUDE	41-57.4	N	
LONGITUDE	140-58.1	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	4.2499	32.9763	26.1513
10	4.2559	32.9764	26.1507
20	4.2668	32.9786	26.1514
30	4.5776	33.0353	26.1639
40	5.5101	33.2439	26.2243
50	6.7215	33.5866	26.3429
75	6.5914	33.734	26.4763
76	6.6481	33.7565	26.4865

STATION US16050			
LATITUDE	41-58.0	N	
LONGITUDE	140-59.4	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	4.2359	32.9631	26.1422
10	4.2392	32.9634	26.1421
20	4.2819	32.9715	26.1442
30	4.2419	32.9626	26.1413
40	4.4985	33.0196	26.1598
50	5.2702	33.2052	26.2214
75	7.0494	33.6526	26.3507
83	6.8113	33.6724	26.3985

STATION US16051			
LATITUDE	41-24.1	N	
LONGITUDE	140-20.4	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	10.5655	33.9235	26.0142
10	10.581	33.9226	26.0107
20	10.5694	33.9217	26.012
30	10.3328	33.9306	26.0601
40	10.0884	33.9435	26.112
50	10.0229	33.9478	26.1264
75	9.7234	33.9617	26.1876
90	8.9388	33.9996	26.3444

STATION US16052			
LATITUDE	41-24.4	N	
LONGITUDE	140-06.1	E	
DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T
5	9.8315	33.9517	26.1617
10	9.8291	33.952	26.1623
20	9.7895	33.9555	26.1717
30	9.7322	33.9602	26.1849
40	9.6514	33.9623	26.2
50	9.4083	33.9756	26.2503
55	9.3761	33.9809	26.2596

STATION US16053			
LATITUDE	41-23.9	N	
LONGITUDE	140-05.9	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	9.6655	33.9522	26.1897
10	9.6679	33.952	26.1892
20	9.6625	33.9503	26.1888
30	9.6562	33.9514	26.1907
40	9.5435	33.9672	26.2216
50	9.399	33.9772	26.253
75	8.5005	34.0248	26.4325
82	8.4457	34.0281	26.4434

STATION US16054			
LATITUDE	41-23.5	N	
LONGITUDE	140-06.0	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	9.7759	33.9535	26.1724
10	9.7851	33.9533	26.1707
20	9.7659	33.9534	26.174
30	9.4926	33.9704	26.2325
40	9.3974	33.9764	26.2526
50	9.3389	33.9798	26.2649
75	8.9377	33.9952	26.3412
92	8.3728	34.0322	26.4578

STATION US16055			
LATITUDE	41-22.2	N	
LONGITUDE	140-06.0	E	
DEPTH (m)	119		
Press.	Temp.	Salinity	Sigma-T
5	9.8379	33.9393	26.1509
10	9.8418	33.9395	26.1504
20	9.8422	33.9391	26.1501
30	9.8371	33.9379	26.15
40	9.8399	33.9368	26.1487
50	9.8322	33.9409	26.1531
75	9.1743	33.9783	26.2902
100	8.2451	34.0165	26.4649
116	7.9166	34.032	26.5259

STATION US16056			
LATITUDE	41-26.1	N	
LONGITUDE	140-02.4	E	
DEPTH (m)	38		
Press.	Temp.	Salinity	Sigma-T
5	9.5913	33.9513	26.2013
10	9.5529	33.9541	26.2098
20	9.5206	33.958	26.2181
30	9.5329	33.9569	26.2153
35	9.5182	33.9583	26.2188

STATION US16057			
LATITUDE	41-26.1	N	
LONGITUDE	140-01.7	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	9.5917	33.9529	26.2025
10	9.5761	33.9528	26.205
20	9.5619	33.9532	26.2076
30	9.5264	33.9547	26.2146
40	9.5502	33.9528	26.2092
50	9.5365	33.9547	26.213
53	9.5363	33.9547	26.213

STATION US16058			
LATITUDE	41-26.0	N	
LONGITUDE	140-01.1	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	9.8935	33.9466	26.1473
10	9.8324	33.9436	26.1553
20	9.7507	33.9463	26.171
30	9.7675	33.9461	26.168
40	9.7565	33.947	26.1706
50	9.7141	33.9461	26.1769
75	9.7207	33.9505	26.1793
78	9.7183	33.9505	26.1797

STATION US16059			
LATITUDE	41-25.1	N	
LONGITUDE	140-00.3	E	
DEPTH (m)	105		
Press.	Temp.	Salinity	Sigma-T
5	10.0752	33.9495	26.1189
10	10.071	33.9492	26.1194
20	10.0465	33.9475	26.1222
30	10.0435	33.9476	26.1228
40	9.9744	33.9455	26.1328
50	9.8016	33.946	26.1623
75	9.5058	33.9453	26.2107
100	7.533	34.0372	26.5856
102	7.4597	34.0399	26.5983

STATION US16060			
LATITUDE	41-35.6	N	
LONGITUDE	140-51.7	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	10.86	33.8158	25.8784
10	10.8555	33.8163	25.8795
20	10.787	33.8635	25.9285
30	10.7894	33.871	25.9339
40	10.7918	33.8714	25.9337
46	10.7927	33.8716	25.9337

STATION	US16061		
LATITUDE	41-36.8	N	
LONGITUDE	140-51.3	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	10.8446	33.8236	25.8872
10	10.8151	33.8285	25.8962
20	10.7828	33.8382	25.9094
30	10.7638	33.8535	25.9247
40	10.7587	33.8619	25.9322
50	10.7637	33.8664	25.9348
75	10.7667	33.8671	25.9348
83	10.7676	33.867	25.9346

STATION	US16062		
LATITUDE	41-38.6	N	
LONGITUDE	140-49.2	E	
DEPTH (m)	325		
Press.	Temp.	Salinity	Sigma-T
5	10.6898	33.8542	25.9384
10	10.6948	33.856	25.9389
20	10.6717	33.9156	25.9894
30	10.4996	33.9132	26.0177
40	10.5054	33.9138	26.0171
50	10.3567	33.8993	26.0315
75	10.269	33.8892	26.0387
100	10.2203	33.901	26.0564
125	10.2223	33.9057	26.0596
150	10.239	33.9057	26.0568
175	10.2399	33.8991	26.0515
200	10.1715	33.9282	26.0859
250	10.1508	33.9502	26.1066
300	10.1441	33.9525	26.1095
307	10.1375	33.9529	26.111

STATION	US16063		
LATITUDE	41-40.8	N	
LONGITUDE	140-47.3	E	
DEPTH (m)	222		
Press.	Temp.	Salinity	Sigma-T
5	10.6891	33.8678	25.9491
10	10.6737	33.8877	25.9672
20	10.6814	33.911	25.984
30	10.6487	33.9091	25.9884
40	10.6465	33.9123	25.9912
50	10.6197	33.9096	25.9938
75	10.618	33.9107	25.995
100	10.4715	33.9151	26.024
125	10.4018	33.9201	26.04
150	10.294	33.9242	26.0618
175	10.2384	33.9374	26.0816
200	10.1683	33.9422	26.0974
205	10.1603	33.9457	26.1015

STATION	US16064		
LATITUDE	41-28.8	N	
LONGITUDE	140-45.2	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	10.6031	33.8884	25.9802
10	10.6032	33.8884	25.9802
20	10.6103	33.8888	25.9792
30	10.5921	33.892	25.9849
40	10.5019	33.8999	26.0068
50	10.1939	33.8868	26.0497
75	10.1606	33.9168	26.0788
81	10.1841	33.926	26.0821

STATION	US16065		
LATITUDE	42-10.4	N	
LONGITUDE	140-41.2	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	5.2933	33.7088	26.6178
10	5.3136	33.711	26.6172
20	5.3989	33.7313	26.6232
30	5.4091	33.7329	26.6233
40	5.3869	33.7319	26.6251
50	5.3786	33.733	26.627
75	5.298	33.7366	26.6393
84	5.3107	33.7388	26.6395

STATION	US16066		
LATITUDE	42-09.6	N	
LONGITUDE	140-35.9	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	4.8196	33.6743	26.6445
10	4.8536	33.679	26.6444
20	4.9509	33.6958	26.6469
30	4.8218	33.6736	26.6437
40	4.8468	33.6813	26.647
50	4.9826	33.7038	26.6496
70	5.1396	33.7366	26.6577

STATION	US16067		
LATITUDE	42-11.0	N	
LONGITUDE	140-35.7	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	5.5685	33.7818	26.643
10	5.5746	33.7812	26.6418
20	5.5777	33.7808	26.6411
30	5.577	33.7807	26.6411
40	5.5761	33.7806	26.6411
50	5.5713	33.7791	26.6405
75	5.4118	33.7705	26.6527
78	5.2834	33.7632	26.662

STATION	US16068		
LATITUDE	42-16.5	N	
LONGITUDE	140-35.7	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	5.6778	33.7868	26.6338
10	5.6814	33.7864	26.6329
20	5.6842	33.7864	26.6326
30	5.6843	33.7861	26.6324
40	5.6854	33.7864	26.6325
50	5.6865	33.7867	26.6326
75	5.6893	33.7862	26.6319
89	5.6843	33.7863	26.6325

STATION	US16069		
LATITUDE	42-20.7	N	
LONGITUDE	140-36.5	E	
DEPTH (m)	88		
Press.	Temp.	Salinity	Sigma-T
5	5.5245	33.7495	26.6227
10	5.525	33.7486	26.6219
20	5.5248	33.7485	26.6218
30	5.5265	33.7493	26.6224
40	5.5195	33.748	26.6221
50	5.576	33.7589	26.6239
75	5.5865	33.7605	26.624
86	5.5895	33.7608	26.6238

STATION	US16070		
LATITUDE	42-26.0	N	
LONGITUDE	140-37.1	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	5.5077	33.6886	26.5765
10	5.5088	33.6888	26.5765
20	5.5071	33.6879	26.576
30	5.5044	33.6875	26.5761
40	5.4975	33.6874	26.5768
50	5.4971	33.6873	26.5767
75	5.6553	33.7552	26.6115
81	5.6548	33.7554	26.6117

STATION	US16071		
LATITUDE	42-31.2	N	
LONGITUDE	140-37.5	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	5.0632	33.6189	26.5732
10	5.067	33.62	26.5736
20	5.0703	33.6205	26.5736
30	5.074	33.6211	26.5737
40	5.0745	33.621	26.5735
50	5.0847	33.6229	26.5739
59	4.9925	33.6149	26.578

STATION	US16072		
LATITUDE	42-28.1	N	
LONGITUDE	140-43.2	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	4.9643	33.4729	26.4686
10	4.9568	33.4763	26.4722
20	5.1087	33.5229	26.4919
30	5.2096	33.5603	26.5099
40	5.3969	33.6419	26.5527
50	5.5446	33.6759	26.562
58	5.5294	33.675	26.5631

STATION	US16073		
LATITUDE	42-25.2	N	
LONGITUDE	140-48.7	E	
DEPTH (m)	43		
Press.	Temp.	Salinity	Sigma-T
5	4.7492	33.3368	26.3845
10	4.7486	33.3362	26.3842
20	4.7491	33.3355	26.3835
30	4.7732	33.3541	26.3957
40	4.881	33.4083	26.4267
41	4.908	33.4314	26.442

STATION	US16074		
LATITUDE	42-20.9	N	
LONGITUDE	140-48.6	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	4.6237	33.2828	26.3554
10	4.6294	33.2821	26.3542
20	4.6245	33.283	26.3555
30	5.0387	33.4481	26.4406
40	5.4161	33.6252	26.5372
49	5.4265	33.6408	26.5483

STATION	US16075		
LATITUDE	42-18.5	N	
LONGITUDE	140-42.3	E	
DEPTH (m)	64		
Press.	Temp.	Salinity	Sigma-T
5	4.9148	33.5678	26.5494
10	4.959	33.5754	26.5505
20	5.2286	33.6659	26.5914
30	5.3088	33.7002	26.6092
40	5.3355	33.7103	26.6141
50	5.3562	33.72	26.6194
62	5.3877	33.7267	26.6209

STATION US16076			
LATITUDE	42-13.4	N	
LONGITUDE	140-41.2	E	
DEPTH (m)	88		
Press.	Temp.	Salinity	Sigma-T
5	4.8513	33.5994	26.5816
10	4.86	33.5994	26.5806
20	4.8532	33.5989	26.5809
30	5.2243	33.7117	26.6281
40	5.2451	33.712	26.626
50	5.2743	33.7183	26.6276
75	5.2977	33.7322	26.6358
86	5.2944	33.7323	26.6364

STATION US16079			
LATITUDE	41-59.5	N	
LONGITUDE	141-01.7	E	
DEPTH (m)	100		
Press.	Temp.	Salinity	Sigma-T
5	5.8042	33.3411	26.266
10	5.7978	33.3411	26.2667
20	5.8053	33.3418	26.2664
30	5.8102	33.3426	26.2664
40	5.8086	33.342	26.2662
50	5.7936	33.3439	26.2695
75	5.7872	33.3764	26.2959
96	5.5047	33.5416	26.4606

STATION US16082			
LATITUDE	41-57.6	N	
LONGITUDE	140-58.4	E	
DEPTH (m)	81		
Press.	Temp.	Salinity	Sigma-T
5	5.7638	33.3317	26.2635
10	5.7665	33.3317	26.2631
20	5.7654	33.3313	26.2629
30	5.7293	33.3311	26.2672
40	5.6206	33.3344	26.2828
50	5.4525	33.3277	26.2975
75	5.6558	33.4902	26.4019
77	5.6041	33.4955	26.4122

STATION US16085			
LATITUDE	42-18.8	N	
LONGITUDE	140-30.2	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	5.4743	33.7351	26.6173
10	5.4746	33.7356	26.6176
20	5.4789	33.7363	26.6177
30	5.482	33.7368	26.6177
40	5.4776	33.7358	26.6175
50	5.4934	33.7387	26.6179
75	5.5293	33.7453	26.6188
90	5.3968	33.774	26.6573

STATION US16088			
LATITUDE	42-17.5	N	
LONGITUDE	140-53.9	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	5.1977	33.3748	26.3644
10	5.1562	33.3715	26.3665
20	5.1173	33.3733	26.3724
30	5.0296	33.3772	26.3854
40	5.0412	33.3956	26.3987
50	5.0143	33.4626	26.4549
55	5.4195	33.7273	26.6176

STATION US16091			
LATITUDE	42-05.0	N	
LONGITUDE	140-56.6	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	5.6106	33.3404	26.2888
10	5.6074	33.3407	26.2894
20	5.5347	33.3354	26.2938
30	5.5046	33.334	26.2963
40	5.5146	33.3367	26.2972
50	5.5161	33.3374	26.2976
75	5.3564	33.3851	26.3542
82	5.3068	33.4588	26.4183

STATION US16077			
LATITUDE	42-10.4	N	
LONGITUDE	140-46.9	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	5.3005	33.6252	26.5508
10	5.3088	33.625	26.5497
20	5.3175	33.6258	26.5493
30	5.319	33.6264	26.5496
40	5.3217	33.6292	26.5515
50	5.3391	33.6427	26.5602
75	5.4312	33.6912	26.5877
92	5.354	33.6978	26.602

STATION US16080			
LATITUDE	41-58.8	N	
LONGITUDE	141-00.7	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	5.8549	33.3489	26.2659
10	5.8542	33.3492	26.2662
20	5.8535	33.3488	26.266
30	5.8595	33.35	26.2662
40	5.8376	33.3485	26.2678
50	5.5827	33.3296	26.2836
75	5.6977	33.3906	26.318
91	5.5091	33.5343	26.4542

STATION US16083			
LATITUDE	42-13.9	N	
LONGITUDE	140-30.1	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	5.4541	33.7483	26.6302
10	5.4546	33.749	26.6306
20	5.4568	33.7497	26.6309
30	5.4615	33.7499	26.6306
40	5.4703	33.7505	26.63
50	5.4686	33.7504	26.63
75	5.4896	33.7663	26.6402
77	5.4916	33.7669	26.6405

STATION US16086			
LATITUDE	42-23.1	N	
LONGITUDE	140-42.6	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	4.7791	33.4651	26.483
10	4.7581	33.464	26.4845
20	4.8756	33.5136	26.5108
30	4.9904	33.5493	26.5262
40	5.3071	33.6629	26.5798
50	5.5683	33.7328	26.6043
59	5.5839	33.7434	26.6108

STATION US16089			
LATITUDE	42-16.0	N	
LONGITUDE	140-58.6	E	
DEPTH (m)	64		
Press.	Temp.	Salinity	Sigma-T
5	5.1898	33.341	26.3385
10	5.1489	33.3394	26.342
20	5.2287	33.3875	26.3709
30	5.1665	33.3849	26.376
40	5.0883	33.3828	26.3832
50	5.1108	33.3946	26.39
63	5.1592	33.4267	26.41

STATION US16078			
LATITUDE	42-07.0	N	
LONGITUDE	140-50.4	E	
DEPTH (m)	68		
Press.	Temp.	Salinity	Sigma-T
5	5.7022	33.3996	26.3246
10	5.708	33.4013	26.3252
20	5.7229	33.4059	26.327
30	5.8914	33.5775	26.4421
40	5.6335	33.5954	26.4877
50	5.3661	33.5909	26.5159
60	5.405	33.6243	26.5378

STATION US16081			
LATITUDE	41-58.2	N	
LONGITUDE	140-59.6	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	5.553	33.2985	26.2625
10	5.5543	33.2985	26.2623
20	5.5597	33.2993	26.2624
30	5.5617	33.2991	26.2619
40	5.644	33.3174	26.2666
50	5.8359	33.3636	26.2799
75	6.0772	33.4635	26.3289
84	5.5375	33.5417	26.4568

STATION US16084			
LATITUDE	42-18.9	N	
LONGITUDE	140-23.1	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	5.3427	33.7605	26.653
10	5.3347	33.7597	26.6533
20	5.3311	33.7592	26.6533
30	5.3333	33.7598	26.6535
40	5.2417	33.7518	26.6579
50	5.199	33.7542	26.6648
51	5.1887	33.7543	26.666

STATION US16087			
LATITUDE	42-15.4	N	
LONGITUDE	140-47.5	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	4.9389	33.4135	26.4244
10	4.9088	33.4149	26.4288
20	4.8098	33.5081	26.5137
30	4.831	33.534	26.5319
40	5.1567	33.653	26.5895
50	5.3604	33.721	26.6196
71	5.3756	33.7408	26.6335

STATION US16090			
LATITUDE	42-12.9	N	
LONGITUDE	140-56.0	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	5.1813	33.3062	26.312
10	5.1441	33.325	26.3311
20	5.2202	33.3427	26.3363
30	5.3394	33.3723	26.346
40	5.1701	33.3625	26.3578
50	5.2699	33.3879	26.3664
68	5.4335	33.71	26.6023

THE " USHIO MARU "

CRUISE 354

CRUISE 355

CRUISE 356

IN FEBRUARY 2016

IN MARCH 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 354

Departure from Hakodate	Feb. 16, 2016
Start hydrographic research (US16092)	16
Finish hydrographic research (US16102)	16
Return to Hakodate	17
Total coverage 64.1 miles	

Cruise 355

Departure from Hakodate	Feb. 22, 2016
Start hydrographic research (US16103)	22
Arrival at Hakodate	23
Depart from Hakodate	24
Arrival at Muroran	25
Depart from and Arrival at Muroran	26
Depart from Muroran	27
Finish hydrographic research (US16140)	27
Return to Hakodate	28
Total coverage 419.1 miles	

Cruise 356

Departure from Hakodate	Mar. 4, 2016
Start hydrographic research (US16141)	4
Arrival at Usujiri	5
Depart from Usujiri	7
Finish hydrographic research (US16164)	8
Arrival at Usujiri	8
Depart from Usujiri	9
Return to Hakodate	10
Total coverage 399.0 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

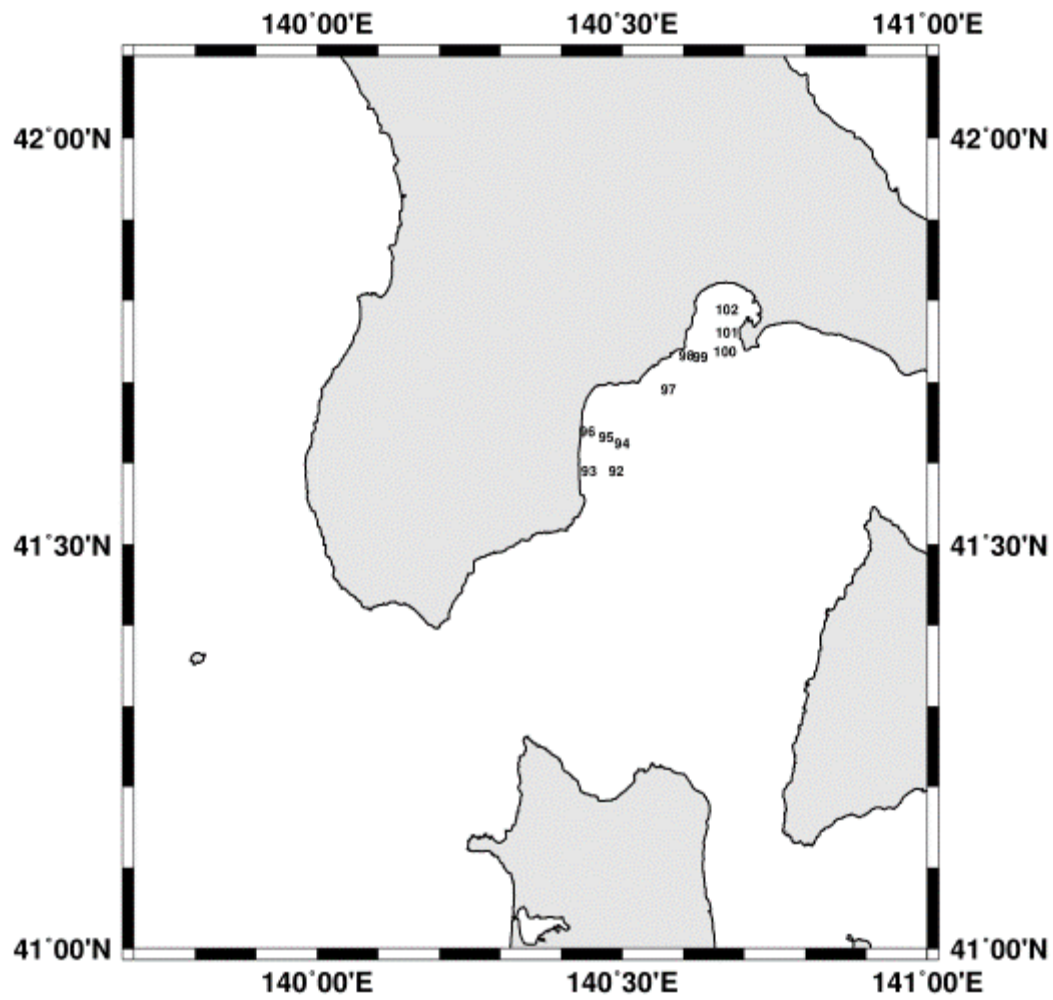


Figure 1. Oceanographic stations (Cruise 354)

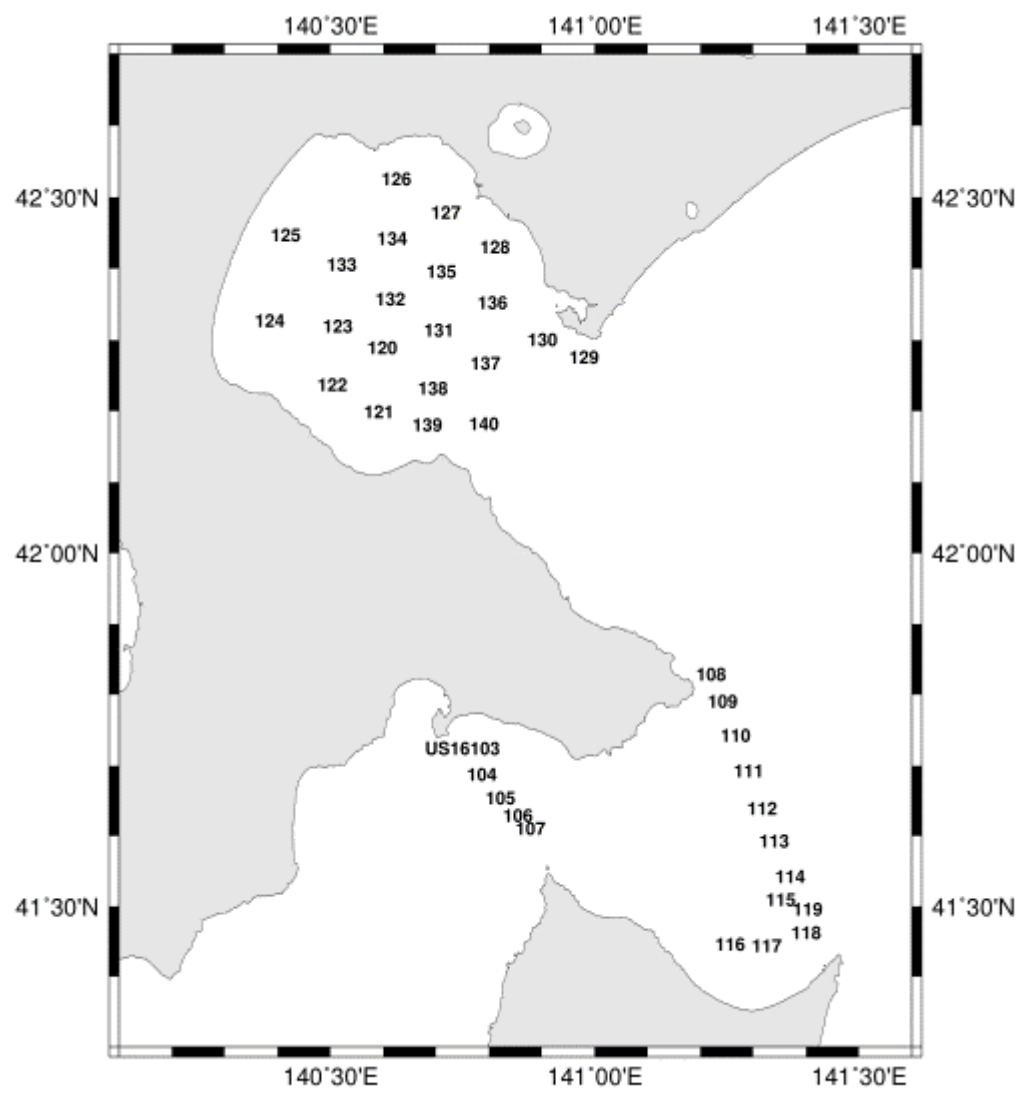


Figure 2. Oceanographic stations (Cruise 355)

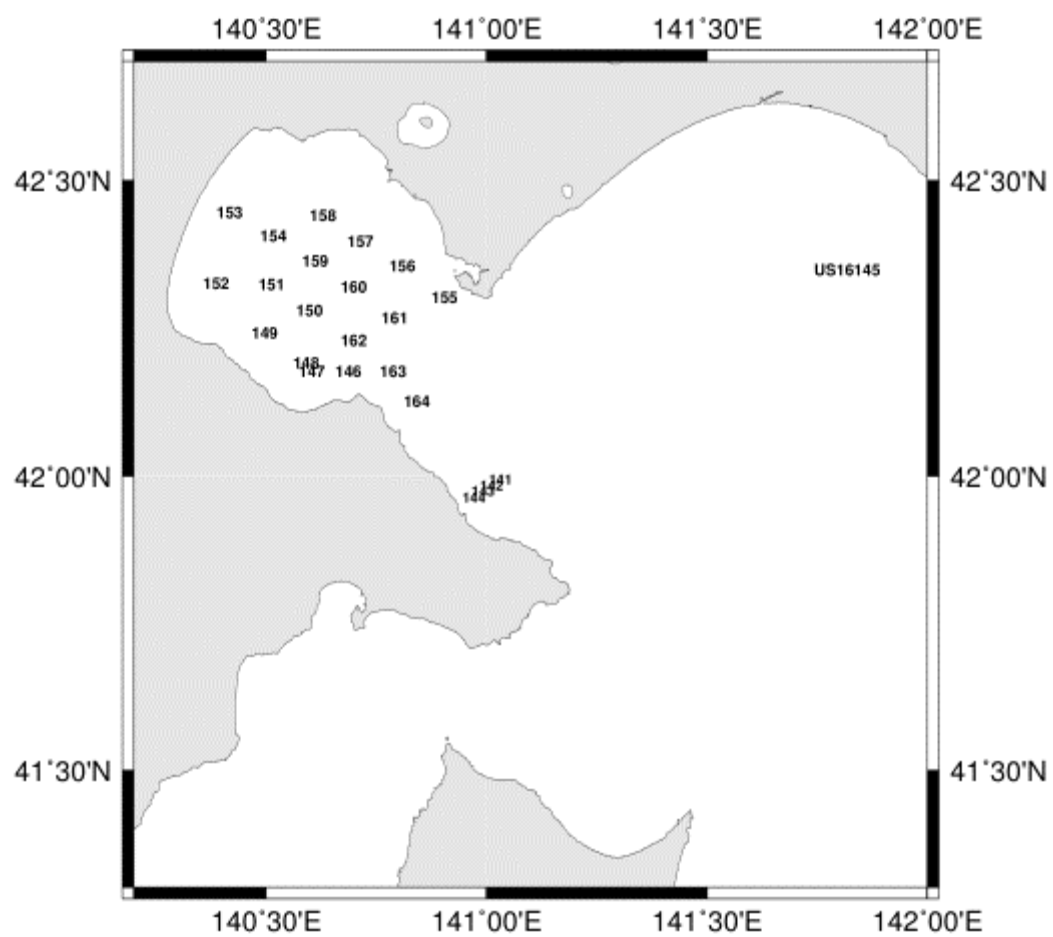


Figure 3. Oceanographic stations (Cruise 356)

Table 1. List of Oceanographic Station

Cruise 354												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16092	41-35.1	140-29.4	2/16	1020-1023	34	SW-1	SSW-2	SW-3	-2.7	8.5	s	1010.6
US16093	41-35.1	140-26.7	2/16	1048-1050	12	West-1	SSE-2	West-3	-2.8	7.6	s	1010.7
US16094	41-37.1	140-30.0	2/16	1130-1136	32	West-1	SSE-2	West-4	-1.6	8.2	s	1010.2
US16095	41-37.6	140-28.4	2/16	1204-1208	22	WSW-3	South-1	WSW-5	-1.6	8.0	s	1009.7
US16096	41-38.0	140-26.6	2/16	1220-1225	15	West-3	South-1	West-5	-3.2	7.6	s	1009.4
US16097	41-41.1	140-34.5	2/16	1330-1335	42	West-2	South-2	West-3	-0.7	8.5	c	1009.0
US16098	41-43.6	140-36.3	2/16	1358-1402	32	West-1	South-2	West-3	-0.8	8.5	s	1008.3
US16099	41-43.5	140-37.7	2/16	1421-1427	56	West-2	SSW-2	West-3	-1.3	8.4	bc	1008.6
US16100	41-43.9	140-40.1	2/16	1503-1509	61	West-1	SSW-2	West-4	-1.5	8.2	s	1008.6
US16101	41-45.3	140-40.3	2/16	1531-1536	53	WSW-2	SSW-2	WSW-4	-0.7	7.7	s	1008.6
US16102	41-47.0	140-40.3	2/16	1601-1605	20	SW-1	SSW-2	SW-3	-1.3	7.8	bc	1008.6

Table 1. List of Oceanographic Station (continued)

Cruise 355													
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)	
US16103	41-42.9	140-45.0	2/22	1817-1827	84	West-2	SW-1	West-4	0.2	8.6	o	1031.1	
US16104	41-40.7	140-47.2	2/22	1847-1907	225	West-2	SW-1	West-4	0.4	9.6	o	1031.2	
US16105	41-38.7	140-49.3	2/22	1925-1946	343	West-2	SW-1	West-4	0.9	9.6	bc	1031.1	
US16106	41-37.2	140-51.3	2/22	2042-2052	103	West-2	SW-1	West-4	1.0	9.6	bc	1030.8	
US16107	41-36.1	140-52.7	2/22	2105-2111	49	West-2	SW-1	West-4	1.3	9.5	bc	1030.7	
US16108	41-49.2	141-13.2	2/22	2302-2318	170	West-2	NW-1	West-4	0.5	5.7	bc	1029.6	
US16109	41-46.9	141-14.5	2/22	2357-0015	199	NW-1	NW-1	NW-2	0.2	5.7	bc	1029.2	
US16110	41-44.0	141-16.0	2/23	0037-0056	228	West-1	West-1	West-2	0.5	6.8	bc	1028.8	
US16111	41-41.0	141-17.5	2/23	0118-0138	232	SSW-1	West-1	SSW-4	1.5	8.4	bc	1028.3	
US16112	41-37.8	141-19.0	2/23	0202-0221	215	SW-2	SSW-1	SW-5	2.5	8.9	bc	1027.8	
US16113	41-35.0	141-20.4	2/23	0245-0310	310	SSW-2	SSW-1	SSW-4	2.2	9.1	bc	1026.7	
US16114	41-32.0	141-22.2	2/23	0334-0354	254	SSW-1	SSW-1	SSW-4	2.0	8.8	bc	1026.5	
US16115	41-30.0	141-21.1	2/23	0450-0510	224	South-3	SSE-1	South-5	2.4	9.3	o	1025.0	
US16116	41-26.2	141-15.4	2/23	0849-0857	77	South-3	South-1	South-5	3.0	9.6	bc	1022.1	
US16117	41-26.1	141-19.5	2/23	0949-0956	73	SSW-3	South-1	SSW-5	4.2	9.5	c	1021.6	
US16118	41-27.2	141-24.0	2/23	1021-1026	48	SSW-2	South-1	SSW-4	4.2	9.4	c	1021.1	
US16119	41-29.2	141-24.2	2/23	1043-1051	83	South-2	South-1	South-4	4.4	9.5	c	1021.0	
US16120	42-16.8	140-35.9	2/25	0623-0628	91	West-3	WNW-1	West-5	-3.7	4.3	c	1026.8	
US16121	42-11.4	140-35.5	2/25	0801-0806	82	WSW-3	West-1	WSW-5	-3.6	4.1	bc	1026.7	
US16122	42-13.7	140-30.2	2/25	0910-0916	77	West-1	West-1	West-3	-2.9	4.4	bc	1026.7	
US16123	42-18.6	140-30.8	2/25	1011-1018	92	West-2	West-1	West-4	-2.6	4.1	s	1026.6	
US16124	42-19.1	140-23.1	2/25	1111-1113	54	West-2	West-1	West-5	-2.7	3.9	s	1026.3	
US16125	42-26.3	140-24.9	2/25	1213-1216	59	West-2	West-1	West-5	-3.6	4.2	s	1025.2	
US16126	42-31.0	140-37.5	2/25	1329-1333	62	West-1	NW-1	West-4	-2.1	3.7	s	1024.7	
US16127	42-28.2	140-43.1	2/25	1415-1418	60	WNW-2	SW-1	WNW-4	-2.9	3.9	s	1024.3	
US16128	42-25.3	140-48.7	2/25	1500-1504	44	West-3	WSW-2	West-5	-2.0	5.3	c	1024.3	
US16129	42-16.0	140-58.8	2/26	0651-0655	64	WNW-2	West-1	WNW-6	-2.6	4.0	bc	1023.6	
US16130	42-17.5	140-54.1	2/26	0731-0734	57	WNW-3	West-2	WNW-5	-2.1	4.4	bc	1023.4	
US16131	42-18.3	140-42.3	2/26	0937-0941	63	West-3	West-1	West-5	-2.0	4.7	bc	1024.1	
US16132	42-20.9	140-36.8	2/26	1020-1025	86	West-3	West-1	West-5	-2.1	4.2	bc	1014.1	
US16133	42-23.8	140-31.3	2/26	1109-1114	95	West-3	West-1	West-5	-2.0	3.9	bc	1024.1	
US16134	42-26.0	140-37.0	2/26	1155-1200	83	West-3	West-1	West-4	-1.0	4.1	bc	1024.0	
US16135	42-23.2	140-42.6	2/26	1241-1245	61	West-2	West-1	West-5	-1.9	4.6	bc	1023.2	
US16136	42-20.6	140-48.4	2/26	1226-1231	55	West-2	West-1	West-5	-1.8	4.9	bc	1023.2	
US16137	42-15.5	140-47.6	2/27	1502-1506	71	WNW-3	West-3	WNW-6	-0.8	4.8	bc	1026.1	
US16138	42-13.4	140-41.6	2/27	1547-1551	89	West-2	West-2	West-5	-1.2	4.1	bc	1027.0	
US16139	42-10.3	140-41.0	2/27	1627-1631	86	West-1	West-1	West-4	-1.4	4.0	bc	1027.3	
US16140	42-10.4	140-47.4	2/27	1712-1717	92	NW-1	NW-1	NW-4	-0.7	4.7	bc	1027.2	

Table 1. List of Oceanographic Station (continued)

Cruise 356												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16141	41-59.2	141-01.9	3/4	1237-1242	101	NNW-1	East-1	NNW-4	1.7	5.2	bc	1034.0
US16142	41-58.6	141-00.7	3/4	1251-1256	94	NNW-2	East-1	NNW-4	2.3	5.1	bc	1033.6
US16143	41-58.0	140-59.5	3/4	1304-1308	86	NNW-2	East-1	NNW-3	2.5	5.6	bc	1033.6
US16144	41-57.4	140-58.3	3/4	1318-1322	79	NNW-2	East-1	NNW-3	2.8	5.6	bc	1033.6
US16145	42-20.4	140-48.7	3/4	2111-2125	312	NNW-3	NNW-1	NNW-5	0.6	3.7	bc	1035.7
US16146	42-10.1	140-41.2	3/7	0913-0917	84	NW-3	ENE-1	NW-5	5.1	4.1	bc	1021.6
US16147	42-10.1	140-36.2	3/7	0953-0957	75	NW-2	East-1	NW-4	5.0	4.0	bc	1021.7
US16148	42-11.0	140-35.4	3/7	1020-1025	80	NW-2	East-1	NW-5	5.5	4.0	bc	1022.1
US16149	42-14.0	140-29.8	3/7	1135-1140	77	NW-1	East-1	NW-4	6.0	4.1	bc	1021.8
US16150	42-16.3	140-35.9	3/7	1235-1240	92	NW-1	NNW-1	NW-4	7.4	4.3	bc	1021.6
US16151	42-18.9	140-30.7	3/7	1414-1419	93	WNW-2	West-1	WNW-5	6.4	4.4	bc	1021.1
US16152	42-19.0	140-23.2	3/7	1507-1512	55	WNW-2	WNW-1	WNW-5	5.6	4.1	c	1021.3
US16153	42-26.2	140-25.0	3/7	1607-1611	61	WNW-2	ESE-1	West-3	6.0	4.1	o	1021.6
US16154	42-23.8	140-31.0	3/7	1652-1656	95	WNW-1	WNW-1	WNW-3	5.6	4.2	o	1021.7
US16155	42-17.6	140-54.3	3/8	0613-0616	56	East-2	East-1	East-3	3.7	3.7	o	1015.6
US16156	42-20.8	140-48.5	3/8	0716-0720	52	Calm	East-1	Calm	3.7	3.9	c	1015.7
US16157	42-23.3	140-42.8	3/8	0800-0804	60	NNE-1	East-1	NNE-2	3.7	4.3	o	1014.6
US16158	42-25.9	140-37.7	3/8	0843-0848	82	Calm	East-1	Calm	4.9	4.6	o	1014.6
US16159	42-21.3	140-36.7	3/8	0931-0936	87	ESE-2	ESE-1	ESE-4	5.0	4.0	c	1014.1
US16160	42-18.7	140-41.9	3/8	1017-1023	70	East-2	ESE-1	East-4	5.6	4.5	c	1012.6
US16161	42-15.5	140-47.5	3/8	1110-1114	71	East-2	ESE-1	East-4	5.8	4.6	c	1012.0
US16162	42-13.3	140-41.9	3/8	1201-1206	89	ESE-1	ESE-1	ESE-3	7.8	4.4	c	1012.1
US16163	42-10.1	140-47.3	3/8	1252-1257	95	calm	East-1	calm	8.3	4.5	c	1010.6
US16164	42-07.1	140-50.5	3/8	1336-1340	73	NW-1	East-2	NW-3	8.8	4.6	bc	1009.4

Table 2. Oceanographic data

STATION	US16092		
LATITUDE	41-35.1	N	
LONGITUE	140-29.4	E	
DEPTH (m)	34		
Press.	Temp.	Salinity	Sigma-T
5	8.7681	33.8869	26.283
10	8.8007	33.8908	26.281
20	8.8065	33.8889	26.2785
30	8.8335	33.893	26.2775
31	8.835	33.893	26.2773

STATION	US16095		
LATITUDE	41-37.6	N	
LONGITUE	140-28.4	E	
DEPTH (m)	22		
Press.	Temp.	Salinity	Sigma-T
5	8.2563	33.7279	26.2367
10	8.3882	33.7671	26.2475
20	8.6097	33.812	26.2488
21	8.6064	33.8108	26.2484

STATION	US16098		
LATITUDE	41-43.6	N	
LONGITUE	140-36.3	E	
DEPTH (m)	32		
Press.	Temp.	Salinity	Sigma-T
5	7.9642	33.4335	26.0489
10	8.8185	33.7991	26.2063
20	9.0195	33.9583	26.2993
30	8.9062	33.9625	26.3205
39	8.8664	33.9659	26.3295

STATION	US16101		
LATITUDE	41-45.3	N	
LONGITUE	140-40.3	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	7.9642	33.4335	26.0489
10	8.8185	33.7991	26.2063
20	9.0195	33.9583	26.2993
30	8.9062	33.9625	26.3205
39	8.8664	33.9659	26.3295

STATION	US16104		
LATITUDE	41-40.7	N	
LONGITUE	140-47.2	E	
DEPTH (m)	225		
Press.	Temp.	Salinity	Sigma-T
5	9.9594	33.9206	26.1159
10	9.964	33.9202	26.1149
20	9.9652	33.9199	26.1144
30	9.9661	33.9198	26.1142
40	9.9544	33.9202	26.1165
50	9.9429	33.9207	26.1188
75	9.8419	33.9292	26.1424
100	9.779	33.9341	26.1567
125	9.6859	33.9398	26.1766
150	9.6035	33.9423	26.1923
175	9.239	33.9577	26.2637
200	9.0924	33.9706	26.2973
211	9.1003	33.9684	26.2943

STATION	US16093		
LATITUDE	41-35.1	N	
LONGITUE	140-26.7	E	
DEPTH (m)	12		
Press.	Temp.	Salinity	Sigma-T
5	8.6991	33.8331	26.2515
10	8.7978	33.854	26.2526
11	8.7776	33.8465	26.2498

STATION	US16096		
LATITUDE	41-38.0	N	
LONGITUE	140-26.6	E	
DEPTH (m)	15		
Press.	Temp.	Salinity	Sigma-T
5	8.2643	33.6717	26.1913
10	8.3912	33.7168	26.2076
15	8.482	33.7626	26.2297

STATION	US16099		
LATITUDE	41-43.5	N	
LONGITUE	140-37.7	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	7.8213	33.4582	26.0891
10	8.3221	33.6356	26.1543
18	8.9517	33.9532	26.306

STATION	US16102		
LATITUDE	41-47.0	N	
LONGITUE	140-40.3	E	
DEPTH (m)	20		
Press.	Temp.	Salinity	Sigma-T
5	7.8213	33.4582	26.0891
10	8.3221	33.6356	26.1543
18	8.9517	33.9532	26.306

STATION	US16105		
LATITUDE	41-38.7	N	
LONGITUE	140-49.3	E	
DEPTH (m)	343		
Press.	Temp.	Salinity	Sigma-T
5	9.8789	33.8452	26.0706
10	9.9197	33.9089	26.1135
20	9.9248	33.9097	26.1133
30	9.9242	33.9095	26.1132
40	9.9178	33.9094	26.1142
50	9.9136	33.9095	26.115
75	9.8271	33.9128	26.132
100	9.8823	33.9389	26.1432
125	9.891	33.9419	26.1441
150	9.8207	33.9469	26.1598
175	9.6029	33.9414	26.1917
200	9.5685	33.9402	26.1964
250	9.5105	33.9446	26.2094
300	9.513	33.9489	26.2123
320	9.4162	33.9599	26.2367

STATION	US16094		
LATITUDE	41-37.1	N	
LONGITUE	140-30.0	E	
DEPTH (m)	32		
Press.	Temp.	Salinity	Sigma-T
5	8.6301	33.8408	26.2682
10	8.6413	33.8433	26.2685
20	8.6376	33.8416	26.2678
30	8.6686	33.8497	26.2693
32	8.6692	33.8499	26.2694

STATION	US16097		
LATITUDE	41-41.1	N	
LONGITUE	140-34.5	E	
DEPTH (m)	42		
Press.	Temp.	Salinity	Sigma-T
5	8.8411	33.9024	26.2837
10	8.8433	33.9024	26.2834
20	8.8464	33.9016	26.2822
30	8.847	33.9022	26.2826
40	8.8588	33.9614	26.3272
40	8.8588	33.9614	26.3272

STATION	US16100		
LATITUDE	41-43.9	N	
LONGITUE	140-40.1	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	8.0753	33.5644	26.1353
10	9.0011	33.9325	26.2819
20	9.0376	33.9625	26.2997
30	8.9842	33.9645	26.3098
40	8.8407	33.9638	26.3319
50	8.6731	33.9729	26.3651
59	8.5606	33.9834	26.3907

STATION	US16103		
LATITUDE	41-42.9	N	
LONGITUE	140-45.0	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
1	9.981	33.9222	26.1136
2	9.995	33.9224	26.1114
3	10.0014	33.9222	26.1101
4	10.0027	33.922	26.1097
5	9.9993	33.9223	26.1106
10	9.9877	33.923	26.113
20	9.9215	33.9284	26.1284
30	9.7694	33.9327	26.1572
40	9.7695	33.9341	26.1583
50	9.7017	33.9317	26.1677
70	9.2337	33.9116	26.2285

STATION	US16105-2		
LATITUDE	41-38.6	N	
LONGITUE	140-49.7	E	
DEPTH (m)	318		
Press.	Temp.	Salinity	Sigma-T
5	9.8839	33.915	26.1243
10	9.8933	33.9126	26.1208
20	9.8878	33.9102	26.1199
30	9.8874	33.9104	26.1201
40	9.8832	33.9097	26.1202
50	9.884	33.9095	26.12
75	9.8681	33.9085	26.1218
100	9.8046	33.9297	26.149
125	9.8347	33.9473	26.1578
150	9.8349	33.9495	26.1594
175	9.6311	33.9402	26.186
200	9.5969	33.9417	26.1929
250	9.5319	33.9413	26.2032
291	9.5502	33.9442	26.2026

STATION US16106			
LATITUDE	41-37.2	N	
LONGITUE	140-51.3	E	
DEPTH (m)	103		
Press.	Temp.	Salinity	Sigma-T
5	9.8682	33.9205	26.1312
10	9.8532	33.9143	26.1289
20	9.8317	33.9109	26.1298
30	9.8409	33.9111	26.1285
40	9.8354	33.9105	26.1289
50	9.8361	33.9086	26.1273
75	9.8313	33.9081	26.1277
97	9.8354	33.9076	26.1267

STATION US16107			
LATITUDE	41-36.1	N	
LONGITUE	140-52.7	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	9.8145	33.6984	25.9667
10	9.8916	33.9077	26.1173
20	9.8756	33.9176	26.1277
30	9.7649	33.9286	26.1548
40	9.7078	33.9364	26.1704

STATION US16108			
LATITUDE	41-49.2	N	
LONGITUE	141-13.2	E	
DEPTH (m)	170		
Press.	Temp.	Salinity	Sigma-T
5	6.1073	33.4129	26.2852
10	6.1103	33.4131	26.285
20	6.1188	33.4146	26.2851
30	6.1118	33.4125	26.2843
40	6.1156	33.4135	26.2846
50	6.1443	33.4193	26.2856
75	6.2115	33.4319	26.2871
100	6.6531	33.5228	26.3016
125	6.3042	33.4735	26.3081
150	6.2193	33.472	26.3177
160	6.2101	33.471	26.3181

STATION US16108-2			
LATITUDE	41-49.0	N	
LONGITUE	141-13.3	E	
DEPTH (m)	170		
Press.	Temp.	Salinity	Sigma-T
5	6.0846	33.4118	26.2871
10	6.116	33.4129	26.2841
20	6.1123	33.4117	26.2836
30	6.1169	33.4117	26.283
40	6.1121	33.4105	26.2827
50	6.1121	33.4101	26.2824
75	6.1153	33.4119	26.2834
100	6.3332	33.4609	26.2944
125	6.3753	33.4774	26.302
150	6.2708	33.48	26.3175
160	6.2503	33.4799	26.3201

STATION US16109			
LATITUDE	41-46.9	N	
LONGITUE	141-14.5	E	
DEPTH (m)	199		
Press.	Temp.	Salinity	Sigma-T
5	6.135	33.4179	26.2857
10	6.139	33.4174	26.2848
20	6.1406	33.4175	26.2847
30	6.1458	33.4187	26.2849
40	6.1538	33.4198	26.2848
50	6.1566	33.4199	26.2846
75	6.1637	33.4206	26.2842
100	6.1565	33.4197	26.2844
125	6.1752	33.4232	26.2848
150	6.302	33.4553	26.294
175	6.4307	33.5285	26.3352
192	6.4423	33.5395	26.3424

STATION US16110			
LATITUDE	41-44.0	N	
LONGITUE	141-16.0	E	
DEPTH (m)	228		
Press.	Temp.	Salinity	Sigma-T
5	7.6731	33.7081	26.3069
10	7.551	33.6762	26.2992
20	7.6667	33.7023	26.3032
30	7.713	33.7097	26.3024
40	7.7769	33.7237	26.3041
50	7.7345	33.7132	26.302
75	7.767	33.7212	26.3036
100	7.6422	33.6946	26.3007
125	7.9298	33.7499	26.3024
150	8.1008	33.7866	26.306
175	6.8915	33.6427	26.3643
200	6.4931	33.6343	26.4105
215	5.9091	33.5856	26.4463

STATION US16111			
LATITUDE	41-41.0	N	
LONGITUE	141-17.5	E	
DEPTH (m)	232		
Press.	Temp.	Salinity	Sigma-T
5	8.8956	33.9363	26.3017
10	8.8875	33.9336	26.3009
20	8.8881	33.9333	26.3005
30	8.8913	33.9335	26.3002
40	8.8811	33.9326	26.3011
50	8.8829	33.9327	26.3008
75	8.8848	33.9329	26.3007
100	8.8813	33.9326	26.301
125	8.8151	33.9249	26.3054
150	8.2305	33.881	26.3606
175	7.428	33.8233	26.4323
200	5.461	33.6364	26.5408
220	5.3964	33.6423	26.5531

STATION US16112			
LATITUDE	41-37.8	N	
LONGITUE	141-19.0	E	
DEPTH (m)	215		
Press.	Temp.	Salinity	Sigma-T
5	9.3765	33.9273	26.2177
10	9.388	33.9267	26.2154
20	9.3931	33.9265	26.2144
30	9.389	33.9252	26.214
40	9.3804	33.9243	26.2147
50	9.3676	33.923	26.2158
75	9.0191	33.8961	26.2507
100	8.6746	33.8762	26.2891
125	8.3939	33.8622	26.3212
150	7.9896	33.8321	26.3581
175	6.8713	33.7812	26.4762
200	4.9367	33.6486	26.611
205	4.866	33.6545	26.6236

STATION US16113			
LATITUDE	41-35.0	N	
LONGITUE	141-20.4	E	
DEPTH (m)	310		
Press.	Temp.	Salinity	Sigma-T
5	9.413	33.9308	26.2145
10	9.4161	33.9298	26.2132
20	9.4144	33.93	26.2136
30	9.4183	33.9296	26.2127
40	9.4097	33.9291	26.2137
50	9.4164	33.9284	26.2121
75	9.4208	33.9286	26.2115
100	9.166	33.9092	26.2375
125	9.0551	33.9024	26.2499
150	8.9504	33.8945	26.2603
175	8.8978	33.8929	26.2673
200	8.4884	33.8626	26.3071
250	7.9116	33.8302	26.3681
300	5.4725	33.7094	26.5971
301	5.4634	33.7148	26.6026

STATION US16114			
LATITUDE	41-32.0	N	
LONGITUE	141-22.2	E	
DEPTH (m)	254		
Press.	Temp.	Salinity	Sigma-T
5	9.5113	33.5264	25.8823
10	9.6945	33.8909	26.137
20	9.7055	33.9292	26.1651
30	9.7037	33.9302	26.1662
40	9.6841	33.9281	26.1678
50	9.6263	33.9233	26.1736
75	9.5678	33.9207	26.1813
100	9.6036	33.9354	26.1868
125	9.3404	33.903	26.2045
150	9.3466	33.924	26.2199
175	9.2913	33.9202	26.2259
200	8.6491	33.8616	26.2816
241	8.5015	33.8727	26.313

STATION US16114-2			
LATITUDE	41-32.4	N	
LONGITUE	141-23.0	E	
DEPTH (m)	235		
Press.	Temp.	Salinity	Sigma-T
5	9.6028	33.7082	26.0094
10	9.6793	33.9127	26.1566
20	9.6824	33.9257	26.1662
30	9.6648	33.9254	26.1689
40	9.6196	33.9273	26.1779
50	9.602	33.9301	26.183
75	9.5992	33.9296	26.1831
100	9.2792	33.8952	26.2084
125	9.2975	33.9152	26.2211
150	9.2532	33.9153	26.2283
175	8.7138	33.8607	26.271
200	8.5863	33.877	26.3033
215	8.5646	33.8767	26.3065

STATION US16115			
LATITUDE	41-30.0	N	
LONGITUE	141-21.1	E	
DEPTH (m)	224		
Press.	Temp.	Salinity	Sigma-T
5	9.6071	33.5386	25.8761
10	9.6952	33.862	26.1143
20	9.7176	33.9286	26.1627
30	9.7119	33.9272	26.1625
40	9.7108	33.9276	26.1629
50	9.722	33.9291	26.1624
75	9.6981	33.9268	26.1645
100	9.6652	33.9237	26.1675
125	9.6616	33.9263	26.1702
150	9.663	33.929	26.1721
175	9.6516	33.9282	26.1733
200	9.6594	33.924	26.1687
209	9.6606	33.9228	26.1676

STATION US16116			
LATITUDE	41-26.2	N	
LONGITUE	141-15.4	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	9.8687	33.9067	26.1203
10	9.8737	33.9193	26.1294
20	9.8726	33.9194	26.1296
30	9.8783	33.9193	26.1286
40	9.8801	33.9187	26.1278
50	9.8765	33.9181	26.1279
66	9.8264	33.916	26.1347

STATION US16118			
LATITUDE	41-27.2	N	
LONGITUE	141-24.0	E	
DEPTH (m)	48		
Press.	Temp.	Salinity	Sigma-T
5	9.7514	33.8531	26.098
10	9.8036	33.9209	26.1424
20	9.8042	33.9198	26.1414
30	9.8088	33.9205	26.1412
35	9.7701	33.9162	26.1442

STATION US16121			
LATITUDE	42-11.4	N	
LONGITUE	140-35.5	E	
DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T
5	4.5053	33.6351	26.6477
10	4.5078	33.6341	26.6467
20	4.5149	33.6345	26.6462
30	4.5128	33.6346	26.6465
40	4.5139	33.6345	26.6463
50	4.5139	33.6343	26.6462
75	4.5227	33.6383	26.6484
80	4.5214	33.6385	26.6487

STATION US16124			
LATITUDE	42-19.1	N	
LONGITUE	140-23.1	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	4.4736	33.6117	26.6326
10	4.4763	33.6126	26.6329
20	4.4823	33.6144	26.6338
30	4.4816	33.6139	26.6334
40	4.4834	33.6142	26.6335
50	4.4847	33.6144	26.6335
53	4.4854	33.6146	26.6336

STATION US16127			
LATITUDE	42-28.2	N	
LONGITUE	140-43.1	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	4.4475	33.454	26.5102
10	4.6101	33.5081	26.5356
20	4.576	33.5204	26.5491
30	4.5547	33.5243	26.5545
40	4.5745	33.5406	26.5653
50	4.6352	33.5727	26.5842
59	4.6578	33.59	26.5955

STATION US16130			
LATITUDE	42-17.5	N	
LONGITUE	140-54.1	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	4.9114	33.3791	26.4002
10	4.9167	33.3777	26.3985
20	4.9148	33.3773	26.3984
30	4.9178	33.3776	26.3983
40	4.9658	33.3875	26.4008
50	4.8779	33.4074	26.4264
55	4.8762	33.4136	26.4315

STATION US16116-2			
LATITUDE	41-26.2	N	
LONGITUE	141-15.5	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	9.8814	33.9201	26.1287
10	9.8865	33.919	26.127
20	9.8864	33.9193	26.1272
30	9.8831	33.9192	26.1277
40	9.8628	33.9174	26.1296
50	9.8512	33.9166	26.131
64	9.8163	33.9141	26.1349

STATION US16119			
LATITUDE	41-29.2	N	
LONGITUE	141-24.2	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	9.8119	33.9197	26.14
10	9.827	33.9284	26.1442
20	9.8035	33.9265	26.1467
30	9.7898	33.9262	26.1487
40	9.7844	33.9264	26.1498
50	9.7865	33.9265	26.1495
70	9.7825	33.927	26.1506

STATION US16122			
LATITUDE	42-13.7	N	
LONGITUE	140-30.2	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	4.5238	33.6115	26.627
10	4.503	33.6135	26.6308
20	4.5056	33.6134	26.6304
30	4.5064	33.6133	26.6303
40	4.5005	33.6134	26.631
50	4.5008	33.6136	26.6312
75	4.5004	33.616	26.6331
75	4.5004	33.616	26.6331

STATION US16125			
LATITUDE	42-26.3	N	
LONGITUE	140-24.9	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	4.3753	33.5738	26.6129
10	4.3902	33.5727	26.6104
20	4.4727	33.5892	26.6148
30	4.5464	33.6031	26.6179
40	4.7001	33.6341	26.6258
50	5.0357	33.706	26.6453
56	5.0912	33.7145	26.6457

STATION US16128			
LATITUDE	42-25.3	N	
LONGITUE	140-48.7	E	
DEPTH (m)	44		
Press.	Temp.	Salinity	Sigma-T
5	5.5338	33.5255	26.4443
10	5.511	33.524	26.4459
20	5.5173	33.5253	26.4461
30	5.3109	33.498	26.4489
40	4.8	33.4396	26.4605
43	4.7641	33.4421	26.4664

STATION US16131			
LATITUDE	42-18.3	N	
LONGITUE	140-42.3	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	5.0966	33.4985	26.474
10	5.0944	33.4983	26.474
20	5.093	33.4989	26.4746
30	5.0646	33.5083	26.4854
40	5.0754	33.6858	26.6248
50	4.8132	33.6804	26.65
61	4.8873	33.6957	26.6539

STATION US16117			
LATITUDE	41-26.1	N	
LONGITUE	141-19.5	E	
DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T
5	9.7932	33.9204	26.1437
10	9.7997	33.918	26.1407
20	9.7924	33.9154	26.1399
30	9.7905	33.915	26.14
40	9.7913	33.9152	26.1399
50	9.7823	33.9151	26.1413
60	9.725	33.9131	26.1493

STATION US16120			
LATITUDE	42-16.8	N	
LONGITUE	140-35.9	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	4.7527	33.5115	26.5227
10	4.767	33.5117	26.5213
20	4.7814	33.5184	26.5251
30	4.6135	33.6126	26.6181
40	4.732	33.6642	26.6462
50	4.7109	33.6599	26.6451
75	4.8008	33.6779	26.6494
90	4.8949	33.6949	26.6526

STATION US16123			
LATITUDE	42-18.6	N	
LONGITUE	140-30.8	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	4.5092	33.6076	26.6255
10	4.5147	33.6071	26.6245
20	4.5219	33.6084	26.6248
30	4.5319	33.6106	26.6254
40	4.6197	33.627	26.629
50	4.6355	33.6327	26.6317
75	4.9807	33.7061	26.6517
90	5.1324	33.7369	26.6587

STATION US16126			
LATITUDE	42-31.0	N	
LONGITUE	140-37.5	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	4.284	33.4099	26.4923
10	4.3666	33.4312	26.5005
20	4.6749	33.4972	26.5199
30	4.7561	33.5421	26.5467
36	4.8885	33.6289	26.6008

STATION US16129			
LATITUDE	42-16.0	N	
LONGITUE	140-58.8	E	
DEPTH (m)	64		
Press.	Temp.	Salinity	Sigma-T
5	5.0118	33.3815	26.3909
10	5.014	33.3808	26.39
20	5.007	33.3792	26.3896
30	5.0051	33.3794	26.3899
40	5.0087	33.3795	26.3897
50	4.9707	33.3782	26.3928
64	4.7195	33.3565	26.4034

STATION US16132			
LATITUDE	42-20.9	N	
LONGITUE	140-36.8	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	4.5691	33.5436	26.5682
10	4.5687	33.5437	26.5684
20	4.5765	33.5468	26.57
30	4.5875	33.5505	26.5717
40	4.694	33.6396	26.6308
50	4.7188	33.6665	26.6495
75	4.7406	33.67	26.6498
83	4.8216	33.6856	26.6532

STATION	US16133		
LATITUDE	42-23.8	N	
LONGITUD	140-31.3	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	4.2198	33.5134	26.5811
10	4.2186	33.5145	26.5822
20	4.2328	33.5199	26.585
30	4.2462	33.5233	26.5863
40	4.2904	33.5338	26.59
50	4.3608	33.5508	26.5961
75	4.8636	33.6942	26.6554
93	4.89	33.7006	26.6575

STATION	US16136		
LATITUDE	42-20.6	N	
LONGITUD	140-48.4	E	
DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T
5	5.17	33.491	26.4596
10	5.1705	33.4907	26.4593
20	5.1671	33.4902	26.4593
30	5.1704	33.4902	26.459
40	5.1336	33.4878	26.4612
50	5.1246	33.4871	26.4617
50	5.1246	33.4871	26.4617

STATION	US16139		
LATITUDE	42-10.3	N	
LONGITUD	140-41.0	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	4.309	33.5629	26.6112
10	4.3279	33.567	26.6125
20	4.3317	33.571	26.6153
30	4.3529	33.5799	26.6201
40	4.3841	33.585	26.6208
50	4.3942	33.5896	26.6234
75	4.3902	33.5864	26.6213
83	4.4688	33.6098	26.6315

STATION	US16142		
LATITUDE	41-58.6	N	
LONGITUD	141-00.7	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	5.9001	33.5309	26.4042
10	5.855	33.5308	26.4096
20	5.7483	33.5293	26.4216
30	5.5494	33.534	26.4493
40	5.4045	33.5262	26.4602
50	5.3153	33.5285	26.4725
75	5.1037	33.5448	26.5098
91	5.0998	33.5565	26.5195

STATION	US16145		
LATITUDE	42-20.4	N	
LONGITUD	140-48.7	E	
DEPTH (m)	312		
Press.	Temp.	Salinity	Sigma-T
5	4.2792	33.1436	26.2812
10	4.6125	33.2138	26.3018
20	4.8519	33.2654	26.3167
30	5.1527	33.3293	26.3335
40	5.1298	33.3244	26.3323
50	5.1222	33.3231	26.3321
75	5.1088	33.3233	26.3338
100	5.0938	33.3241	26.3361
125	5.3379	33.3777	26.3505
150	5.5255	33.434	26.373
175	5.459	33.4456	26.39
200	5.6068	33.5012	26.4164
250	5.4039	33.488	26.43
300	5.0192	33.5086	26.4908
302	5.0064	33.5121	26.495

STATION	US16134		
LATITUDE	42-26.0	N	
LONGITUD	140-37.0	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	4.4635	33.541	26.5775
10	4.4548	33.5434	26.5803
20	4.4494	33.5472	26.5839
30	4.4731	33.5796	26.6071
40	4.4783	33.5952	26.619
50	4.7932	33.6736	26.6469
75	4.9552	33.7091	26.6569
81	4.959	33.71	26.6572

STATION	US16137		
LATITUDE	42-15.5	N	
LONGITUD	140-47.6	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	5.8153	33.5891	26.4606
10	5.8159	33.5892	26.4606
20	5.8138	33.5896	26.4612
30	5.579	33.5615	26.4675
40	4.6119	33.5827	26.5946
50	4.7677	33.6631	26.6414
69	4.9523	33.704	26.6532

STATION	US16140		
LATITUDE	42-10.4	N	
LONGITUD	140-47.4	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	4.9882	33.5551	26.5311
10	4.9914	33.5544	26.5302
20	4.9925	33.5538	26.5296
30	4.9904	33.5532	26.5294
40	4.9897	33.5526	26.529
50	4.9953	33.5535	26.529
75	4.7592	33.6668	26.6452
90	4.7674	33.6685	26.6457

STATION	US16143		
LATITUDE	41-58.0	N	
LONGITUD	140-59.5	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	5.9598	33.5327	26.3983
10	5.8983	33.53	26.4037
20	5.8373	33.5296	26.4109
30	5.8195	33.5305	26.4138
40	5.7376	33.5286	26.4223
50	5.5596	33.5273	26.4427
75	5.3384	33.5504	26.4871
83	5.0678	33.5473	26.5159

STATION	US16146		
LATITUDE	42-10.1	N	
LONGITUD	140-41.2	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	4.4444	33.602	26.6279
10	4.4362	33.6025	26.6292
20	4.4175	33.6032	26.6318
30	4.4206	33.6116	26.6381
40	4.4374	33.6219	26.6445
50	4.4341	33.6226	26.6454
75	4.4505	33.6259	26.6463
82	4.4527	33.6261	26.6462

STATION	US16135		
LATITUDE	42-23.2	N	
LONGITUD	140-42.6	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	4.8371	33.547	26.5416
10	4.8024	33.5429	26.5421
20	4.7451	33.5427	26.5484
30	4.6003	33.541	26.5628
40	4.5709	33.55	26.5731
50	4.581	33.5676	26.586
59	4.8471	33.6406	26.6147

STATION	US16138		
LATITUDE	42-13.4	N	
LONGITUD	140-41.6	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	4.5326	33.5952	26.6131
10	4.5343	33.5947	26.6125
20	4.5377	33.5944	26.612
30	4.5105	33.6033	26.6219
40	4.4787	33.611	26.6314
50	4.4728	33.6113	26.6323
75	4.488	33.618	26.636
86	4.5048	33.6241	26.6391

STATION	US16141		
LATITUDE	41-59.2	N	
LONGITUD	141-01.9	E	
DEPTH (m)	101		
Press.	Temp.	Salinity	Sigma-T
5	5.4597	33.4722	26.4109
10	5.3957	33.4687	26.4157
20	5.4093	33.4855	26.4274
30	5.3557	33.4891	26.4366
40	5.3407	33.491	26.4398
50	5.3216	33.4916	26.4426
75	5.059	33.5465	26.5162
97	5.0379	33.5568	26.5268

STATION	US16144		
LATITUDE	41-57.4	N	
LONGITUD	140-58.3	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	5.8951	33.5076	26.3864
10	5.8312	33.5123	26.398
20	5.7791	33.5229	26.4127
30	5.6657	33.5103	26.4165
40	5.6027	33.5258	26.4364
50	5.533	33.5401	26.456
75	5.1212	33.566	26.5247
76	5.1224	33.5663	26.5247

STATION	US16147		
LATITUDE	42-10.1	N	
LONGITUD	140-36.2	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	4.381	33.5371	26.5831
10	4.3568	33.5531	26.5984
20	4.4257	33.6072	26.6341
30	4.4375	33.618	26.6414
40	4.4457	33.6208	26.6428
50	4.4516	33.6217	26.6428
72	4.4489	33.6229	26.644

STATION	US16148		
LATITUDE	42-11.0	N	
LONGITUD	140-35.4	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	4.4708	33.5877	26.6138
10	4.4499	33.5863	26.6149
20	4.4157	33.5877	26.6196
30	4.448	33.6193	26.6414
40	4.4489	33.6198	26.6416
50	4.4511	33.6207	26.6421
75	4.4573	33.6225	26.6429
78	4.4583	33.6225	26.6427

STATION	US16151		
LATITUDE	42-18.9	N	
LONGITUD	140-30.7	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	4.5782	33.5796	26.5959
10	4.5682	33.5796	26.5969
20	4.5005	33.5803	26.6048
30	4.4865	33.5857	26.6105
40	4.4829	33.5888	26.6133
50	4.4812	33.5902	26.6147
75	4.4711	33.5996	26.6232
91	4.4672	33.6038	26.627

STATION	US16154		
LATITUDE	42-23.8	N	
LONGITUD	140-31.0	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	4.6405	33.5476	26.5637
10	4.5979	33.5531	26.5727
20	4.509	33.5793	26.6031
30	4.5085	33.5847	26.6073
40	4.5069	33.5863	26.6088
50	4.4993	33.5883	26.6112
75	4.5	33.5934	26.6152
93	4.4496	33.6088	26.6328

STATION	US16157		
LATITUDE	42-23.3	N	
LONGITUD	140-42.8	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	4.6682	33.3004	26.3645
10	4.6612	33.3	26.365
20	4.8333	33.3387	26.3768
30	4.9163	33.3542	26.3799
40	4.9209	33.3559	26.3807
50	4.8902	33.3631	26.3898
59	4.4266	33.5755	26.6088

STATION	US16160		
LATITUDE	42-18.7	N	
LONGITUD	140-41.9	E	
DEPTH (m)	70		
Press.	Temp.	Salinity	Sigma-T
5	4.8395	33.4618	26.4738
10	4.7761	33.4759	26.4919
20	4.7677	33.525	26.5318
30	4.6831	33.5399	26.5529
40	4.5544	33.5766	26.596
50	4.5332	33.5936	26.6118
69	4.2986	33.6058	26.6464

STATION	US16163		
LATITUDE	42-10.1	N	
LONGITUD	140-47.3	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	4.8373	33.523	26.5225
10	4.7545	33.5264	26.5344
20	4.4477	33.5812	26.6111
30	4.386	33.5981	26.6311
40	4.3537	33.603	26.6384
50	4.3184	33.6049	26.6436
75	4.2601	33.6086	26.6526
93	4.2622	33.6091	26.6528

STATION	US16149		
LATITUDE	42-14.0	N	
LONGITUD	140-29.8	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	4.5186	33.5796	26.6022
10	4.4795	33.5801	26.6068
20	4.4486	33.5837	26.613
30	4.4539	33.6057	26.6298
40	4.4463	33.6123	26.636
50	4.4353	33.6153	26.6395
75	4.2098	33.6008	26.6517
76	4.2115	33.6017	26.6521

STATION	US16152		
LATITUDE	42-19.0	N	
LONGITUD	140-23.2	E	
DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T
5	4.3652	33.5061	26.5602
10	4.3792	33.5346	26.5813
20	4.3613	33.5667	26.6088
30	4.3698	33.5827	26.6205
40	4.3693	33.5863	26.6234
50	4.3641	33.5862	26.6239
52	4.3632	33.5863	26.6241

STATION	US16155		
LATITUDE	42-17.6	N	
LONGITUD	140-54.3	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	3.7232	32.8759	26.1237
10	3.8526	32.9464	26.1673
20	4.0063	33.1008	26.2749
30	4.0588	33.1331	26.2953
40	4.082	33.1381	26.297
50	4.1528	33.1695	26.3147
54	4.2779	33.2223	26.3438

STATION	US16158		
LATITUDE	42-25.9	N	
LONGITUD	140-37.7	E	
DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T
5	4.9344	33.3959	26.4109
10	4.9151	33.3974	26.4143
20	4.6981	33.5108	26.5282
30	4.6637	33.5529	26.5654
40	4.5975	33.5575	26.5762
50	4.5376	33.5634	26.5874
75	4.4975	33.5711	26.5978
80	4.5009	33.5718	26.598

STATION	US16161		
LATITUDE	42-15.5	N	
LONGITUD	140-47.5	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	4.5898	33.2097	26.301
10	4.6032	33.2339	26.3187
20	4.8942	33.3269	26.3607
30	5.119	33.3762	26.3745
40	5.0628	33.3788	26.383
50	4.6253	33.523	26.5458
69	4.2799	33.6058	26.6484

STATION	US16164		
LATITUDE	42-07.1	N	
LONGITUD	140-50.5	E	
DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T
5	4.848	33.5678	26.5569
10	4.7398	33.5631	26.5652
20	4.504	33.5991	26.6193
30	4.4502	33.6189	26.6408
40	4.4478	33.6249	26.6458
50	4.448	33.6254	26.6462
71	4.4492	33.6256	26.6462

STATION	US16150		
LATITUDE	42-16.3	N	
LONGITUD	140-35.9	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	4.6946	33.5507	26.5602
10	4.4486	33.5779	26.6084
20	4.3944	33.586	26.6205
30	4.3325	33.5844	26.6258
40	4.3028	33.5867	26.6308
50	4.2986	33.5885	26.6326
75	4.2933	33.5926	26.6364
90	4.3065	33.6119	26.6503

STATION	US16153		
LATITUDE	42-26.2	N	
LONGITUD	140-25.0	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	4.6464	33.1155	26.2202
10	4.5978	33.4578	26.497
20	4.4762	33.4897	26.5354
30	4.4608	33.5023	26.5471
40	4.4647	33.506	26.5496
50	4.4326	33.5135	26.5589
59	4.3507	33.549	26.5958

STATION	US16156		
LATITUDE	42-20.8	N	
LONGITUD	140-48.5	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	4.2493	33.1523	26.2912
10	4.3005	33.1688	26.2989
20	4.2513	33.2256	26.3493
30	4.2522	33.2261	26.3495
40	4.2533	33.2259	26.3493
50	4.254	33.2262	26.3494
51	4.2567	33.2268	26.3497

STATION	US16159		
LATITUDE	42-21.3	N	
LONGITUD	140-36.7	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	5.1454	33.4062	26.3952
10	5.1421	33.4066	26.3959
20	4.9205	33.4136	26.4265
30	4.7785	33.4771	26.4926
40	4.8576	33.5079	26.5083
50	4.8478	33.5306	26.5274
75	4.3449	33.5938	26.632
84	4.3193	33.6092	26.6469

STATION	US16162		
LATITUDE	42-13.3	N	
LONGITUD	140-41.9	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	4.6334	33.5822	26.5919
10	4.566	33.5865	26.6026
20	4.4608	33.6036	26.6274
30	4.435	33.6152	26.6394
40	4.4259	33.6174	26.6422
50	4.4237	33.6185	26.6433
75	4.4098	33.6227	26.648
86	4.4085	33.6233	26.6487

THE " USHIO MARU "

CRUISE 357

CRUISE 358

CRUISE 359

IN MARCH 2016

IN APRIL 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 357

Departure from Hakodate	Mar. 21, 2016
Start hydrographic research (US16165)	21
Arrival at Muroran	22
Depart from Muroran	23
Finish hydrographic research (US16186)	23
Return to Hakodate	24
Total coverage 280.8 miles	

Cruise 358

Departure from Hakodate	Apr. 11, 2016
Start hydrographic research (US16187)	11
Towing frame twawl net	11
Twoing frame trawl net	12
Finish hydrographic research (US16194)	12
Arrival at Hakodate	12
Depart from Hakodate	13
Retrieval ADCP mooring system	13
Arrival at Mori	13
Depart from Mori	14
Set ADCP mooring system	14
Finish hydrographic research (US16204)	14
Return to Hakodate	14
Total coverage 250.6 miles	

Cruise 359

Departure from Hakodate	Apr. 21, 2016
Start hydrographic research (US16205)	21
Arrival at Usujiri	21
Depart from Usujiri	22
Towing frame trawl net	22
Arrival at Muroran	22
Depart from Muroran	23
Arrival at Usujiri	24
Depart from Usujiri	25
Calibration of echo sounder	25
Towing frame trawl net	26
Finish hydrographic research	27
Arrival at and depart from Usujiri	27
Return to Hakodate	28
Total coverage 472.3 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

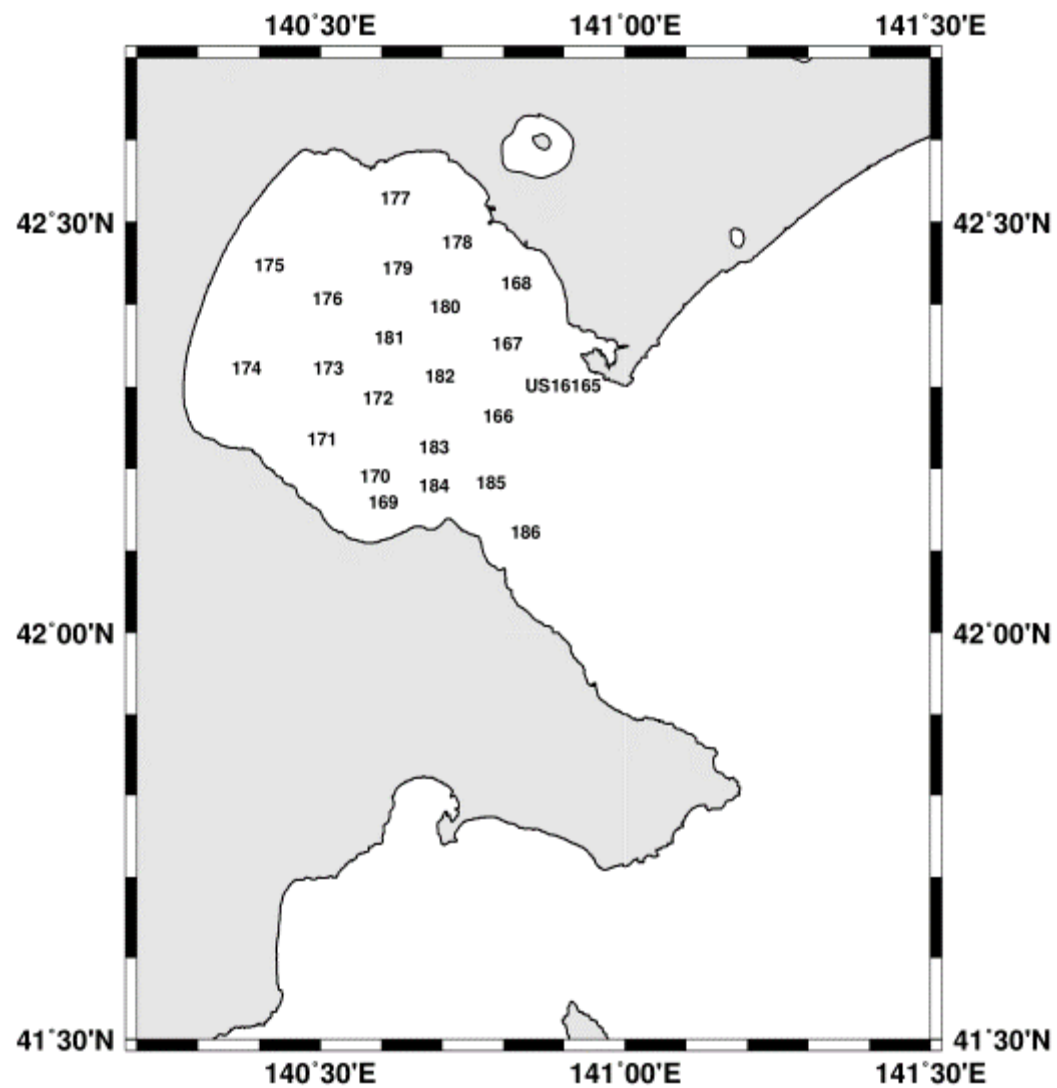


Figure 1. Oceanographic stations (Cruise 357)

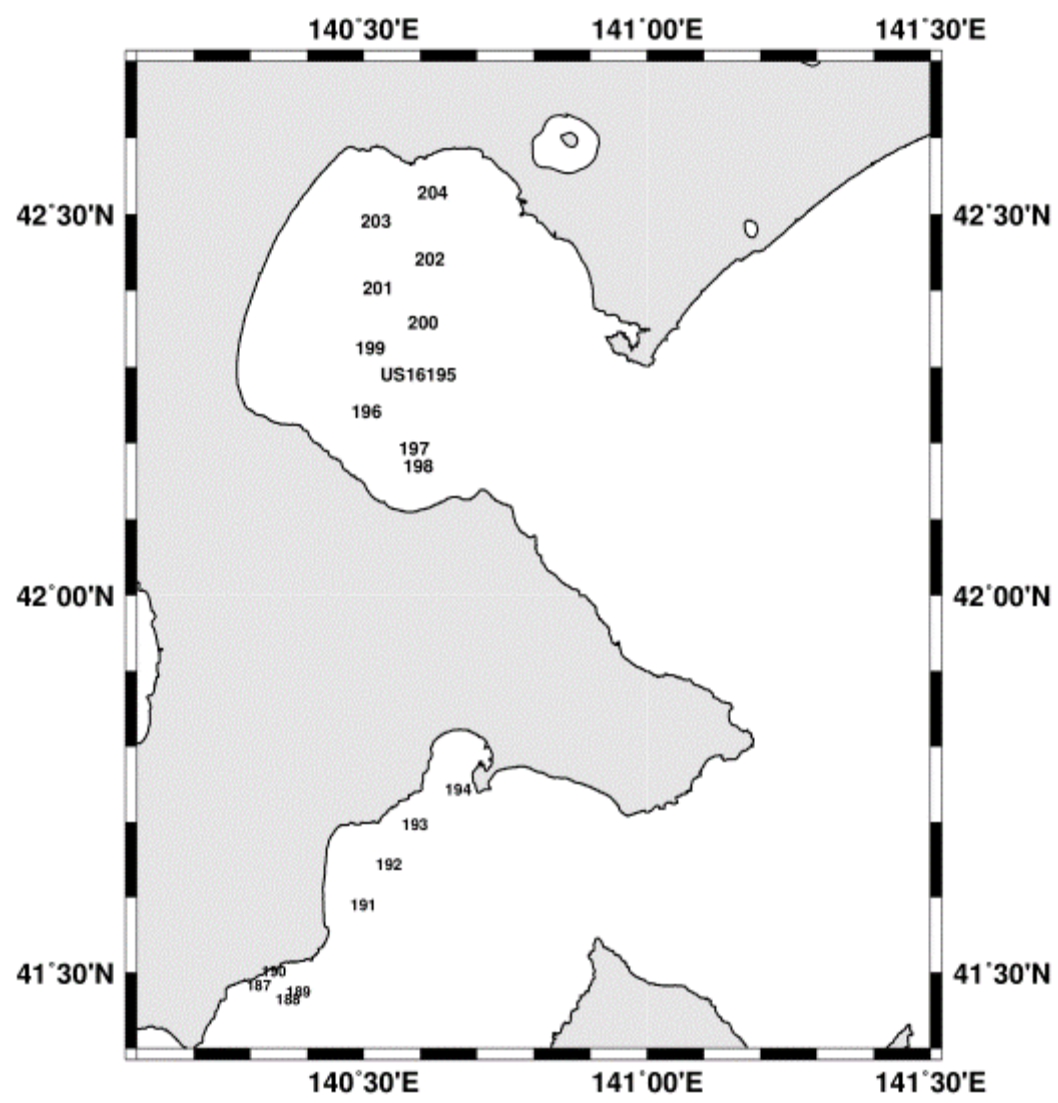


Figure 2. Oceanographic stations (Cruise 358)

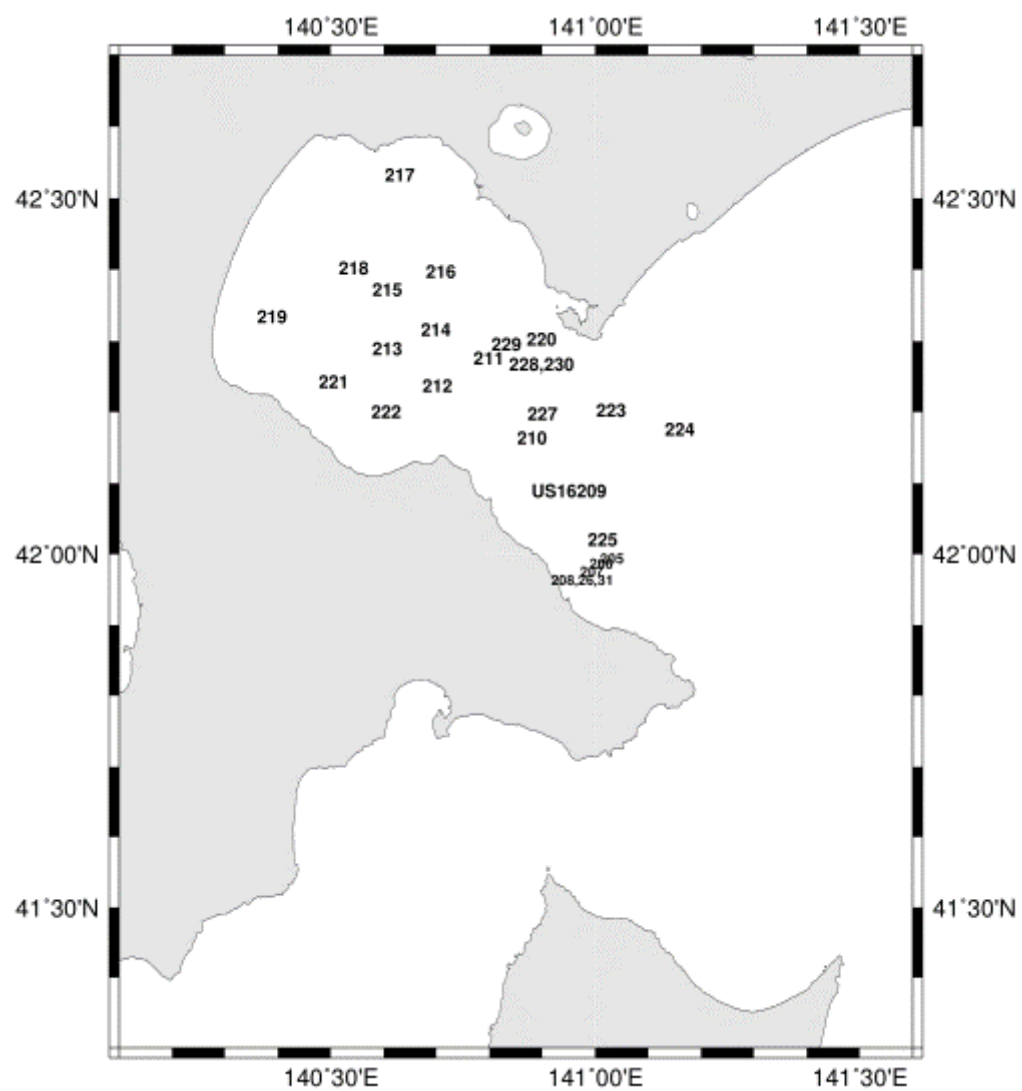


Figure 3. Oceanographic stations (Cruise 359)

Table 1. List of Oceanographic Station

Cruise 357												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16165	42-17.6	140-53.9	3/21	1348-1353	57	NW-2	NNW-1	NW-5	4.1	3.1	bc	1016.5
US16166	42-15.4	140-47.5	3/21	1522-1535	72	NW-3	NW-1	NW-6	3.2	3.3	bc	1016.2
US16167	42-20.7	140-48.4	3/21	1618-1622	53	NW-3	NW-1	NW-6	2.9	3.3	b	1016.2
US16168	42-25.1	140-49.3	3/21	1702-1705	43	NW-3	NW-1	NW-5	2.6	4.0	bc	1016.1
US16169	42-09.1	140-36.2	3/22	0522-0559	69	SSW-2	ESE-1	SSW-3	1.7	4.3	b	1013.7
US16170	42-11.0	140-35.4	3/22	0639-0644	80	South-2	ESE-1	South-2	2.3	4.3	bc	1013.2
US16171	42-13.7	140-30.2	3/22	0744-0749	77	Calm	ESE-1	Calm	3.0	4.2	bc	1012.7
US16172	42-16.7	140-35.7	3/22	0833-0840	91	Calm	NW-1	Calm	4.2	4.4	bc	1012.6
US16173	42-18.9	140-30.8	3/22	1033-1039	94	Calm	NW-1	Calm	6.4	4.3	bc	1012.4
US16174	42-18.9	140-22.8	3/22	1131-1135	52	West-2	West-1	West-5	4.4	4.4	bc	1011.6
US16175	42-26.4	140-25.0	3/22	1237-1240	60	West-2	West-1	West-5	4.6	4.6	bc	1010.6
US16176	42-24.0	140-30.7	3/22	1324-1328	95	West-2	West-1	West-5	5.1	4.4	bc	1010.5
US16177	42-31.3	140-37.4	3/22	1431-1439	61	West-2	West-1	West-4	6.1	4.1	bc	1009.8
US16178	42-28.1	140-43.5	3/23	0825-0829	59	West-3	West-1	West-5	3.1	4.1	bc	1011.8
US16179	42-26.2	140-37.6	3/23	0907-0912	82	West-2	West-1	West-4	3.9	3.8	bc	1012.1
US16180	42-23.4	140-42.3	3/23	0950-0955	63	West-2	West-1	West-4	4.6	3.7	bc	1012.5
US16181	42-21.1	140-36.8	3/23	1033-1039	87	WNW-2	West-1	WNW-3	4.1	3.8	c	1012.6
US16182	42-18.3	140-41.8	3/23	1119-1122	67	West-2	West-1	West-3	4.7	3.9	c	1012.7
US16183	42-13.1	140-41.2	3/23	1210-1215	84	WNW-2	WSW-1	WNW-2	4.7	4.6	c	1012.8
US16184	42-10.3	140-41.2	3/23	1245-1249	86	NNW-2	NW-1	NNW-4	4.4	4.7	c	1012.8
US16185	42-10.5	140-46.8	3/23	1330-1334	95	NNW-3	NW-1	NNW-5	4.7	4.1	c	1013
US16186	42-06.9	140-50.2	3/23	1417-1421	71	WNW-2	NW-1	WNW-3	3	4.1	s	1013.6

Table 1. List of Oceanographic Station (continued)

Cruise 358												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16187	41-28.6	140-18.9	4/11	1125-1129	54	NW-3	SW-1	NNW-3	9.2	9.2	bc	1013.1
US16188	41-27.5	140-22.0	4/11	1219-1225	84	NW-3	SW-1	NNW-3	5.3	9.5	bc	1013.6
US16189	41-28.1	140-23.1	4/11	1249-1257	108	North-3	SW-1	North-6	5	9.1	s	1013.8
US16190	41-29.7	140-20.5	4/11	2048-2053	50	WSW-2	SW-1	WSW-5	5	8.6	bc	1018.8
US16191	41-35.0	140-30.0	4/12	0537-0542	46	West-3	South-1	West-5	6.4	8.9	bc	1021.7
US16192	41-38.2	140-32.7	4/12	0625-0631	49	West-2	South-1	West-4	6.5	9.1	bc	1021.9
US16193	41-41.4	140-35.4	4/12	0711-0717	52	West-2	South-1	West-3	6.4	9	bc	1022.1
US16194	41-44.2	140-40.0	4/12	0803-0807	58	NW-1	SSW-1	NW-3	8.5	8.8	bc	1022.1
US16195	42-16.9	140-35.8	4/13	1320-1332	91	ESE-3	East-1	ESE-5	6.9	4.7	r	1011.6
US16196	42-14.0	140-30.3	4/13	1500-1506	80	East-2	East-1	East-4	6.4	4.4	r	1010.2
US16197	42-11.1	140-35.3	4/13	1537-1544	79	East-2	East-1	East-4	6.7	4.5	r	1009.8
US16198	42-09.7	140-35.8	4/13	1556-1603	71	East-2	East-1	East-4	6.6	4.5	r	1009.8
US16199	42-19.0	140-30.7	4/14	0635-0641	94	Calm	ESE-1	Calm	6.5	4.5	r	1010.5
US16200	42-21.0	140-36.3	4/14	0717-0723	89	NNW-1	ESE-1	NNW-1	6.3	4.9	m	1010
US16201	42-23.7	140-31.5	4/14	0750-0757	96	Calm	ESE-1	Calm	7.2	4.3	m	1010.1
US16202	42-26.0	140-37.0	4/14	0827-0834	84	Calm	ESE-1	Calm	6.8	4.1	m	1010.1
US16203	42-29.0	140-31.3	4/14	0907-0912	75	Calm	East-1	Calm	7.3	4.1	m	1009.8
US16204	42-31.2	140-37.3	4/14	0945-0953	62	Calm	East-1	Calm	8	4.5	m	1010

Cruise 359												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16205	41-59.2	141-01.9	4/21	1259-1304	100	SSW-2	ESE-1	SSW-4	17.6	9.2	bc	1011.6
US16206	41-58.8	141-00.7	4/21	1314-1319	94	South-3	ESE-1	South-5	16.5	9.3	bc	1011.5
US16207	41-58.1	140-59.6	4/21	1329-1333	87	SW-1	ESE-1	SW-2	15.8	9	bc	1011.2
US16208	41-57.4	140-58.5	4/21	1343-1347	81	Calm	ESE-1	Calm	14.2	7.1	bc	1011.2
US16209	42-04.8	140-57.0	4/22	0540-0546	83	Calm	ESE-1	Calm	8	6.9	o	1008.6
US16210	42-09.3	140-52.8	4/22	0644-0650	77	South-1	ESE-1	South-3	8.3	6.5	o	1009.1
US16211	42-16.0	140-47.9	4/22	0751-0757	70	Calm	ESE-1	SSE-2	8.5	6.1	o	1009.3
US16212	42-13.7	140-42.1	4/22	0858-0903	87	Calm	ESE-1	SE-2	9.2	7	c	1009.8
US16213	42-16.8	140-36.4	4/22	0947-0952	90	SE-2	ESE-1	SE-3	10.3	6.2	bc	1010.4
US16214	42-18.4	140-41.9	4/22	1045-1050	67	SE-2	ESE-1	SE-3	9.6	5.9	bc	1010.8
US16215	42-21.8	140-36.4	4/22	1141-1145	89	SE-2	ESE-1	SE-2	11.2	6.2	bc	1011.1
US16216	42-23.3	140-42.5	4/22	1416-1420	62	ESE-3	ESE-1	ESE-4	10.2	6.6	bc	1011
US16217	42-31.4	140-37.8	4/23	1345-1351	60	SE-3	SE-1	SE-3	9.5	5.1	o	1008.1
US16218	42-23.6	140-32.6	4/23	1518-1524	96	SE-3	SE-1	SE-3	8.5	5.5	o	1008
US16219	42-19.5	140-23.3	4/23	1640-1645	55	SE-3	SE-1	South-3	7.6	5.8	o	1009.1
US16220	42-17.6	140-53.9	4/24	0455-0501	57	NW-2	SE-1	NW-3	5.7	5.7	bc	1013.2
US16221	42-14.0	140-30.3	4/24	0707-0712	80	West-2	ESE-1	West-3	6	5.4	bc	1014
US16222	42-11.5	140-36.3	4/24	0814-0820	83	WNW-2	ESE-1	WNW-2	7.9	5.7	bc	1014.4
US16223	42-11.6	141-01.8	4/24	1111-1120	79	NW-2	ESE-1	NW-3	9.9	6.1	bc	1014.5
US16224	42-10.0	141-09.6	4/24	1223-1230	119	NW-2	ESE-1	NW-3	12.8	6.8	bc	1013.6
US16225	42-00.7	141-00.8	4/24	1413-1419	90	Calm	ESE-1	South-2	13.7	8.1	bc	1014
US16226	41-57.0	140-57.8	4/25	0816-0823	66	Calm	Calm	ESE-1	10.6	6.4	bc	1022.2
US16227	42-11.3	140-54.0	4/26	0658-0706	71	Calm	ESE-1	Calm	8.3	7.8	o	1021.1
US16228	42-15.5	140-53.9	4/26	0944-0948	59	Calm	ESE-1	Calm	11.8	7.5	c	1020
US16229	42-17.2	140-49.9	4/26	1124-1130	63	Calm	East-1	Calm	11	7.2	c	1020.1
US16230	42-15.3	140-54.2	4/26	2115-2121	59	NW-3	NW-1	NW-4	7.5	7.1	bc	1020.1
US16231	42-57.2	140-57.5	4/27	0734-0738	62	NNW-2	NE-1	NNW-4	7.8	7	bc	1020.6

Table 2. Oceanographic data

STATION	US16165		
LATITUDE	42-17.6	N	
LONGITUE	140-53.9	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	3.9325	32.9171	26.1361
10	3.7931	32.9241	26.1553
20	3.6634	32.9597	26.1961
30	3.6519	32.9824	26.2152
40	3.6708	33.0154	26.2397
50	3.7218	33.0249	26.2424
56	3.765	33.0347	26.2461

STATION	US16168		
LATITUDE	42-25.1	N	
LONGITUE	140-49.3	E	
DEPTH (m)	43		
Press.	Temp.	Salinity	Sigma-T
5	4.3851	32.9952	26.1524
10	4.3828	32.9953	26.1527
20	3.915	33.059	26.2507
30	3.9816	33.0875	26.2668
40	4.2273	33.1728	26.3097
42	4.2268	33.1715	26.3088

STATION	US16171		
LATITUDE	42-13.7	N	
LONGITUE	140-30.2	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	4.6394	33.2215	26.305
10	4.6423	33.2226	26.3056
20	4.7356	33.2698	26.3329
30	4.6911	33.3857	26.4297
40	4.6728	33.4826	26.5085
50	4.5344	33.5559	26.5818
74	4.4171	33.6026	26.6313

STATION	US16174		
LATITUDE	42-18.9	N	
LONGITUE	140-22.8	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	4.8402	33.1763	26.2473
10	4.7142	33.1738	26.259
20	4.7367	33.2141	26.2886
30	4.6038	33.2858	26.3599
40	4.6188	33.3614	26.4183
50	4.6425	33.4064	26.4514
50	4.6425	33.4064	26.4514

STATION	US16177		
LATITUDE	42-31.3	N	
LONGITUE	140-37.4	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	4.7028	33.1824	26.2671
10	4.3758	33.0642	26.2081
20	4.4374	33.1066	26.2353
30	4.687	33.2319	26.3081
40	4.6948	33.3425	26.395
50	4.6403	33.4112	26.4554
58	4.6228	33.5173	26.5415

STATION	US16166		
LATITUDE	42-15.4	N	
LONGITUE	140-47.5	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	3.6625	32.7841	26.0564
10	3.6532	32.7871	26.0596
20	4.7845	33.2922	26.3453
30	4.9183	33.3312	26.3615
40	5.035	33.3572	26.369
50	5.0395	33.4001	26.4025
71	4.4013	33.5967	26.6283

STATION	US16169		
LATITUDE	42-09.1	N	
LONGITUE	140-36.2	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	4.665	33.2187	26.3
10	4.7941	33.2207	26.2875
20	4.7863	33.2929	26.3457
30	4.7791	33.297	26.3497
40	4.8108	33.3286	26.3713
50	4.6824	33.3878	26.4324
60	4.478	33.3981	26.4625

STATION	US16172		
LATITUDE	42-16.7	N	
LONGITUE	140-35.7	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	4.5709	33.29	26.3668
10	4.5344	33.2377	26.3292
20	4.7255	33.2983	26.3566
30	4.7262	33.3061	26.3627
40	4.5965	33.4007	26.4518
50	4.6154	33.4912	26.5217
75	4.4938	33.5921	26.6148
86	4.4614	33.5959	26.6213

STATION	US16175		
LATITUDE	42-26.4	N	
LONGITUE	140-25.0	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	4.7746	33.1389	26.2248
10	4.7467	33.1397	26.2285
20	4.5363	33.1981	26.2975
30	4.7272	33.3154	26.3699
40	4.615	33.423	26.4676
50	4.5306	33.5641	26.5887
58	4.4288	33.5999	26.6279

STATION	US16178		
LATITUDE	42-28.1	N	
LONGITUE	140-43.5	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	4.4965	33.1025	26.2258
10	4.492	33.1039	26.2274
20	4.4497	33.1307	26.2531
30	4.5018	33.2329	26.3288
40	4.5128	33.2478	26.3395
50	4.7887	33.307	26.3566
58	4.8398	33.3121	26.355

STATION	US16167		
LATITUDE	42-20.7	N	
LONGITUE	140-48.4	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	3.8359	32.8787	26.115
10	3.8225	32.8801	26.1174
20	3.7984	32.883	26.1221
30	5.0232	33.3218	26.3423
40	4.6531	33.2661	26.3389
50	4.6827	33.2765	26.344
52	4.6807	33.2763	26.344

STATION	US16170		
LATITUDE	42-11.0	N	
LONGITUE	140-35.4	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	4.667	33.2614	26.3337
10	4.6857	33.2657	26.3351
20	4.6949	33.2917	26.3547
30	4.6337	33.3075	26.3739
40	4.5324	33.3333	26.4052
50	4.5053	33.3815	26.4464
75	4.5365	33.418	26.4721
78	4.4867	33.4314	26.488

STATION	US16173		
LATITUDE	42-18.9	N	
LONGITUE	140-30.8	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	4.0966	32.9753	26.166
10	4.0351	32.9848	26.1798
20	4.334	33.0927	26.2351
30	4.5216	33.4625	26.509
40	4.5744	33.55	26.5728
50	4.5547	33.5655	26.5872
75	4.4259	33.6014	26.6295
91	4.3674	33.6075	26.6404

STATION	US16176		
LATITUDE	42-24.0	N	
LONGITUE	140-30.7	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	4.8382	33.256	26.3107
10	4.8309	33.2552	26.3108
20	4.6958	33.2705	26.3378
30	4.6365	33.3636	26.4181
40	4.637	33.4158	26.4595
50	4.6251	33.4363	26.477
75	4.4772	33.5776	26.605
94	4.3828	33.6049	26.6367

STATION	US16179		
LATITUDE	42-26.2	N	
LONGITUE	140-37.6	E	
DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T
5	4.3408	33.0591	26.2076
10	4.3437	33.0584	26.2069
20	4.3187	33.1074	26.2484
30	4.6952	33.2768	26.3429
40	4.7999	33.3032	26.3524
50	4.9915	33.3899	26.3998
75	4.482	33.5883	26.6131
79	4.4343	33.5984	26.6262

STATION	US16180		
LATITUDE	42-23.4	N	
LONGITUE	140-42.3	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	3.9021	32.9244	26.1449
10	3.8761	32.9264	26.1491
20	3.8777	32.941	26.1605
30	4.9078	33.3085	26.3446
40	4.8002	33.2932	26.3444
50	4.6083	33.5001	26.5294
61	4.4172	33.6024	26.6312

STATION	US16183		
LATITUDE	42-13.1	N	
LONGITUE	140-41.2	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	4.8802	33.289	26.3322
10	4.7299	33.2924	26.3514
20	4.7006	33.3058	26.3653
30	4.6775	33.3133	26.3738
40	4.4752	33.3925	26.4583
50	4.4072	33.4486	26.5101
75	4.527	33.5717	26.595
87	4.3874	33.5992	26.6318

STATION	US16186		
LATITUDE	42-06.9	N	
LONGITUE	140-50.2	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	4.7186	33.116	26.2127
10	4.629	33.1734	26.268
20	4.715	33.2247	26.2994
30	4.7533	33.2673	26.329
40	4.7599	33.2974	26.3522
50	4.7029	33.3319	26.3857
61	4.5984	33.4364	26.48

STATION	US16189		
LATITUDE	41-28.1	N	
LONGITUE	140-23.1	E	
DEPTH (m)	108		
Press.	Temp.	Salinity	Sigma-T
5	9.1912	34.0361	26.3328
10	9.111	34.0299	26.3408
20	8.881	34.0276	26.3755
30	8.831	34.028	26.3837
40	8.7509	34.0174	26.3879
50	8.6523	34.0116	26.3987
75	8.4514	34.013	26.4307
99	8.307	34.0136	26.4532

STATION	US16192		
LATITUDE	41-38.2	N	
LONGITUE	140-32.7	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	9.2684	33.9208	26.2301
10	9.2939	33.9282	26.2318
20	9.1812	33.9773	26.2884
30	9.1346	33.9915	26.3069
40	9.1428	33.9924	26.3064
48	9.1461	33.9927	26.3061

STATION	US16181		
LATITUDE	42-21.1	N	
LONGITUE	140-36.8	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	4.1721	32.9512	26.1393
10	4.0631	32.9533	26.1519
20	4.593	33.3921	26.4454
30	4.5647	33.5133	26.5447
40	4.5343	33.5476	26.5752
50	4.4895	33.5725	26.5997
75	4.4118	33.5974	26.6277
85	4.404	33.6029	26.6329

STATION	US16184		
LATITUDE	42-10.3	N	
LONGITUE	140-41.2	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	4.8879	33.2799	26.3242
10	4.7281	33.2757	26.3384
20	4.6757	33.2798	26.3473
30	4.6741	33.2817	26.349
40	4.6669	33.2843	26.3519
50	4.6609	33.3779	26.4268
75	4.55	33.4415	26.4892
83	4.4041	33.4563	26.5165

STATION	US16187		
LATITUDE	41-28.6	N	
LONGITUE	140-18.9	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	9.2916	33.8125	26.1417
10	9.0643	33.8819	26.2324
20	8.9794	33.905	26.264
30	8.9665	33.907	26.2675
40	8.9474	33.9069	26.2705
50	8.9286	33.9067	26.2733
52	8.9201	33.907	26.2749

STATION	US16190		
LATITUDE	41-29.7	N	
LONGITUE	140-20.5	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	8.8909	34.0197	26.3678
10	8.8689	34.0224	26.3734
20	8.792	34.0231	26.3859
30	8.6841	34.024	26.4035
40	8.6327	34.0267	26.4135
48	8.3321	34.0215	26.4556

STATION	US16193		
LATITUDE	41-41.4	N	
LONGITUE	140-35.4	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	9.1076	33.6323	26.0302
10	9.3903	33.9555	26.2375
20	9.2827	33.9928	26.2841
30	9.281	33.9934	26.2849
40	9.0734	34.0001	26.3235
50	8.9643	34.003	26.3431
51	8.9675	34.0038	26.3432

STATION	US16182		
LATITUDE	42-18.3	N	
LONGITUE	140-41.8	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	4.3418	33.0363	26.1895
10	4.2696	33.0696	26.2234
20	4.71	33.282	26.3454
30	4.6802	33.3186	26.3777
40	4.5479	33.3848	26.4444
50	4.5567	33.4913	26.528
65	4.4324	33.5954	26.624

STATION	US16185		
LATITUDE	42-10.5	N	
LONGITUE	140-46.8	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	4.4108	32.9633	26.1244
10	4.381	33.0939	26.2312
20	4.7443	33.2798	26.3399
30	4.754	33.2896	26.3466
40	4.7125	33.3075	26.3653
50	4.6841	33.379	26.4252
75	4.5062	33.548	26.5785
91	4.4031	33.5974	26.6287

STATION	US16188		
LATITUDE	41-27.5	N	
LONGITUE	140-22.0	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	9.0346	33.9692	26.3054
10	8.9082	33.9992	26.3489
20	8.7634	34.0261	26.3928
30	8.6415	34.0126	26.4012
40	8.4605	34.0033	26.4218
50	8.3424	34.0116	26.4462
75	8.1398	34.0193	26.4828
81	7.8562	34.0255	26.5296

STATION	US16191		
LATITUDE	41-35.0	N	
LONGITUE	140-30.0	E	
DEPTH (m)	46		
Press.	Temp.	Salinity	Sigma-T
5	9.0743	33.8819	26.2308
10	9.1037	33.8889	26.2316
20	9.1389	33.8985	26.2335
30	9.1455	33.9003	26.2338
40	9.1428	33.9006	26.2345
45	9.1417	33.901	26.235

STATION	US16194		
LATITUDE	41-44.2	N	
LONGITUE	140-40.0	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	9.1852	33.7031	26.0732
10	9.356	33.8772	26.1818
20	9.4189	33.9709	26.2449
30	9.3039	33.9876	26.2767
40	9.0692	33.9974	26.322
50	8.6706	34.0113	26.3956
57	8.5849	34.0184	26.4144

STATION US16195			
LATITUDE 42-16.9 N			
LONGITUD 140-35.8 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	4.8466	32.483	25.6969
10	4.8858	32.529	25.7291
20	5.3113	32.9875	26.0447
30	5.2633	33.0451	26.0958
40	4.681	33.4009	26.4429
50	4.5786	33.5043	26.536
75	4.4071	33.5817	26.6158
85	4.4038	33.5979	26.629

STATION US16198			
LATITUDE 42-09.7 N			
LONGITUD 140-35.8 E			
DEPTH (m) 71			
Press.	Temp.	Salinity	Sigma-T
5	5.2174	32.4202	25.6062
10	4.8877	32.5517	25.7469
20	4.564	32.6269	25.8413
30	4.9392	33.1345	26.2032
40	5.1659	33.2749	26.2889
50	5.3587	33.3675	26.34
60	5.1899	33.4146	26.3968

STATION US16201			
LATITUDE 42-23.7 N			
LONGITUD 140-31.5 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	4.6103	32.4401	25.6881
10	4.5644	32.454	25.704
20	4.1711	32.5273	25.8026
30	3.9414	32.6073	25.8889
40	5.0421	33.1408	26.1967
50	5.3431	33.3925	26.3616
75	4.5686	33.5365	26.5627
92	4.457	33.5934	26.6198

STATION US16204			
LATITUDE 42-31.2 N			
LONGITUD 140-37.3 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	4.6225	32.4518	25.6962
10	4.5755	32.4807	25.724
20	3.8983	32.6882	25.9575
30	4.4683	33.0112	26.1563
40	4.7662	33.1202	26.2109
50	4.7622	33.1944	26.2702
55	4.8947	33.3055	26.3437

STATION US16207			
LATITUDE 41-58.1 N			
LONGITUD 140-59.6 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	8.5703	33.728	26.1891
10	8.5688	33.7349	26.1947
20	8.4558	33.8326	26.2886
30	8.259	33.8368	26.3217
40	8.1588	33.8237	26.3264
50	8.0894	33.8265	26.339
75	7.4443	33.7924	26.4058
83	7.024	33.7419	26.4245

STATION US16196			
LATITUDE 42-14.0 N			
LONGITUD 140-30.3 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	4.7459	32.4907	25.7139
10	4.7263	32.4979	25.7217
20	5.0654	32.912	26.0128
30	4.9763	33.1742	26.2305
40	5.0044	33.3674	26.3805
50	4.9335	33.4377	26.4442
75	4.5009	33.5804	26.6048
75	4.5009	33.5804	26.6048

STATION US16199			
LATITUDE 42-19.0 N			
LONGITUD 140-30.7 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	4.7267	32.4289	25.6669
10	4.7214	32.4309	25.6691
20	4.9928	32.7998	25.932
30	5.0978	33.0933	26.1528
40	5.1429	33.3463	26.348
50	4.869	33.379	26.4048
75	4.4977	33.5669	26.5944
90	4.4302	33.5985	26.6267

STATION US16202			
LATITUDE 42-26.0 N			
LONGITUD 140-37.0 E			
DEPTH (m) 84			
Press.	Temp.	Salinity	Sigma-T
5	4.3167	32.4568	25.7319
10	4.3107	32.4623	25.7368
20	4.2084	32.4777	25.7594
30	3.9647	32.6218	25.8981
40	4.5861	33.0241	26.1541
50	4.7857	33.1251	26.2127
75	4.8297	33.4636	26.4763
80	4.7626	33.4907	26.5051

STATION US16205			
LATITUDE 41-59.2 N			
LONGITUD 141-01.9 E			
DEPTH (m) 100			
Press.	Temp.	Salinity	Sigma-T
5	9.2729	33.8458	26.1707
10	8.965	33.849	26.2224
20	8.7341	33.8348	26.2475
30	8.5435	33.8293	26.2725
40	8.35	33.8184	26.2936
50	8.2942	33.8188	26.3023
75	8.0894	33.8445	26.3531
96	6.8882	33.6861	26.399

STATION US16208			
LATITUDE 41-57.4 N			
LONGITUD 140-58.5 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	6.0881	32.8595	25.8505
10	5.7725	32.8671	25.8951
20	8.1791	33.7451	26.2616
30	8.5928	33.8533	26.2838
40	8.245	33.8121	26.3045
50	8.3013	33.8706	26.3418
75	6.6339	33.6984	26.4426
77	6.5805	33.6948	26.4468

STATION US16197			
LATITUDE 42-11.1 N			
LONGITUD 140-35.3 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	4.7459	32.4907	25.7139
10	4.7263	32.4979	25.7217
20	5.0654	32.912	26.0128
30	4.9763	33.1742	26.2305
40	5.0044	33.3674	26.3805
50	4.9335	33.4377	26.4442
75	4.5009	33.5804	26.6048
75	4.5009	33.5804	26.6048

STATION US16200			
LATITUDE 42-21.0 N			
LONGITUD 140-36.3 E			
DEPTH (m) 89			
Press.	Temp.	Salinity	Sigma-T
5	5.1555	32.7337	25.8614
10	5.1081	32.7464	25.8768
20	5.0851	32.8058	25.9265
30	5.0241	32.8947	26.0037
40	4.964	33.1271	26.1946
50	4.7891	33.335	26.3787
75	4.5856	33.5431	26.566
85	4.5076	33.5718	26.5973

STATION US16203			
LATITUDE 42-29.0 N			
LONGITUD 140-31.3 E			
DEPTH (m) 75			
Press.	Temp.	Salinity	Sigma-T
5	4.5184	32.4256	25.6863
10	4.2924	32.4405	25.7213
20	4.183	32.4657	25.7524
30	4.5852	33.0262	26.1559
40	4.6634	33.0641	26.1776
50	5.0398	33.2961	26.32
71	4.9013	33.4824	26.4832

STATION US16206			
LATITUDE 41-58.8 N			
LONGITUD 141-00.7 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	9.0749	33.8591	26.2129
10	8.9001	33.8571	26.2389
20	8.6111	33.8237	26.2578
30	8.1789	33.7714	26.2824
40	8.2459	33.8058	26.2993
50	8.1517	33.8279	26.3308
75	7.7238	33.8113	26.3806
90	7.1375	33.7123	26.3856

STATION US16209			
LATITUDE 42-04.8 N			
LONGITUD 140-57.0 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	6.8774	33.2711	26.0734
10	7.5547	33.4841	26.1476
20	8.0322	33.6435	26.2038
30	8.2958	33.7369	26.2378
40	8.3903	33.805	26.2769
50	8.1665	33.7794	26.2905
75	8.0747	33.8601	26.3675
81	7.3743	33.7553	26.3865

STATION	US16210		
LATITUDE	42-09.3	N	
LONGITUE	140-52.8	E	
DEPTH (m)	77		
Press.	Temp.	Salinity	Sigma-T
5	6.2322	32.8341	25.8126
10	5.7515	32.8834	25.9105
20	5.5093	32.923	25.9706
30	6.3241	33.179	26.0731
40	7.3394	33.4244	26.131
50	7.7764	33.6047	26.2107
75	6.0059	33.5401	26.3984
75	6.0059	33.5401	26.3984

STATION	US16213		
LATITUDE	42-16.8	N	
LONGITUE	140-36.4	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	5.8548	32.7064	25.7582
10	5.9188	32.7199	25.7611
20	5.4055	32.7008	25.8068
30	5.207	32.739	25.8598
40	5.1124	32.7612	25.888
50	4.9985	33.0761	26.1503
75	4.5566	33.542	26.5683
88	4.4657	33.5875	26.6142

STATION	US16216		
LATITUDE	42-23.3	N	
LONGITUE	140-42.5	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	6.6169	32.585	25.567
10	5.3939	32.6015	25.7296
20	5.1302	32.6829	25.824
30	5.1496	32.7413	25.8681
40	4.8466	32.8843	26.0151
50	5.1029	33.3203	26.332
60	5.2171	33.3779	26.3646

STATION	US16219		
LATITUDE	42-19.5	N	
LONGITUE	140-23.3	E	
DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T
5	6.061	32.5179	25.5842
10	5.935	32.55	25.6249
20	5.1435	32.901	25.9953
30	4.7785	33.1466	26.2305
34	4.7418	33.1763	26.2581

STATION	US16222		
LATITUDE	42-11.5	N	
LONGITUE	140-36.3	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	6.7355	32.7639	25.6927
8	6.723	32.7667	25.6965

STATION	US16211		
LATITUDE	42-16.0	N	
LONGITUE	140-47.9	E	
DEPTH (m)	70		
Press.	Temp.	Salinity	Sigma-T
5	5.5469	32.6421	25.7439
10	5.4647	32.6654	25.772
20	5.2945	32.6941	25.8143
30	5.1311	32.7581	25.8835
40	5.0762	32.8801	25.9863
50	5.0744	33.0909	26.1535
69	5.6338	33.5025	26.4142

STATION	US16214		
LATITUDE	42-18.4	N	
LONGITUE	140-41.9	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	6.004	32.6117	25.6652
10	5.4365	32.5952	25.7197
20	5.3018	32.6449	25.7745
30	5.0599	32.7039	25.8485
40	4.825	32.8789	26.0131
50	4.7961	33.3185	26.3649
64	4.8125	33.4946	26.5028

STATION	US16217		
LATITUDE	42-31.4	N	
LONGITUE	140-37.8	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	5.6915	32.6746	25.7526
10	5.677	32.6754	25.755
20	5.6562	32.6793	25.7605
30	5.6305	32.6825	25.7661
40	5.011	32.8397	25.9616
50	4.799	33.2186	26.2853
58	5.015	33.3925	26.3992

STATION	US16220		
LATITUDE	42-17.6	N	
LONGITUE	140-53.9	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	5.8826	32.6952	25.746
10	5.7947	32.7085	25.7671
20	5.7976	32.8894	25.9097
30	5.5717	33.0142	26.0353
40	5.4154	33.3424	26.3134
50	5.5152	33.4152	26.3593
55	5.4992	33.4242	26.3683

STATION	US16223		
LATITUDE	42-11.6	N	
LONGITUE	141-01.8	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	5.8807	32.7087	25.7569
10	5.7498	32.7029	25.768
20	5.5748	32.7288	25.8093
30	5.0213	32.9083	26.0148
40	6.3404	33.3338	26.1932
50	6.263	33.4798	26.3183
75	6.2051	33.5942	26.416
77	6.2027	33.5946	26.4166

STATION	US16212		
LATITUDE	42-13.7	N	
LONGITUE	140-42.1	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	6.6688	32.6735	25.6301
10	5.7051	32.6775	25.7533
20	5.2356	32.7681	25.8796
30	5.0852	32.8532	25.964
40	5.5681	32.999	26.0238
50	5.8645	33.3598	26.2734
75	6.0075	33.6244	26.4648
84	4.7893	33.5182	26.5241

STATION	US16215		
LATITUDE	42-21.8	N	
LONGITUE	140-36.4	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	6.0468	32.6551	25.6943
10	5.5537	32.6374	25.7395
20	5.0325	32.6861	25.8375
30	5.1908	32.7837	25.8971
40	4.922	32.8739	25.9985
50	5.1185	33.3703	26.3699
75	4.5644	33.5414	26.567
85	4.5042	33.5729	26.5985

STATION	US16218		
LATITUDE	42-23.6	N	
LONGITUE	140-32.6	E	
DEPTH (m)	96		
Press.	Temp.	Salinity	Sigma-T
5	5.854	32.7136	25.7639
10	5.8196	32.714	25.7685
20	5.7591	32.7151	25.7766
30	5.2637	32.7154	25.8347
40	5.0708	32.8716	25.9802
50	4.8187	33.2159	26.2811
75	4.515	33.5598	26.5869
94	4.4726	33.5842	26.6108

STATION	US16221		
LATITUDE	42-14.0	N	
LONGITUE	140-30.3	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	5.6149	32.6587	25.7491
10	5.5943	32.6652	25.7568
20	5.0854	32.8237	25.9406
24	5.0691	32.8702	25.9792

STATION	US16224		
LATITUDE	42-10.0	N	
LONGITUE	141-09.6	E	
DEPTH (m)	119		
Press.	Temp.	Salinity	Sigma-T
5	6.5994	33.0814	25.9607
10	6.5492	33.1145	25.9934
20	6.9196	33.2851	26.0788
30	6.9534	33.3164	26.0989
40	7.1799	33.4173	26.1476
50	7.4138	33.5036	26.1829
75	7.2651	33.5963	26.2767
100	6.4784	33.6126	26.3953
116	6.4685	33.6164	26.3996

	STATION	US16225	
	LATITUDE	42-00.7	N
	LONGITUDE	141-00.8	E
	DEPTH (m)	90	
Press.	Temp.	Salinity	Sigma-T
5	7.3028	32.9763	25.7837
10	8.1783	33.5821	26.1339
20	8.2279	33.7663	26.2711
30	8.2057	33.7941	26.2962
40	8.2228	33.8013	26.2993
50	8.3794	33.846	26.3108
75	7.43	33.7419	26.368
89	6.3956	33.6692	26.4508

	STATION	US16228		
	LATITUDE	42-15.5	N	
	LONGITUDE	140-53.9	E	
	DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T	
5	7.3091	31.6859	24.7679	
10	5.9868	32.4583	25.5462	
20	5.8047	32.6984	25.7579	
30	5.5847	33.2055	26.1852	
40	5.8282	33.3429	26.2644	
50	5.893	33.4316	26.3266	
55	5.8989	33.4437	26.3355	

	STATION	US16231	
	LATITUDE	42-57.2	N
	LONGITUDE	140-57.5	E
	DEPTH (m)	62	
Press.	Temp.	Salinity	Sigma-T
5	7.0421	32.5235	25.4627
10	6.593	32.7276	25.6826
20	6.4594	32.8476	25.7944
30	6.0801	33.0976	26.0396
40	7.4788	33.5959	26.2463
50	7.7832	33.7635	26.3345
55	6.6601	33.6114	26.3708

STATION		US16226	
LATITUDE	41-57.0	N	
LONGITUDE	140-57.8	E	
DEPTH (m)		66	
Press.	Temp.	Salinity	Sigma-T
5	6.2926	32.7783	25.761
10	6.0735	32.7928	25.7997
20	6.2158	33.1448	26.0599
30	7.5473	33.627	26.2611
40	8.0439	33.7475	26.2837
50	7.9791	33.7989	26.3336
61	7.5073	33.7787	26.386

STATION		US16229	
LATITUDE		42-17.2	N
LONGITUDE		140-49.9	E
DEPTH (m)		63	
Press.	Temp.	Salinity	Sigma-T
5	6.8149	31.8633	24.9728
10	6.2653	32.3409	25.4192
20	5.8763	32.6944	25.7462
30	5.4668	32.9635	26.0076
40	5.3016	33.2044	26.2174
50	5.4695	33.4013	26.3537
58	5.5036	33.421	26.3652

STATION		US16227	
LATITUDE	42-11.3	N	
LONGITUDE	140-54.0	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	5.8773	32.592	25.665
10	5.739	32.6974	25.765
20	5.9149	33.0319	26.0081
30	6.6046	33.2415	26.0862
40	5.4353	33.2473	26.2358
50	5.2458	33.3441	26.3345
60	5.4733	33.4177	26.3663

	STATION	US16230	
	LATITUDE	42-15.3	N
	LONGITUDE	140-54.2	E
	DEPTH (m)	59	
Press.	Temp.	Salinity	Sigma-T
5	7.0983	31.9917	25.0367
10	5.7575	32.7716	25.8214
20	5.4757	32.9812	26.0206
30	5.7928	33.1652	26.1283
40	5.9142	33.44	26.3307
50	5.9909	33.4753	26.349
54	5.9914	33.4751	26.3488

THE " USHIO MARU "

CRUISE 360

CRUISE 361

CRUISE 362

IN MAY 2016

IN JUNE 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 360

Departure from Hakodate	May 10, 2016
Start hydrographic research (US16232)	10
Setting mooring ADCP system	10
Arrival at Hakodate	10
Departure from Hakodate	12
Re-setting mooring ADCP system	13
Arrival at and departure from Usujiri	13
Towing frame trawl net	13
Towing frame trawl net	14
Arrival at Usujiri	15
Departure from Usujiri	17
Arrival at Usujiri	18
Departure from Usujiri	19
Sampling by trawl net	19
Finish hydrographic research	19
Return to Hakodate	20
Total coverage 570.0 miles	

Cruise 361

Departure from Hakodate	May. 24, 2016
Arrival at and departure from Usujiri	25
Arrival at Muroran	25
Departure from Muroran	25
Start hydrographic research (US16266)	25
Towing 80cm ring net	25
Finish hydrographic research (US16267)	25
Hook and line fishing research	26
Return to Hakodate	27
Total coverage 240.6 miles	

Cruise 362	
Departure from Hakodate	May. 30, 2016
Start hydrographic research (US16268)	30
Sampling by trawl net	30
Arrival at Aomori	30
Departure from Aomori	31
Sampling by trawl net	31
Arrival at Noheji	31
Departure from Noheji	Jun. 1, 2016
Sampling by trawl net	1
Arrival at Ominato	1
Departure from Ominato	2
Sampling by trawl net	2
Finish hydrographic research (US16291)	2
Return to Hakodate	3
Total coverage 219.1 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

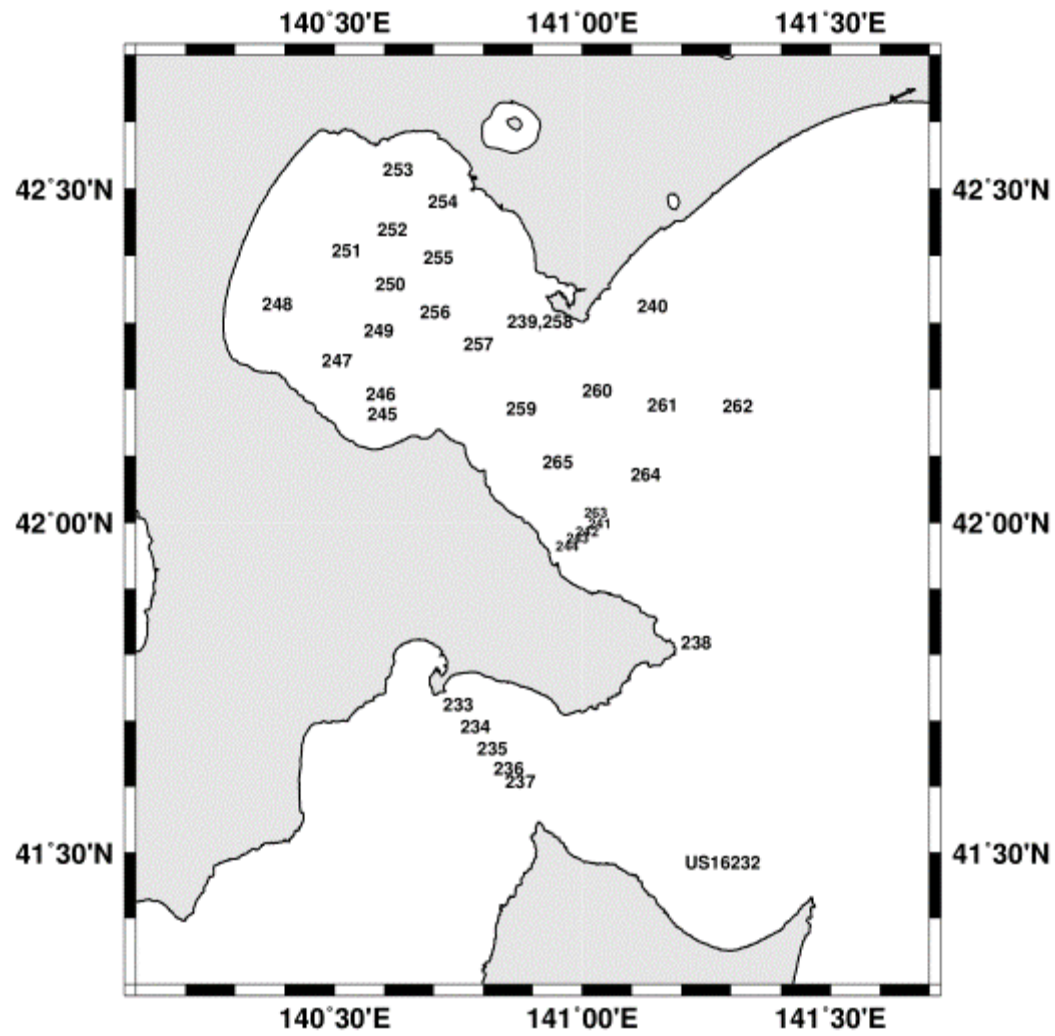


Figure 1. Oceanographic stations (Cruise 360)

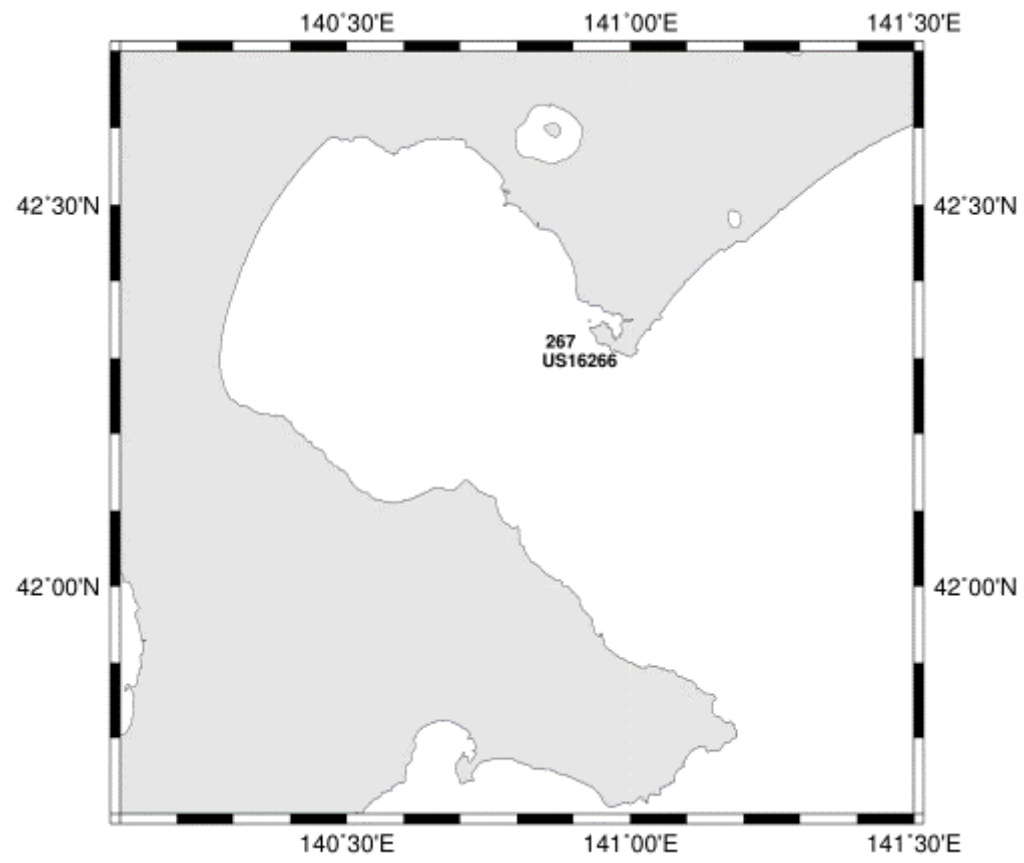


Figure 2. Oceanographic stations (Cruise 361)

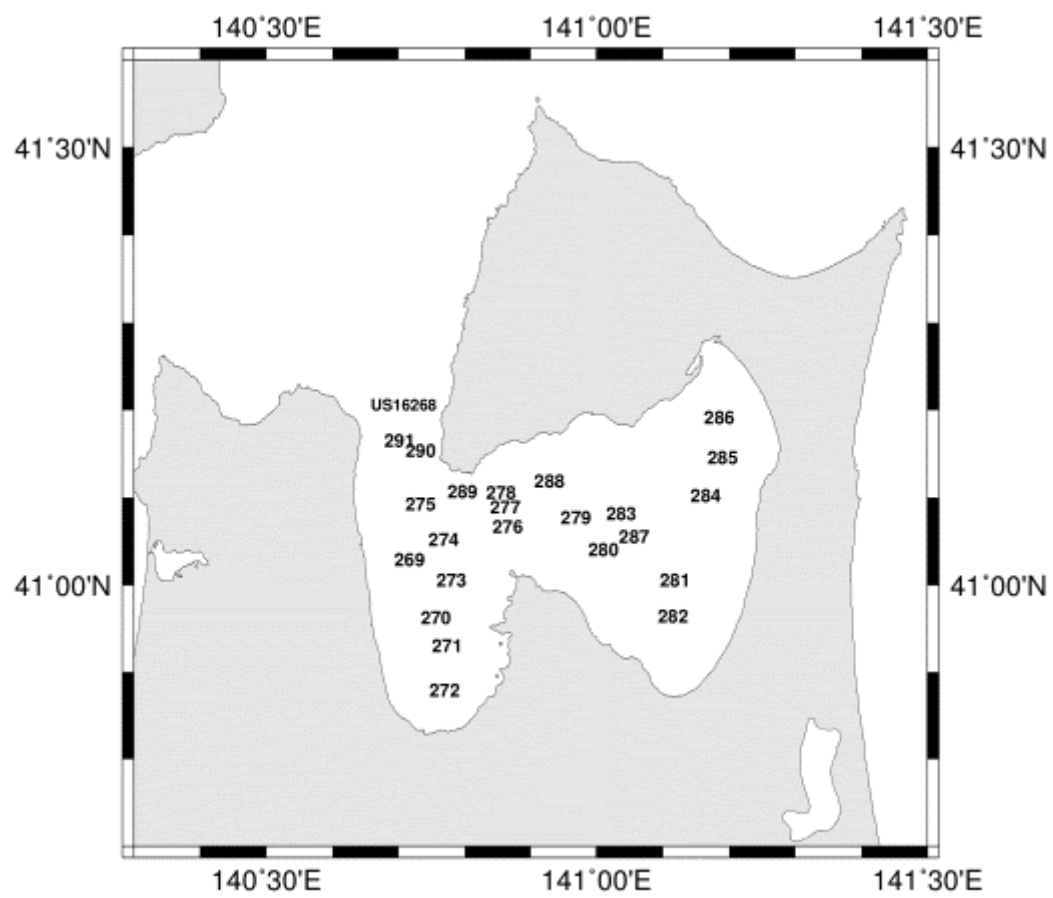


Figure 3. Oceanographic stations (Cruise 362)

Table 1. List of Oceanographic Station

Cruise 360												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16232	41-28.5	141-17.0	5/10	1105-1115	231	East-3	ESE-1	East-5	10.8	10.5	o	1018
US16233	41-42.9	140-45.0	5/13	0306-0314	83	NNE-2	ESE-1	NNE-3	9.4	10.6	bc	1018.8
US16234	41-40.9	140-47.1	5/13	0334-0352	216	NNE-2	ESE-1	NNE-2	9.5	10.5	bc	1018.8
US16235	41-38.9	140-49.1	5/13	0411-0435	350	NE-2	ESE-1	NE-2	9.9	10.9	bc	1018.7
US16236	41-37.1	140-51.1	5/13	0452-0503	96	NE-2	ESE-1	NE-2	10.6	11	b	1018.6
US16237	41-35.9	140-52.5	5/13	0519-0524	38	NE-2	ESE-1	NE-3	10.9	11	b	1019
US16238	41-48.5	141-13.8	5/13	0931-0946	185	South-1	ESE-1	South-2	13.7	8.3	bc	1018.8
US16239	42-17.5	140-54.9	5/13	2125-2132	57	NW-3	NW-1	NW-5	10.1	8.2	c	1022.5
US16240	42-18.9	141-08.5	5/14	0643-0648	68	West-2	WNW-1	West-2	10.7	8.3	bc	1029.2
US16240-2	42-19.4	141-09.2	5/14	0726-0732	72	Calm	ESE-1	Calm	11.6	8.6	bc	1029.2
US16241	41-59.4	141-02.1	5/15	0412-0418	101	East-2	East-1	East-4	9	8.2	bc	1027.1
US16242	41-58.7	141-00.6	5/15	0429-0434	93	East-2	East-1	East-4	9.2	8.2	bc	1027.1
US16243	41-58.1	140-59.4	5/15	0443-0448	85	SE-2	East-1	SE-3	9.2	8.1	bc	1027.2
US16244	41-57.4	140-58.2	5/15	0458-0503	78	SE-2	East-1	SE-4	9.6	8.4	bc	1027.2
US16245	42-09.2	140-35.8	5/17	0619-0626	68	West-1	East-1	West-2	11.1	6.4	c	1013.7
US16246	42-11.0	140-35.6	5/17	0647-0653	80	West-1	East-1	West-2	12	7	c	1014.1
US16247	42-14.0	140-30.3	5/17	0756-0801	79	SW-2	East-1	SW-4	13.2	7.5	c	1014.2
US16248	42-19.1	140-23.1	5/17	0910-0915	53	SW-2	East-1	SW-4	13.5	8.9	c	1014.6
US16249	42-16.7	140-35.4	5/17	1023-1035	91	WSW-2	East-1	WSW-3	13.8	8.5	bc	1014.7
US16250	42-20.9	140-36.8	5/17	1141-1148	87	SW-2	East-1	SW-3	16.2	8.5	bc	1015
US16251	42-23.9	140-31.5	5/17	1221-1227	96	SW-2	East-1	SW-3	16	8.7	bc	1014.6
US16252	42-25.8	140-37.0	5/17	1320-1326	83	SSW-2	East-1	SSW-3	13.6	8.7	bc	1014
US16253	42-31.2	140-37.7	5/17	1400-1408	60	SSW-2	East-1	SSW-4	17.8	10.6	bc	1014
US16254	42-28.3	140-43.1	5/17	1505-1510	60	SSW-2	East-1	SSW-4	13.3	9.3	bc	1013.6
US16255	42-23.3	140-42.6	5/17	1601-1606	61	South-2	East-1	South-2	14.1	9.4	bc	1013.8
US16256	42-18.4	140-42.2	5/18	0412-0417	64	Calm	SE-1	Calm	10.4	8.7	bc	1017.2
US16257	42-15.5	140-47.4	5/18	0511-0516	71	NW-2	SE-1	NW-2	10.1	8.6	b	1017.8
US16258	42-17.5	140-53.9	5/18	0608-0613	56	WNW-2	SE-1	WNW-2	12.4	8.6	b	1018.5
US16259	42-09.7	140-52.6	5/18	0716-0721	74	Calm	East-1	Calm	11.8	8.9	b	1019.3
US16260	42-11.3	141-01.8	5/18	0823-0828	80	West-2	East-1	West-3	15.1	8.7	bc	1019.5
US16261	42-10.0	141-09.7	5/18	0933-0940	119	West-2	East-1	West-3	16.9	9.3	bc	1019.6
US16262	42-09.9	141-18.8	5/18	1046-1103	334	West-2	East-1	West-4	18.5	8.9	bc	1019.2
US16263	42-00.4	141-01.6	5/18	1343-1348	96	Calm	East-1	Calm	17.4	9.8	bc	1019.2
US16264	42-03.7	141-07.7	5/19	0659-0707	119	ENE-2	SE-1	ENE-2	10.5	9.3	c	1025.2
US16265	42-04.9	140-57.0	5/19	0918-0924	82	ENE-2	SE-1	ENE-3	10.3	9.4	f	1025.7

Cruise 361												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16266	42-17.3	140-54.6	5/25	1353-1359	57	NNE-2	SE-1	NNE-2	19.3	11.9	bc	1010.5
US16267	42-18.8	140-52.6	5/25	1750-1754	51	Calm	SE-1	Calm	16.8	12.1	o	1011

Table 1. List of Oceanographic Station (continued)

Cruise 362												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16268	41-12.0	140-42.5	5/30	1158-1203	73	East-2	East-1	East-5	19	14	bc	1009.6
US16269	41-01.3	140-43.0	5/30	1348-1351	55	East-3	East-1	ENE-6	17	13.9	bc	1009.2
US16270	40-57.3	140-45.4	5/30	1420-1424	50	NE-3	NE-1	NE-5	17.6	15.5	bc	1008.7
US16271	40-55.4	140-46.4	5/30	1516-1519	41	NE-3	NE-1	NE-5	18.9	15.8	bc	1008.5
US16272	40-52.3	140-46.2	5/30	1541-1543	29	NE-2	NE-1	NE-4	19.7	16.1	bc	1008.2
US16273	40-59.9	140-46.8	5/31	0727-0730	51	Calm	NNE-1	Calm	16	15	o	1006.8
US16274	41-02.7	140-46.1	5/31	0833-0836	51	NNE-2	NNE-1	NNE-3	15.9	14.9	o	1006.2
US16275	41-05.1	140-44.0	5/31	0855-0900	60	East-2	NE-1	East-3	15.9	14.9	c	1006.1
US16276	41-03.6	140-51.9	5/31	1026-1030	50	NE-2	NE-1	NE-3	18.7	15.6	bc	1005
US16277	41-04.9	140-51.7	5/31	1041-1045	52	ENE-2	NE-1	ENE-3	17.6	15.3	bc	1004.7
US16278	41-05.9	140-51.3	5/31	1112-1115	52	NE-2	NE-1	NE-2	18.4	14.8	bc	1004.5
US16279	41-04.2	140-58.1	5/31	1232-1236	49	East-2	NE-1	East-3	21.2	15.8	bc	1002.8
US16280	41-02.0	141-00.6	5/31	1307-1311	49	ESE-2	NE-1	ESE-2	20.7	16	bc	1002.2
US16281	40-59.9	141-07.1	5/31	1348-1351	42	ESE-2	NE-1	ESE-4	21.3	16	c	1001.1
US16282	40-57.4	141-06.9	5/31	1510-1514	36	WNW-2	NE-1	WNW-4	16.1	16	r	1001.1
US16283	41-04.5	141-02.2	6/1	0750-0755	47	West-2	West-1	West-4	11	14.6	r	1000
US16284	41-05.7	141-09.9	6/1	0858-0901	38	WSW-2	West-1	WSW-4	11.6	14.6	c	999.7
US16285	41-08.3	141-11.4	6/1	0927-0931	34	WSW-3	WSW-1	WSW-5	12.5	14.4	bc	999
US16286	41-11.1	141-11.1	6/1	0952-0956	29	WSW-3	WSW-1	WSW-5	14.2	14.6	bc	998.5
US16287	41-02.9	141-03.4	6/2	0941-0944	37	NW-3	West-1	NW-4	13.6	13.7	c	1004.3
US16288	41-06.7	140-55.7	6/2	1030-1035	46	NW-3	West-1	NW-4	13.3	13.6	c	1005.2
US16289	41-06.0	140-47.8	6/2	1118-1124	50	NNW-2	West-1	NNW-5	13.6	13	bc	1005.5
US16290	41-08.8	140-44.0	6/2	1158-1202	61	NNW-3	NNW-1	NNW-5	14	13.6	bc	1005.5
US16291	41-09.5	140-42.1	6/2	1222-1226	49	North-3	NNW-1	Notrh-6	14	14.1	bc	1005.5

Table 2. Oceanographic data

STATION US16232			
LATITUDE 41-28.5 N			
LONGITUD 141-17.0 E			
DEPTH (m) 231			
Press.	Temp.	Salinity	Sigma-T
5	10.6653	33.8741	25.9582
10	10.6651	33.8746	25.9586
20	10.6621	33.8748	25.9593
30	10.5748	33.8824	25.9805
40	10.5191	33.8933	25.9987
50	10.4912	33.9014	26.0099
75	10.4542	33.9106	26.0235
100	10.3041	33.9258	26.0613
125	10.1858	33.9583	26.107
150	10.1876	33.9582	26.1066
175	10.1816	33.9564	26.1062
200	9.8089	33.9551	26.1681
220	7.5186	33.7203	26.3387

STATION US16235			
LATITUDE 41-38.9 N			
LONGITUD 140-49.1 E			
DEPTH (m) 350			
Press.	Temp.	Salinity	Sigma-T
5	11.2601	33.8124	25.8038
10	11.2464	33.8372	25.8256
20	11.1685	33.8652	25.8615
30	11.1552	33.8699	25.8676
40	11.124	33.8778	25.8793
50	11.0811	33.8825	25.8907
75	10.873	33.8996	25.9413
100	10.7196	33.9246	25.988
125	10.5914	33.9451	26.0265
150	10.4644	33.974	26.0711
175	10.4316	33.982	26.0831
200	10.1857	34.0088	26.1464
250	10.045	34.0181	26.1776
300	9.9283	34.0271	26.2043
322	9.9124	34.0293	26.2088

STATION US16238			
LATITUDE 41-48.5 N			
LONGITUD 141-13.8 E			
DEPTH (m) 185			
Press.	Temp.	Salinity	Sigma-T
5	8.3011	33.1874	25.806
10	8.2215	33.307	25.9117
20	8.4335	33.5697	26.0859
30	8.5238	33.6394	26.1268
40	8.5526	33.6785	26.153
50	8.6905	33.7269	26.1697
75	7.5622	33.6751	26.2968
100	7.2479	33.6852	26.3489
125	6.7416	33.6421	26.384
150	6.5549	33.6356	26.4035
172	6.5247	33.6359	26.4077

STATION US16240-2			
LATITUDE 42-19.4 N			
LONGITUD 141-09.2 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	8.5035	32.7059	25.3981
10	7.943	32.8561	25.5987
20	7.295	33.1195	25.8973
30	6.5282	33.2598	26.1106
40	6.6831	33.3972	26.1987
50	5.8204	33.3417	26.2644
66	5.8263	33.4104	26.3181

STATION US16233			
LATITUDE 41-42.9 N			
LONGITUD 140-45.0 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	10.9749	33.7342	25.7943
10	10.9795	33.7513	25.8068
20	10.9048	33.7964	25.8553
30	10.7075	33.9637	26.0205
40	10.5405	33.9922	26.072
50	10.4805	34.0036	26.0914
72	10.0821	34.0314	26.1816

STATION US16236			
LATITUDE 41-37.1 N			
LONGITUD 140-51.1 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	11.2768	33.79	25.7833
10	11.262	33.8058	25.7984
20	11.3163	33.8327	25.8094
30	11.2589	33.8323	25.8195
40	11.2437	33.8356	25.8249
50	11.2646	33.8331	25.8191
75	11.2339	33.8375	25.8281
86	11.2295	33.8385	25.8297

STATION US16239			
LATITUDE 42-17.5 N			
LONGITUD 140-54.9 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	7.9899	32.4666	25.2862
10	7.9924	32.472	25.29
20	7.6924	32.6348	25.4607
30	7.5202	32.7916	25.6081
40	7.3119	32.9867	25.7905
48	6.8534	33.1597	25.9889

STATION US16241			
LATITUDE 41-59.4 N			
LONGITUD 141-02.1 E			
DEPTH (m) 101			
Press.	Temp.	Salinity	Sigma-T
5	8.514	32.8241	25.4892
10	8.5024	32.8491	25.5105
20	8.1506	33.0615	25.7296
30	8.0565	33.1027	25.7757
40	7.4218	33.4001	26.1004
50	7.4299	33.6271	26.2778
75	6.7051	33.6192	26.3708
99	5.6976	33.579	26.467

STATION US16234			
LATITUDE 41-40.9 N			
LONGITUD 140-47.1 E			
DEPTH (m) 216			
Press.	Temp.	Salinity	Sigma-T
5	11.3673	33.8894	25.8442
10	11.3699	33.9064	25.857
20	11.3716	33.9142	25.8627
30	11.3112	33.9199	25.8782
40	11.2932	33.9209	25.8823
50	11.2885	33.921	25.8832
75	11.2368	33.9344	25.903
100	11.1401	33.9489	25.9318
125	10.5681	33.9704	26.0502
150	10.4832	33.9924	26.0822
175	10.5341	33.9854	26.0679
200	10.0014	34.0394	26.2016
201	10.0007	34.0402	26.2023

STATION US16237			
LATITUDE 41-35.9 N			
LONGITUD 140-52.5 E			
DEPTH (m) 38			
Press.	Temp.	Salinity	Sigma-T
5	11.3385	33.804	25.783
10	11.3429	33.821	25.7955
20	11.3521	33.826	25.7977
30	11.3554	33.8272	25.798
31	11.356	33.8273	25.7979

STATION US16240			
LATITUDE 42-18.9 N			
LONGITUD 141-08.5 E			
DEPTH (m) 68			
Press.	Temp.	Salinity	Sigma-T
5	8.4268	32.7918	25.4769
10	8.2319	32.8457	25.5483
20	6.8987	33.235	26.0422
30	6.7137	33.3281	26.1402
40	6.2247	33.3206	26.1975
50	5.634	33.3398	26.2855
60	5.7431	33.3786	26.303

STATION US16242			
LATITUDE 41-58.7 N			
LONGITUD 141-00.6 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	8.3915	32.6688	25.3858
10	8.2846	32.7827	25.491
20	8.1526	32.8726	25.581
30	7.8707	32.9138	25.6544
40	6.6843	33.2307	26.0673
50	6.8281	33.5279	26.2823
75	6.5069	33.6032	26.3843
90	5.2506	33.5406	26.4896

STATION	US16243		
LATITUDE	41-58.1	N	
LONGITUD	140-59.4	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	8.3662	32.5645	25.3078
10	8.1464	32.6497	25.4071
20	7.7754	32.8168	25.5919
30	7.1596	32.9555	25.7869
40	6.7426	33.1073	25.9623
50	6.8722	33.4696	26.2306
75	5.6663	33.5129	26.4185
82	5.2858	33.5246	26.4729

STATION	US16246		
LATITUDE	42-11.0	N	
LONGITUD	140-35.6	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	7.2397	32.7378	25.6046
10	7.0434	32.7439	25.6361
20	6.5514	32.7714	25.7225
30	5.6119	32.8515	25.9019
40	5.3628	33.2	26.2069
50	6.0692	33.4521	26.3209
75	5.0002	33.4853	26.4744
78	4.9961	33.4893	26.478

STATION	US16249		
LATITUDE	42-16.7	N	
LONGITUD	140-35.4	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	8.4855	32.5173	25.253
10	8.4341	32.5503	25.2866
20	8.3239	32.5446	25.2985
30	8.2419	32.5542	25.3181
40	7.1982	32.7906	25.6518
50	6.437	33.1229	26.0144
75	5.0604	33.4558	26.4442
87	4.6694	33.5304	26.5469

STATION	US16252		
LATITUDE	42-25.8	N	
LONGITUD	140-37.0	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	8.929	32.4779	25.1547
10	8.8895	32.4694	25.1541
20	8.4563	32.4697	25.2201
30	8.4478	32.4744	25.2251
40	8.3131	32.4872	25.2551
50	6.6759	32.9543	25.8505
75	5.2045	33.361	26.3526
82	4.9305	33.4681	26.4686

STATION	US16255		
LATITUDE	42-23.3	N	
LONGITUD	140-42.6	E	
DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T
5	9.2172	32.479	25.1105
10	8.7444	32.4791	25.184
20	8.4365	32.4929	25.2412
30	8.2837	32.5365	25.2981
40	7.0431	32.8684	25.734
50	5.3029	33.086	26.1236
59	5.3082	33.1643	26.185

STATION	US16244		
LATITUDE	41-57.4	N	
LONGITUD	140-58.2	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	8.3599	32.5641	25.3084
10	8.5004	32.5454	25.2728
20	7.9556	32.8272	25.5742
30	6.848	32.8972	25.7829
40	6.9606	33.3539	26.1275
50	6.967	33.4885	26.2326
75	5.8212	33.5221	26.4069
75	5.8212	33.5221	26.4069

STATION	US16247		
LATITUDE	42-14.0	N	
LONGITUD	140-30.3	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	7.8074	32.6463	25.4534
10	7.5858	32.6488	25.4867
20	6.9707	32.6734	25.5902
30	6.9468	32.8764	25.7533
40	6.4842	32.9912	25.9045
50	7.0379	33.3723	26.1315
75	5.0109	33.3864	26.3948
77	5.0064	33.3971	26.4037

STATION	US16250		
LATITUDE	42-20.9	N	
LONGITUD	140-36.8	E	
DEPTH (m)	87		
Press.	Temp.	Salinity	Sigma-T
5	9.0144	32.4986	25.1576
10	8.5389	32.4908	25.2243
20	8.3904	32.5062	25.2585
30	8.3305	32.5162	25.2753
40	8.2269	32.5237	25.2964
50	7.2605	33.0713	25.8642
75	4.8614	33.4381	26.4525
85	4.6876	33.5108	26.5294

STATION	US16253		
LATITUDE	42-31.2	N	
LONGITUD	140-37.7	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	9.5266	32.229	24.8659
10	8.828	32.4334	25.1354
20	8.5952	32.4887	25.2141
30	8.1517	32.5582	25.3345
40	8.0506	32.5827	25.3685
50	7.9967	32.5997	25.3896
55	8.0203	32.6221	25.4038

STATION	US16256		
LATITUDE	42-18.4	N	
LONGITUD	140-42.2	E	
DEPTH (m)	64		
Press.	Temp.	Salinity	Sigma-T
5	8.8889	32.4822	25.1642
10	8.7967	32.4714	25.17
20	8.7053	32.4818	25.1921
30	7.9405	32.6359	25.4262
40	6.429	32.8173	25.7744
50	5.4555	33.2041	26.1993
62	5.1809	33.4575	26.4319

STATION	US16245		
LATITUDE	42-09.2	N	
LONGITUD	140-35.8	E	
DEPTH (m)	68		
Press.	Temp.	Salinity	Sigma-T
5	6.7575	32.7656	25.6912
10	6.6731	32.825	25.749
20	5.7608	32.9086	25.9293
30	5.0955	33.0745	26.1381
40	6.1965	33.4383	26.294
50	6.0654	33.4903	26.3516
64	5.3615	33.449	26.4042

STATION	US16248		
LATITUDE	42-19.1	N	
LONGITUD	140-23.1	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	9.1589	32.359	25.0259
10	8.3503	32.4616	25.2295
20	8.3257	32.5194	25.2785
30	7.1947	32.8351	25.6873
40	6.8271	32.9881	25.8572
50	5.0026	33.1347	26.1963
51	4.9898	33.1561	26.2147

STATION	US16251		
LATITUDE	42-23.9	N	
LONGITUD	140-31.5	E	
DEPTH (m)	96		
Press.	Temp.	Salinity	Sigma-T
5	8.8161	32.4697	25.1656
10	8.4156	32.4704	25.2267
20	8.3776	32.4808	25.2405
30	8.3255	32.4868	25.2529
40	8.1566	32.5115	25.2972
50	6.0874	32.7577	25.7703
75	5.0501	33.3438	26.3566
93	4.8392	33.4754	26.4846

STATION	US16254		
LATITUDE	42-28.3	N	
LONGITUD	140-43.1	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	8.9346	32.6354	25.277
10	8.2888	32.6351	25.3747
20	8.0087	32.689	25.458
30	7.8889	32.7442	25.5186
40	7.8017	32.7781	25.5578
50	6.4228	33.0922	25.992
56	6.1555	33.1712	26.0883

STATION	US16257		
LATITUDE	42-15.5	N	
LONGITUD	140-47.4	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	8.9515	32.1915	24.9268
10	7.515	32.1861	25.133
20	7.5826	32.4816	25.3558
30	7.1513	32.64	25.5397
40	6.0638	32.9289	25.9083
50	6.3835	33.1968	26.0795
69	4.9346	33.5039	26.4966

	STATION	US16258		
	LATITUDE	42-17.5	N	
	LONGITUD	140-53.9	E	
	DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T	
5	8.8144	32.1395	24.9074	
10	8.7351	32.2366	24.9954	
20	8.6523	32.2924	25.0517	
30	8.2228	32.5436	25.3126	
40	7.8786	32.603	25.4093	
50	7.1804	32.8845	25.7281	
54	6.7178	33.1658	26.0117	

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	STATION	US16261		
	LATITUDE	42-10.0	N	
	LONGITUD	141-09.7	E	
	DEPTH (m)	119		
Press.	Temp.	Salinity	Sigma-T	
5	9.7384	32.7482	25.2372	
10	8.8756	32.838	25.4448	
20	8.3251	32.8892	25.5685	
30	6.2641	33.0472	25.9768	
40	5.5733	33.1822	26.168	
50	6.0131	33.3505	26.2477	
75	6.6745	33.5411	26.3133	
100	6.6192	33.5603	26.3357	
117	6.501	33.5595	26.3505	

	STATION	US16264		
	LATITUDE	42-03.7	N	
	LONGITUD	141-07.7	E	
	DEPTH (m)	119		
Press.	Temp.	Salinity	Sigma-T	
5	9.3296	32.3727	25.0097	
10	8.8463	32.7798	25.4037	
20	6.6702	33.0957	25.9627	
30	6.8714	33.3207	26.1133	
40	6.5418	33.3774	26.2016	
50	7.3157	33.6179	26.2866	
75	6.9948	33.5822	26.3026	
100	6.312	33.5463	26.3646	
116	6.3373	33.5575	26.3701	

	STATION	US16267		
	LATITUDE	42-18.8	N	
	LONGITUD	140-52.6	E	
	DEPTH (m)	51		
Press.	Temp.	Salinity	Sigma-T	
5	10.7984	32.242	24.6638	
10	9.9865	32.3305	24.8704	
20	7.5344	32.5464	25.4134	
30	6.8902	32.753	25.6636	
40	5.9766	32.9983	25.974	
46	6.0314	33.1661	26.0998	

	STATION	US16270		
	LATITUDE	40-57.3	N	
	LONGITUD	140-45.4	E	
	DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T	
5	15.6677	33.2413	24.4697	
10	15.0316	33.3446	24.689	
20	13.8053	33.6149	25.1571	
30	13.434	33.6157	25.2336	
40	12.7393	33.5571	25.3265	
49	11.7074	33.5035	25.4816	

	STATION	US16259		
	LATITUDE	42-09.7	N	
	LONGITUD	140-52.6	E	
	DEPTH (m)	74		
Press.	Temp.	Salinity	Sigma-T	
5	8.7832	32.3548	25.0807	
10	7.793	32.6174	25.4327	
20	6.5161	32.8319	25.7747	
30	6.3045	32.9483	25.8936	
40	6.6509	33.3423	26.1595	
50	6.5927	33.2857	26.1226	
72	4.7313	33.5078	26.5222	

	STATION	US16262		
	LATITUDE	42-09.9	N	
	LONGITUD	141-18.8	E	
	DEPTH (m)	334		
Press.	Temp.	Salinity	Sigma-T	
5	9.2249	32.9109	25.4471	
10	8.5924	33.0623	25.664	
20	8.4328	33.1777	25.7786	
30	8.2795	33.2094	25.8264	
40	8.0965	33.2574	25.8912	
50	7.6361	33.4707	26.1255	
75	7.5388	33.6541	26.2836	
100	6.715	33.5879	26.3448	
125	6.3237	33.5678	26.38	
150	6.1304	33.6058	26.4346	
175	5.702	33.5845	26.4708	
200	5.0109	33.5264	26.5058	
250	4.3986	33.5605	26.5998	
300	3.4353	33.5569	26.6934	
312	3.7466	33.6172	26.7115	

	STATION	US16265		
	LATITUDE	42-04.9	N	
	LONGITUD	140-57.0	E	
	DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T	
5	9.2738	32.5996	25.1959	
10	8.6394	32.636	25.3228	
20	5.9618	32.8283	25.8415	
30	6.8106	33.258	26.0718	
40	7.0322	33.3359	26.1036	
50	6.3047	33.3065	26.1763	
75	4.8137	33.4871	26.4967	
80	4.7967	33.4998	26.5086	

	STATION	US16268		
	LATITUDE	41-12.0	N	
	LONGITUD	140-42.5	E	
	DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T	
5	14.1411	33.5791	25.0597	
10	14.0364	33.5903	25.0902	
20	13.471	33.6033	25.2165	
30	13.1711	33.6039	25.2773	
40	12.5092	33.6067	25.4097	
50	12.3909	33.6335	25.4533	
71	10.1647	33.6406	25.8627	

	STATION	US16271		
	LATITUDE	40-55.4	N	
	LONGITUD	140-46.4	E	
	DEPTH (m)	41		
Press.	Temp.	Salinity	Sigma-T	
5	15.9057	33.0734	24.2873	
10	15.0229	33.2785	24.64	
20	13.2444	33.4296	25.1278	
30	12.9566	33.6088	25.3238	
40	11.5492	33.4001	25.4304	

	STATION	US16260		
	LATITUDE	42-11.3	N	
	LONGITUI	141-01.8	E	
	DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T	
5	8.9094	32.3395	25.0494	
10	8.0532	32.3032	25.1487	
20	6.7155	32.8042	25.7271	
30	6.2122	32.9546	25.9102	
40	6.0171	33.1187	26.064	
50	6.1675	33.2758	26.1693	
75	5.868	33.294	26.2209	
78	5.8579	33.2993	26.2263	

	STATION	US16263		
	LATITUDE	42-00.4	N	
	LONGITUI	141-01.6	E	
	DEPTH (m)	96		
Press.	Temp.	Salinity	Sigma-T	
5	8.4401	32.8017	25.4827	
10	8.414	32.858	25.5308	
20	8.086	33.0302	25.7145	
30	6.0211	32.947	25.928	
40	5.4749	33.0987	26.1136	
50	6.0959	33.3538	26.2399	
75	5.9367	33.4186	26.3109	
95	4.9543	33.5006	26.4917	

	STATION	US16266		
	LATITUDE	42-17.3	N	
	LONGITUI	140-54.6	E	
	DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T	
5	11.0327	32.1917	24.5836	
10	10.231	32.3217	24.8227	
20	9.4218	32.4602	25.0634	
30	6.6443	32.6359	25.6037	
40	6.0284	32.7493	25.7709	
50	5.7146	33.0744	26.066	
51	5.7363	33.1451	26.1192	

	STATION	US16269		
	LATITUDE	41-01.3	N	
	LONGITUI	140-43.0	E	
	DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T	
5	14.1279	33.5487	25.039	
10	14.1028	33.5484	25.044	
20	13.9154	33.5488	25.0833	
30	13.4895	33.6208	25.2262	
40	11.4323	33.4268	25.4726	
50	10.9302	33.633	25.7235	
54	10.3183	33.67	25.8593	

	STATION	US16272		
	LATITUDE	40-52.3	N	
	LONGITUI	140-46.2	E	
	DEPTH (m)	29		
Press.	Temp.	Salinity	Sigma-T	
5	15.8454	33.076	24.3025	
10	14.3408	33.4716	24.9348	
20	13.8944	33.5408	25.0814	
29	12.6968	33.4025	25.215	

STATION US16273			
LATITUDE 40-59.9 N			
LONGITUD 140-46.8 E			
DEPTH (m) 51			
Press.	Temp.	Salinity	Sigma-T
5	14.958	33.3625	24.7188
10	14.6993	33.4354	24.8307
20	12.7917	33.42	25.21
30	12.1956	33.4708	25.3645
40	11.6753	33.5662	25.5362
50	10.3614	33.6383	25.8272

STATION US16276			
LATITUDE 41-03.6 N			
LONGITUD 140-51.9 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	14.9423	33.3883	24.7421
10	14.1447	33.45	24.9593
20	13.2994	33.5133	25.1815
30	12.401	33.5588	25.3935
40	12.7873	33.7325	25.453
49	11.582	33.5343	25.5287

STATION US16279			
LATITUDE 41-04.2 N			
LONGITUD 140-58.1 E			
DEPTH (m) 49			
Press.	Temp.	Salinity	Sigma-T
5	14.8047	33.1821	24.6128
10	14.7914	33.1965	24.6268
20	12.6789	33.2795	25.1231
30	10.8283	33.2323	25.4295
40	10.4605	33.3912	25.6175
48	9.1777	33.4126	25.8471

STATION US16282			
LATITUDE 40-57.4 N			
LONGITUD 141-06.9 E			
DEPTH (m) 36			
Press.	Temp.	Salinity	Sigma-T
5	15.7281	33.1066	24.3526
10	15.1772	33.1382	24.4984
20	11.0951	33.2042	25.3604
30	10.2081	33.3089	25.5965
33	10.0995	33.3387	25.6381

STATION US16285			
LATITUDE 41-08.3 N			
LONGITUD 141-11.4 E			
DEPTH (m) 34			
Press.	Temp.	Salinity	Sigma-T
5	14.673	33.0856	24.5666
10	14.5181	33.1213	24.627
20	11.2173	33.2162	25.3477
30	10.7555	33.2812	25.4804
33	10.7681	33.3377	25.5222

STATION US16288			
LATITUDE 41-06.7 N			
LONGITUD 140-55.7 E			
DEPTH (m) 46			
Press.	Temp.	Salinity	Sigma-T
5	13.8694	33.3653	24.9511
10	13.8521	33.3661	24.9552
20	12.0637	33.2213	25.1955
30	10.6886	33.3084	25.5133
40	9.7697	33.3737	25.7206
47	9.6799	33.4086	25.7627

STATION US16274			
LATITUDE 41-02.7 N			
LONGITUD 140-46.1 E			
DEPTH (m) 51			
Press.	Temp.	Salinity	Sigma-T
5	14.962	33.3604	24.7163
10	14.9218	33.3639	24.7277
20	13.5771	33.5734	25.1718
30	12.5462	33.6226	25.4149
40	11.322	33.5404	25.581
50	10.8606	33.5761	25.6916
51	10.4233	33.5363	25.7371

STATION US16277			
LATITUDE 41-04.9 N			
LONGITUD 140-51.7 E			
DEPTH (m) 52			
Press.	Temp.	Salinity	Sigma-T
5	14.5424	33.4359	24.8645
10	13.8431	33.5045	25.064
20	13.656	33.5579	25.1437
30	13.0313	33.6887	25.3708
40	12.7487	33.7219	25.4524
50	11.6902	33.6202	25.5754
51	11.5621	33.6145	25.5948

STATION US16280			
LATITUDE 41-02.0 N			
LONGITUD 141-00.6 E			
DEPTH (m) 49			
Press.	Temp.	Salinity	Sigma-T
5	15.4801	33.1488	24.4401
10	15.3061	33.1524	24.4811
20	11.6746	33.1797	25.2361
30	10.8111	33.2405	25.4389
40	10.8305	33.5138	25.6483
46	9.7921	33.3936	25.7324

STATION US16283			
LATITUDE 41-04.5 N			
LONGITUD 141-02.2 E			
DEPTH (m) 47			
Press.	Temp.	Salinity	Sigma-T
5	14.9159	33.0059	24.4531
10	14.8474	33.1294	24.563
20	13.9531	33.1462	24.7642
30	11.0888	33.2237	25.3767
40	9.6958	33.351	25.715
45	9.3469	33.3949	25.8061

STATION US16286			
LATITUDE 41-11.1 N			
LONGITUD 141-11.1 E			
DEPTH (m) 29			
Press.	Temp.	Salinity	Sigma-T
5	14.8601	33.1024	24.5395
10	14.7854	33.105	24.5575
20	11.3156	33.2159	25.3298
28	10.6212	33.2568	25.4848

STATION US16289			
LATITUDE 41-06.0 N			
LONGITUD 140-47.8 E			
DEPTH (m) 50			
Press.	Temp.	Salinity	Sigma-T
5	13.1548	33.4602	25.1694
10	13.0436	33.4683	25.1978
20	12.5235	33.6108	25.4101
30	11.9277	33.5914	25.5087
40	11.0439	33.479	25.5833
48	9.5833	33.3966	25.7692

STATION US16275			
LATITUDE 41-05.1 N			
LONGITUI 140-44.0 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	14.967	33.3625	24.7169
10	14.813	33.3881	24.7698
20	12.0354	33.3108	25.2706
30	11.3077	33.3116	25.4056
40	10.6067	33.372	25.5771
50	10.469	33.4851	25.6892
58	9.6835	33.4554	25.7984

STATION US16278			
LATITUDE 41-05.9 N			
LONGITUI 140-51.3 E			
DEPTH (m) 52			
Press.	Temp.	Salinity	Sigma-T
5	14.225	33.5304	25.0045
10	14.1891	33.552	25.0288
20	13.7377	33.5416	25.1144
30	13.0254	33.6926	25.3751
40	12.5403	33.6825	25.4625
50	10.8308	33.5704	25.6923
51	10.0824	33.4398	25.7203

STATION US16281			
LATITUDE 40-59.9 N			
LONGITUI 141-07.1 E			
DEPTH (m) 42			
Press.	Temp.	Salinity	Sigma-T
5	15.9402	33.1434	24.3333
10	15.7877	33.1476	24.3708
20	13.3296	33.1914	24.9263
30	10.6193	33.2389	25.4712
40	9.5518	33.3725	25.7554

STATION US16284			
LATITUDE 41-05.7 N			
LONGITUI 141-09.9 E			
DEPTH (m) 38			
Press.	Temp.	Salinity	Sigma-T
5	14.7942	33.1535	24.593
10	14.7946	33.1534	24.5928
20	13.6015	33.1651	24.851
30	10.9294	33.2326	25.4119
37	9.7509	33.3759	25.7255

STATION US16287			
LATITUDE 41-02.9 N			
LONGITUI 141-03.4 E			
DEPTH (m) 37			
Press.	Temp.	Salinity	Sigma-T
5	13.5755	33.1334	24.8319
10	13.3965	33.1428	24.8754
20	12.2256	33.1615	25.1187
30	10.5797	33.2954	25.5222
36	10.3383	33.3561	25.611

STATION US16290			
LATITUDE 41-08.8 N			
LONGITUI 140-44.0 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	14.0965	33.3896	24.9228
10	14.0682	33.391	24.9297
20	13.4743	33.5189	25.1505
30	12.886	33.6255	25.3507
40	12.2122	33.6421	25.4943
50	11.1036	33.598	25.6653
58	10.2188	33.6712	25.8773

STATION	US16291		
LATITUDE	41-09.5	N	
LONGITUD	140-42.1	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	14.1337	33.5164	25.0128
10	14.0928	33.5203	25.0244
20	14.0674	33.5401	25.045
30	13.9671	33.5596	25.0809
40	13.5974	33.5881	25.179
47	13.0445	33.6573	25.3439

THE " USHIO MARU "

CRUISE 363

CRUISE 364

CRUISE 365

IN JUNE 2016

IN JULY 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 363

Departure from Hakodate	Jun. 7, 2016
Retrieval ADCP mooring system	7
Start hydrographic research (US16292)	7
Arrival at Hakodate	8
Departure from Hakodate	9
Calibration og echo sounder	9
Towing frame trawl net	10
Towing frame trawl net	11
Finish hydrographic research (US16314)	11
Arrival at Hakodate	12
Depature from Hakodate	13
Return to Hakodate	14
Total coverage 458.7 miles	

Cruise 364

Departure from Hakodate	Jun. 20, 2016
Start hydrographic research (US16315)	20
Arrival at Ominato	20
Departure from Ominato	21
Finish hydrographic research (US16331)	21
Return to Hakodate	22
Total coverage 171.5 miles	

Cruise 365

Departure from Hakodate	Jul. 28, 2016
Testing echo sounder system	28
Arrival at and departure from Hakodate	28
Start hydrographic research (US16332)	29
Finish hydrographic research (US16340)	29
Return to Hakodate	30
Total coverage 235.1 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

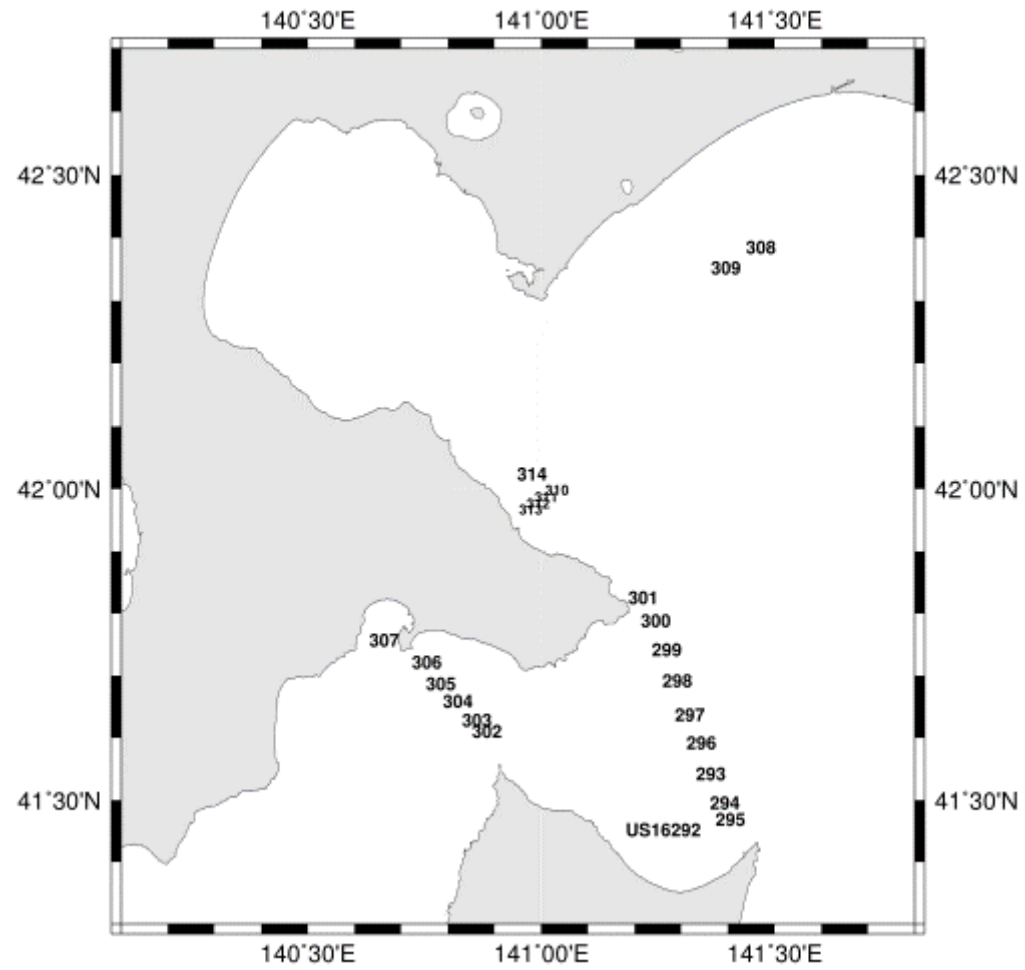


Figure 1. Oceanographic stations (Cruise 363)

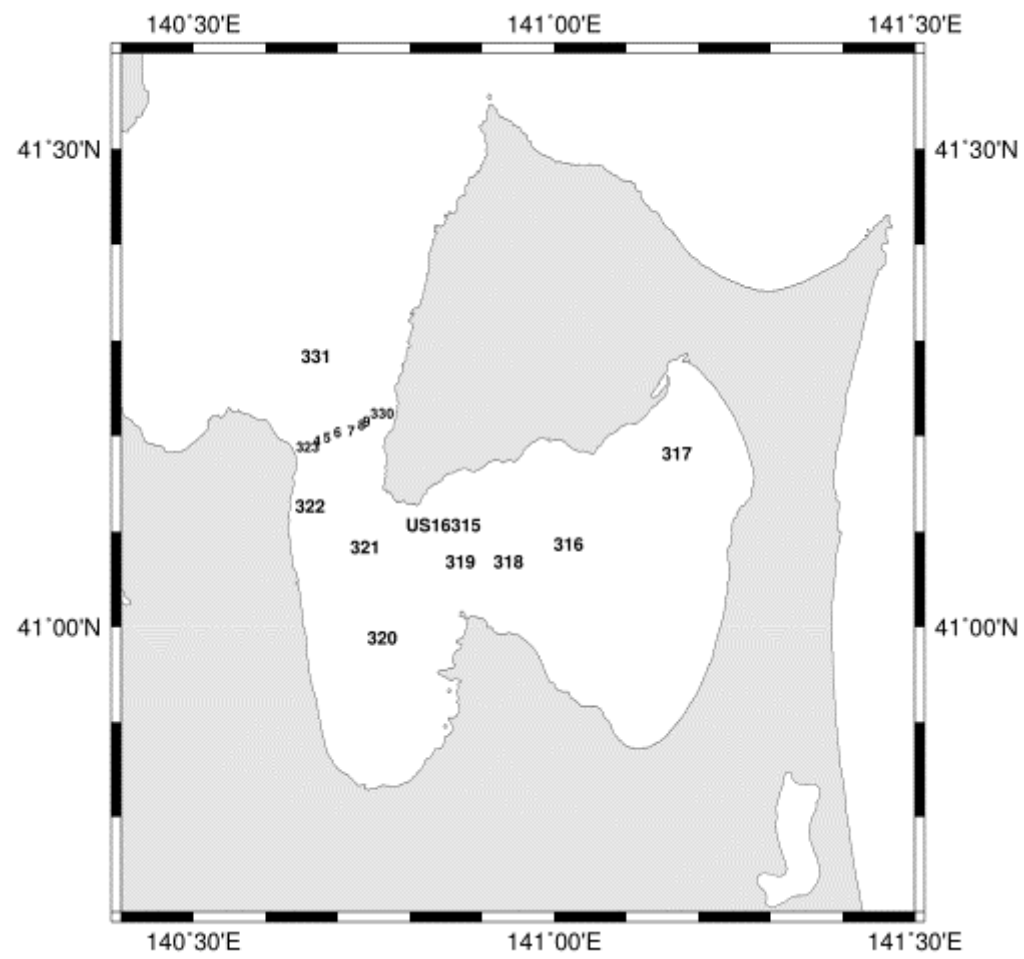


Figure 2. Oceanographic stations (Cruise 364)

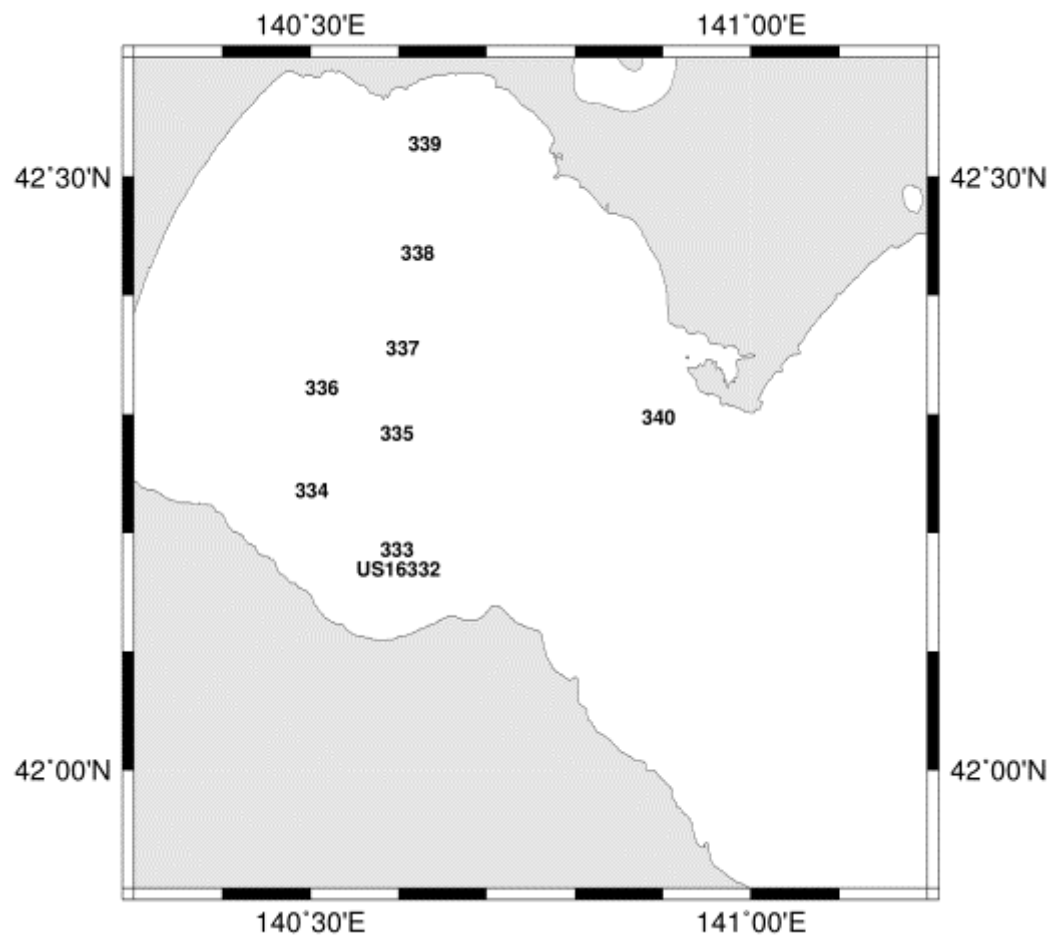


Figure 3. Oceanographic stations (Cruise 365)

Table 1. List of Oceanographic Station

Cruise 363												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16292	41-26.5	141-15.7	6/7	1304-1312	83	WNW-1	East-1	WNW-3	19.4	13.9	bc	1015.8
US16293	41-31.9	141-21.8	6/7	1421-1440	256	ESE-1	East-1	ESE-4	15.9	13.6	bc	1015.5
US16294	41-29.1	141-23.6	6/7	1555-1604	96	ESE-3	East-1	ESE-5	16.9	13.3	c	1014.8
US16295	41-27.5	141-24.3	6/7	1620-1626	49	ESE-3	East-1	ESE-5	16.5	13	c	1014.8
US16296	41-34.9	141-20.6	6/7	1718-1742	321	SE-2	East-1	SE-3	16.1	12.5	c	1014.9
US16297	41-37.6	141-19.1	6/8	0551-0608	215	North-2	ENE-1	North-2	12.7	11.6	c	1014.3
US16298	41-40.9	141-17.5	6/8	0634-0654	230	North-2	ENE-1	North-3	13.1	11.5	c	1014.1
US16299	41-43.9	141-16.1	6/8	0717-0736	230	North-2	East-1	North-3	13.6	12.4	c	1014.5
US16300	41-46.7	141-14.7	6/8	0758-0817	203	NNW-2	East-1	NNW-4	14.3	12.8	c	1014.5
US16301	41-48.9	141-13.1	6/8	0837-0853	159	NW-2	East-1	NW-4	14.7	12.8	m	1014.2
US16302	41-36.0	140-53.0	6/8	1150-1159	56	SE-2	East-1	SE-3	14.7	13.4	r	1014.1
US16303	41-37.1	140-51.7	6/8	1218-1232	105	East-2	East-1	East-3	14.3	14	r	1014.1
US16304	41-38.9	140-49.3	6/8	1300-1322	343	ESE-2	East-1	ESE-3	15.7	13.9	r	1014.1
US16305	41-40.6	140-47.1	6/8	1402-1420	228	SE-2	East-1	SE-2	15.6	14.2	o	1014.1
US16306	41-42.7	140-45.3	6/8	1440-1450	86	SE-2	ESE-1	SE-3	15	14.3	r	1014.1
US16307	41-44.8	140-39.8	6/9	0934-0939	53	North-1	NNW-1	North-3	15.7	12.4	r	1013.1
US16308	42-22.5	141-28.2	6/10	1311-1326	344	West-2	WSW-1	West-2	21.7	11.9	bc	1013.6
US16309	42-20.5	141-23.7	6/10	2145-2152	400	East-1	SE-1	East-3	14.9	13.3	c	1016.8
US16310	41-59.4	141-02.0	6/11	0734-0741	100	West-2	WNW-1	West-3	13.5	11.2	o	1018.7
US16311	41-58.7	141-00.6	6/11	0751-0758	93	WNW-2	NW-1	WNW-3	13.5	11.5	o	1018.6
US16312	41-58.1	140-59.6	6/11	0806-0811	86	NW-1	NW-1	NW-3	13.7	11.8	c	1018.7
US16313	41-57.5	140-58.6	6/11	0820-0825	82	NW-1	NW-1	NW-3	14.2	12.2	c	1018.7
US16314	42-00.8	140-58.8	6/11	1555-1600	83	SE-1	NW-1	SE-3	17.2	13.8	bc	1017

Cruise 364												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16315	41-06.0	140-50.8	6/20	1316-1327	52	ENE-2	NE-1	ENE-4	18	16	o	1006.1
US16316	41-04.8	141-01.2	6/20	1420-1427	47	East-2	East-1	East-3	20.1	16.2	c	1005.8
US16317	41-10.5	141-10.2	6/20	1628-1633	30	NE-2	No Swell	NE-3	20	16.5	c	1006
US16318	41-03.7	140-56.2	6/21	0743-0750	37	SE-2	SSE-1	SE-3	17.2	16.6	o	1010.7
US16319	41-03.7	140-52.2	6/21	0905-0911	50	ESE-1	East-1	ESE-2	20.2	16.3	o	1011.1
US16320	40-58.9	140-45.7	6/21	1004-1009	51	North-1	North-1	North-1	18.3	16.2	o	1011.1
US16321	41-07.9	140-40.6	6/21	1133-1140	58	ENE-1	North-1	ENE-3	18.9	16.2	c	1011
US16322	41-07.2	140-39.7	6/21	1211-1217	48	ESE-1	North-1	ESE-3	20.7	16	bc	1011
US16323	41-11.3	140-40.0	6/21	1236-1242	40	NNE-1	North-1	NNE-2	18.9	15.8	bc	1011
US16324	41-11.5	140-42.5	6/21	1251-1258	57	NNE-1	North-1	NNE-3	22.4	16	bc	1010.7
US16325	41-11.6	140-41.1	6/21	1306-1313	68	NNE-1	North-1	NNE-4	18.4	16.1	bc	1011
US16326	41-11.9	140-42.0	6/21	1325-1333	74	NNE-1	North-1	NNE-3	18.9	15.9	bc	1011.1
US16327	41-12.0	140-43.1	6/21	1343-1350	71	NNE-1	North-1	NNE-3	20.4	16	bc	1010.9
US16328	41-12.4	140-44.0	6/21	1359-1406	70	North-1	North-1	North-3	20.6	16.6	bc	1010.8
US16329	41-12.6	140-44.4	6/21	1415-1421	68	ENE-1	North-1	ENE-2	22.2	16.2	bc	1010.8
US16330	41-13.1	140-45.7	6/21	1428-1434	63	Calm	North-1	Calm	22.7	16.1	bc	1011
US16331	41-16.6	140-40.2	6/21	1507-1518	142	Calm	North-1	Calm	20.6	16.3	c	1010.8

Cruise 365												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16332	42-09.8	140-36.0	7/29	0848-0856	72	East-3	East-1	East-5	20.2	19.2	o	1013.1
US16333	42-10.8	140-35.9	7/29	0919-0925	78	East-3	East-1	East-5	19.7	19	r	1012.7
US16334	42-13.8	140-30.1	7/29	0958-1003	76	East-3	East-1	East-5	20	18.8	o	1012.7
US16335	42-16.7	140-35.9	7/29	1049-1100	90	ESE-3	East-1	ESE-5	20.3	18.6	o	1013.1
US16336	42-19.0	140-30.8	7/29	1208-1214	91	ESE-3	East-1	ESE-5	22.7	19	c	1013.2
US16337	42-21.0	140-36.3	7/29	1244-1250	86	NE-1	ESE-1	NE-2	21.7	18.8	c	1013.1
US16338	42-25.8	140-37.3	7/29	1326-1331	82	Calm	ESE-1	Calm	22.1	18.7	o	1013.2
US16339	42-31.3	140-37.8	7/29	1415-1421	59	West-1	ESE-1	West-3	23.3	20.3	c	1013.1
US16340	42-17.5	140-53.7	7/29	1651-1656	55	East-3	East-1	East-5	20.9	18.3	c	1013.1

Table 2. Oceanographic data

STATION US16292			
LATITUDE	41-26.5	N	
LONGITUDE	141-15.7	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	13.6755	33.8195	25.3418
10	12.8907	33.8511	25.5245
20	12.2694	33.9134	25.6939
30	12.1259	34.0229	25.8063
40	11.513	34.0595	25.9497
50	10.661	34.0631	26.1062
69	10.4893	34.058	26.1323

STATION US16293			
LATITUDE	41-31.9	N	
LONGITUDE	141-21.8	E	
DEPTH (m)	256		
Press.	Temp.	Salinity	Sigma-T
5	12.7135	33.9819	25.6608
10	12.5997	33.9887	25.6884
20	11.8326	34.061	25.8914
30	11.6799	34.0767	25.9321
40	11.5978	34.0773	25.9479
50	11.4905	34.0815	25.971
75	11.1824	34.0837	26.0291
100	11.0883	34.0875	26.049
125	10.9503	34.0901	26.0759
150	10.3492	34.0311	26.1356
175	10.2276	34.0343	26.1591
200	8.889	33.9042	26.2776
240	7.3505	33.7624	26.3953

STATION US16294			
LATITUDE	41-29.1	N	
LONGITUDE	141-23.6	E	
DEPTH (m)	96		
Press.	Temp.	Salinity	Sigma-T
5	13.2977	33.9414	25.5132
10	12.7413	33.9541	25.6338
20	11.8696	34.0623	25.8854
30	11.5102	34.0716	25.9597
40	11.0048	34.0728	26.0526
50	10.4478	34.0625	26.143
75	10.1303	34.0676	26.2017
80	9.7016	34.0089	26.228

STATION US16295			
LATITUDE	41-27.5	N	
LONGITUDE	141-24.3	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	11.9788	34.0532	25.8578
10	11.9003	34.0619	25.8793
20	11.7969	34.0647	25.9009
30	11.574	34.0676	25.9447
40	10.5401	34.0427	26.1115

STATION US16296			
LATITUDE	41-34.9	N	
LONGITUDE	141-20.6	E	
DEPTH (m)	321		
Press.	Temp.	Salinity	Sigma-T
5	11.1248	33.0264	25.2167
10	11.5687	33.1641	25.2434
20	11.9826	33.4394	25.3804
30	10.7291	33.2513	25.4617
40	11.264	33.545	25.5951
50	11.5142	33.6527	25.6332
75	11.1233	33.9407	25.9284
100	10.5506	33.9385	26.0284
125	9.4896	33.9109	26.1864
150	8.1911	33.8339	26.3296
175	6.8526	33.7252	26.4346
200	6.5221	33.6916	26.4519
250	5.61	33.6442	26.5291
300	3.9862	33.5884	26.6648

STATION US16297			
LATITUDE	41-37.6	N	
LONGITUDE	141-19.1	E	
DEPTH (m)	215		
Press.	Temp.	Salinity	Sigma-T
5	11.5669	33.948	25.8531
10	11.546	33.9501	25.8585
20	11.4801	33.9547	25.8743
30	11.2521	34.005	25.9551
40	11.0734	34.0707	26.0387
50	11.0534	34.0954	26.0614
75	10.8701	34.1002	26.0981
100	10.5525	34.0585	26.1216
125	10.4163	34.0622	26.1483
150	9.587	33.9762	26.2214
175	8.7042	33.8766	26.2848
200	5.6701	33.6574	26.5324

STATION US16298			
LATITUDE	41-40.9	N	
LONGITUDE	141-17.5	E	
DEPTH (m)	230		
Press.	Temp.	Salinity	Sigma-T
5	12.1326	32.799	24.8552
10	10.9486	32.9882	25.2183
20	11.5653	33.6352	25.6102
30	11.5783	33.919	25.8284
40	11.259	34.0588	25.9958
50	11.0773	34.0449	26.0179
75	9.8649	33.9752	26.1745
100	9.187	33.9387	26.2572
125	8.0507	33.8408	26.3559
150	6.0255	33.5593	26.4111
175	5.5284	33.5577	26.4705
200	4.8164	33.5431	26.5408
210	4.3455	33.5299	26.5812

STATION US16299			
LATITUDE	41-43.9		
LONGITUDE	141-16.1		
DEPTH (m)	230		
Press.	Temp.	Salinity	Sigma-T
5	11.6079	32.4262	24.6625
10	10.2894	32.5095	24.9593
20	8.7901	32.8065	25.4334
30	7.9074	32.9317	25.6632
40	7.7179	32.9931	25.7386
50	7.2206	33.3427	26.0832
75	6.5377	33.5067	26.3041
100	6.5038	33.5788	26.3654
125	6.1465	33.5801	26.4122
150	5.6917	33.5441	26.4401
175	5.1634	33.5135	26.4782
200	4.5615	33.4931	26.5289
210	4.3	33.4938	26.5573

STATION US16300			
LATITUDE	41-46.7	N	
LONGITUDE	141-14.7	E	
DEPTH (m)	203		
Press.	Temp.	Salinity	Sigma-T
5	12.8814	32.4774	24.4624
10	10.8988	32.4181	24.7833
20	8.0788	32.811	25.5434
30	8.0725	33.2999	25.9281
40	7.9923	33.4138	26.0293
50	6.6841	33.3445	26.157
75	6.2606	33.4426	26.2892
100	6.4902	33.5738	26.3632
125	6.4296	33.5981	26.3902
150	6.0732	33.5654	26.4099
175	5.1088	33.4985	26.4726
190	4.7203	33.4952	26.5134

STATION US16301			
LATITUDE	41-48.9	N	
LONGITUDE	141-13.1	E	
DEPTH (m)	159		
Press.	Temp.	Salinity	Sigma-T
5	10.7917	32.4114	24.7967
10	9.6741	32.5583	25.0994
20	7.656	33.0132	25.7631
30	6.462	33.0215	25.9312
40	6.3398	33.0688	25.9842
50	6.1177	33.1281	26.059
75	6.7882	33.5329	26.2917
100	6.4343	33.5388	26.3429
125	6.4131	33.5481	26.353
140	6.1927	33.537	26.3724

STATION US16302			
LATITUDE	41-36.0	N	
LONGITUDE	140-53.0	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	13.7418	34.0587	25.5132
10	13.3291	34.0814	25.6151
20	12.7401	34.1399	25.778
30	12.6976	34.1414	25.7875
40	12.6708	34.1433	25.7943
50	12.7078	34.1429	25.7867

STATION US16303			
LATITUDE	41-37.1	N	
LONGITUDE	140-51.7	E	
DEPTH (m)	105		
Press.	Temp.	Salinity	Sigma-T
5	13.3351	34.1032	25.6308
10	13.0005	34.1252	25.7151
20	12.7168	34.1411	25.7835
30	12.5957	34.1467	25.8117
40	12.2035	34.1628	25.9001
50	12.083	34.1644	25.9243
75	11.9634	34.1635	25.9464
100	11.7598	34.1593	25.9814
110	11.51	34.1522	26.0223

STATION US16304			
LATITUDE	41-38.9	N	
LONGITUDE	140-49.3	E	
DEPTH (m)	343		
Press.	Temp.	Salinity	Sigma-T
5	13.6402	34.1282	25.5879
10	13.3961	34.1176	25.6296
20	13.1787	34.1237	25.6782
30	12.9881	34.1344	25.7247
40	12.6799	34.1497	25.7975
50	12.5226	34.1583	25.8349
75	11.8261	34.1649	25.9733
100	10.9356	34.1585	26.1317
125	10.1872	34.1371	26.2463
150	9.9637	34.1355	26.2831
175	9.7798	34.134	26.3128
200	9.7086	34.1355	26.3258
250	9.6469	34.1336	26.3346
275	9.5298	34.1292	26.3505

STATION US16307			
LATITUDE	41-44.8	N	
LONGITUDE	140-39.8	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	12.1988	33.3963	25.3061
10	12.0132	33.854	25.6965
20	11.728	33.9664	25.8375
30	11.5469	34.0925	25.9691
40	11.4628	34.136	26.0184
50	11.2237	34.1385	26.0642

STATION US16310			
LATITUDE	41-59.4	N	
LONGITUDE	141-02.0	E	
DEPTH (m)	100		
Press.	Temp.	Salinity	Sigma-T
5	11.3479	32.7663	24.9744
10	11.2948	32.7593	24.9785
20	10.2215	32.8621	25.2457
30	7.7749	33.0905	25.807
40	6.68	33.1187	25.9795
50	6.3874	33.2417	26.1145
75	6.7498	33.5292	26.2939
95	6.0667	33.4783	26.3419

STATION US16313			
LATITUDE	41-57.5	N	
LONGITUDE	140-58.6	E	
DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T
5	12.4876	32.6576	24.6781
10	12.342	32.7835	24.8035
20	12.0525	32.9505	24.9877
30	8.7307	32.662	25.3293
40	7.6828	32.8788	25.6538
50	6.4814	33.0527	25.9534
75	6.1219	33.3881	26.2638
77	5.9464	33.3685	26.2702

STATION US16316			
LATITUDE	41-04.8	N	
LONGITUDE	141-01.2	E	
DEPTH (m)	47		
Press.	Temp.	Salinity	Sigma-T
5	16.3041	33.0647	24.1904
10	16.1773	33.0957	24.2431
20	13.8927	33.3897	24.9651
30	11.7291	33.3232	25.3374
40	10.0474	33.3771	25.6769
43	10.0386	33.3984	25.695

STATION US16305			
LATITUDE	41-40.6	N	
LONGITUDE	140-47.1	E	
DEPTH (m)	228		
Press.	Temp.	Salinity	Sigma-T
5	14.6843	34.2093	25.4308
10	14.3896	34.2131	25.4968
20	14.013	34.2078	25.5722
30	13.3157	34.1857	25.6986
40	12.5008	34.1726	25.8502
50	12.3774	34.1746	25.8757
75	12.0517	34.1656	25.9312
100	12.0042	34.1713	25.9446
125	11.3684	34.1578	26.0528
150	11.0333	34.1418	26.1013
175	11.033	34.1463	26.1047
200	10.7292	34.1354	26.1505
210	10.4503	34.1353	26.1993

STATION US16308			
LATITUDE	42-22.5	N	
LONGITUDE	141-28.2	E	
DEPTH (m)	344		
Press.	Temp.	Salinity	Sigma-T
5	10.2911	32.4295	24.8966
10	10.5396	32.8733	25.2002
20	9.3701	33.3202	25.744
30	7.3272	33.1845	25.944
40	8.1	33.5413	26.1135
50	9.027	33.7864	26.1635
75	8.5498	33.7798	26.2329
100	7.9883	33.6938	26.2496
125	6.8782	33.6322	26.3578
150	5.7544	33.5094	26.4051
175	4.9578	33.4387	26.4423
200	4.6147	33.4389	26.4802
250	3.631	33.3958	26.5464
300	3.7395	33.5111	26.6276
327	3.6465	33.5773	26.6894

STATION US16311			
LATITUDE	41-58.7	N	
LONGITUDE	141-00.6	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	11.6328	32.9716	25.0821
10	11.5541	32.9751	25.0992
20	9.7913	32.913	25.3572
30	6.4799	32.9093	25.8404
40	7.1234	33.2702	26.0395
50	6.0069	33.2164	26.1425
75	6.5386	33.5088	26.3057
92	5.4792	33.4568	26.3965

STATION US16314			
LATITUDE	42-00.8	N	
LONGITUDE	140-58.8	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	12.5885	32.7533	24.7329
10	11.8745	32.8206	24.9202
20	10.5288	33.2596	25.5031
30	7.5912	33.02	25.7776
40	7.1993	33.2527	26.0153
50	6.4079	33.2403	26.1107
75	6.198	33.4617	26.3123
80	5.6669	33.448	26.3671

STATION US16317			
LATITUDE	41-10.5	N	
LONGITUDE	141-10.2	E	
DEPTH (m)	30		
Press.	Temp.	Salinity	Sigma-T
5	16.0374	33.032	24.2258
10	14.4324	33.2075	24.7116
20	12.2276	33.2722	25.2043
26	11.1741	33.2711	25.3983

STATION US16306			
LATITUDE	41-42.7	N	
LONGITUDE	140-45.3	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	14.2765	34.1928	25.5051
10	14.223	34.195	25.5182
20	13.685	34.1648	25.607
30	13.373	34.1658	25.6716
40	12.9656	34.1526	25.7432
50	12.2306	34.1634	25.8953
70	11.623	34.136	25.9889

STATION US16309			
LATITUDE	42-20.5	N	
LONGITUDE	141-23.7	E	
DEPTH (m)	400		
Press.	Temp.	Salinity	Sigma-T
5	10.7009	32.3876	24.794
10	10.3936	32.6394	25.0429
20	8.5657	32.6558	25.3495
30	9.7859	33.532	25.8415
40	6.7325	33.1344	25.985
50	7.5213	33.43	26.1098
75	8.7657	33.8306	26.2393
100	7.0438	33.6203	26.326
101	7.1011	33.6374	26.3316

STATION US16312			
LATITUDE	41-58.1	N	
LONGITUDE	140-59.6	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	12.1296	33.0004	25.012
10	11.8979	32.9998	25.0549
20	9.6115	32.8983	25.375
30	7.5294	33.0035	25.7733
40	6.3411	33.0018	25.9311
50	6.1703	33.1872	26.099
75	6.2863	33.447	26.2895
82	5.848	33.4522	26.3485

STATION US16315			
LATITUDE	41-06.0	N	
LONGITUDE	140-50.8	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	15.789	33.2314	24.435
10	15.5785	33.3325	24.5596
20	13.0359	33.5053	25.228
30	12.745	33.6195	25.3737
40	12.7014	33.8152	25.5339
48	12.1861	33.8982	25.6985

STATION US16318			
LATITUDE	41-03.7	N	
LONGITUDE	140-56.2	E	
DEPTH (m)	37		
Press.	Temp.	Salinity	Sigma-T
5	16.3967	33.0249	24.1387
10	16.2855	33.027	24.1656
20	12.1391	33.2273	25.1863
30	11.4826	33.4157	25.4548
33	11.5232	33.4958	25.5096

STATION	US16319		
LATITUDE	41-03.7	N	
LONGITUDE	140-52.2	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	16.237	33.186	24.299
10	15.7796	33.281	24.4752
20	14.3535	33.6572	25.0752
30	12.698	33.502	25.2919
40	12.1401	33.6789	25.5365
46	11.7097	33.7266	25.6545

STATION	US16322		
LATITUDE	41-07.2	N	
LONGITUDE	140-39.7	E	
DEPTH (m)	48		
Press.	Temp.	Salinity	Sigma-T
5	15.8035	33.4266	24.5818
10	15.7409	33.4613	24.6225
20	15.5177	33.6617	24.8265
30	15.47	33.6815	24.8524
40	14.2967	33.84	25.2285
44	13.7171	33.9152	25.4074

STATION	US16325		
LATITUDE	41-11.6	N	
LONGITUDE	140-41.1	E	
DEPTH (m)	68		
Press.	Temp.	Salinity	Sigma-T
5	15.4891	33.6047	24.789
10	15.2611	33.6584	24.8807
20	14.8998	33.7343	25.018
30	14.4794	33.8338	25.185
40	13.9185	33.9268	25.3747
50	12.8984	34.0473	25.675
64	12.4137	34.0866	25.8004

STATION	US16328		
LATITUDE	41-12.4	N	
LONGITUDE	140-44.0	E	
DEPTH (m)	70		
Press.	Temp.	Salinity	Sigma-T
5	15.3502	33.6541	24.8577
10	15.2575	33.6592	24.8821
20	14.2014	33.7819	25.2037
30	13.9376	33.965	25.4002
40	13.3865	34.1026	25.6199
50	12.698	34.0063	25.6828
66	12.9665	34.0975	25.7004

STATION	US16331		
LATITUDE	41-16.6	N	
LONGITUDE	140-40.2	E	
DEPTH (m)	142		
Press.	Temp.	Salinity	Sigma-T
5	15.2234	33.7074	24.9267
10	15.0779	33.7564	24.9962
20	14.8406	33.7945	25.0772
30	14.1729	33.8806	25.2859
40	13.9572	33.8854	25.3347
50	13.3164	33.9502	25.5162
75	11.969	34.0638	25.8678
100	11.9051	34.0688	25.8838
125	11.6758	34.0769	25.9331
134	11.4662	34.0865	25.9792

STATION	US16320		
LATITUDE	40-58.9	N	
LONGITUDE	140-45.7	E	
DEPTH (m)	51		
Press.	Temp.	Salinity	Sigma-T
5	16.1673	33.1803	24.3104
10	15.9386	33.2339	24.4033
20	14.5925	33.5952	24.9768
30	14.6321	33.9813	25.2661
40	13.7177	33.9293	25.4182
47	13.3568	33.9266	25.4897

STATION	US16323		
LATITUDE	41-11.3	N	
LONGITUDE	140-40.0	E	
DEPTH (m)	40		
Press.	Temp.	Salinity	Sigma-T
5	15.6015	33.5924	24.7546
10	15.0459	33.6614	24.9301
20	14.8285	33.7296	25.0297
30	14.592	33.7779	25.1178
36	14.1333	33.8544	25.274

STATION	US16326		
LATITUDE	41-11.9	N	
LONGITUDE	140-42.0	E	
DEPTH (m)	74		
Press.	Temp.	Salinity	Sigma-T
5	15.592	33.5287	24.7076
10	15.2963	33.6571	24.8719
20	14.7083	33.7394	25.0632
30	14.6	33.8173	25.1465
40	13.9883	33.9218	25.3563
50	13.4565	34.0049	25.5301
70	12.4249	34.089	25.8001

STATION	US16329		
LATITUDE	41-12.6	N	
LONGITUDE	140-44.4	E	
DEPTH (m)	68		
Press.	Temp.	Salinity	Sigma-T
5	15.4703	33.623	24.8073
10	14.9876	33.7158	24.9846
20	14.5328	33.7677	25.1226
30	13.9868	33.9844	25.4051
40	13.0603	33.9553	25.5716
50	12.9478	34.0333	25.6544
64	13.0834	34.096	25.6759

STATION	US16332		
LATITUDE	42-09.8	N	
LONGITUDE	140-36.0	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	11.837	31.508	23.908
5	18.5752	31.739	22.6361
10	18.4479	31.8023	22.7157
20	17.8182	32.1002	23.0963
30	14.5877	32.3454	24.0139
40	12.0133	32.9731	25.0126
50	8.9355	32.8892	25.4756
69	6.4523	33.1343	26.0215

STATION	US16321		
LATITUDE	41-07.9	N	
LONGITUDE	140-40.6	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	16.0164	32.9707	24.1834
10	15.9062	33.002	24.2323
20	14.847	33.5142	24.8596
30	13.8936	34.079	25.4975
40	13.4441	34.1013	25.6072
50	12.7769	34.0597	25.7086
54	12.0103	33.9088	25.7396

STATION	US16324		
LATITUDE	41-11.5	N	
LONGITUDE	140-42.5	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	15.4688	33.6069	24.7952
10	15.1169	33.6825	24.9309
20	14.8338	33.7543	25.0477
30	14.5025	33.7977	25.1522
40	13.6249	33.9744	25.4721
50	12.6999	34.0562	25.7211
53	12.2904	34.0809	25.8198

STATION	US16327		
LATITUDE	41-12.0	N	
LONGITUDE	140-43.1	E	
DEPTH (m)	71		
Press.	Temp.	Salinity	Sigma-T
5	16.2332	33.4177	24.4777
10	15.4381	33.6099	24.8043
20	15.1043	33.6851	24.9356
30	14.5577	33.7482	25.1022
40	13.8024	33.9443	25.4123
50	12.4487	34.0116	25.7354
67	12.0853	33.9617	25.7665

STATION	US16330		
LATITUDE	41-13.1	N	
LONGITUDE	140-45.7	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	15.92	33.4546	24.5771
10	15.3944	33.6121	24.8156
20	14.1701	33.8753	25.2824
30	13.5568	34.0204	25.5216
40	13.3737	34.035	25.5702
50	13.4108	34.0791	25.5968
59	13.2985	34.0809	25.6209

STATION	US16333		
LATITUDE	42-10.8	N	
LONGITUDE	140-35.9	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	18.7592	31.6763	22.5427
10	18.5075	31.798	22.6978
20	17.3954	32.0113	23.129
30	15.3658	32.7536	24.1609
40	11.7479	32.9713	25.0607
50	9.8916	33.0123	25.4182
75	7.1344	33.5105	26.2271

STATION US16334			
LATITUDE	42-13.8	N	
LONGITUDE	140-30.1	E	
DEPTH (m)	76		
Press.	Temp.	Salinity	Sigma-T
5	18.9013	31.6144	22.4602
10	18.5552	31.7828	22.6745
20	18.473	31.8481	22.7445
30	16.813	32.8379	23.899
40	12.0973	32.8622	24.9109
50	9.452	32.9192	25.4173
73	6.7265	33.3197	26.1319

STATION US16337			
LATITUDE	42-21.0	N	
LONGITUDE	140-36.3	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	18.8578	31.7756	22.594
10	18.6028	31.7305	22.6228
20	18.5213	31.8334	22.7215
30	17.5801	32.7908	23.6821
40	12.2981	32.5897	24.6616
50	11.0892	33.0132	25.2127
75	7.7037	33.5838	26.2048
83	5.8036	33.4325	26.3386

STATION US16340			
LATITUDE	42-17.5	N	
LONGITUDE	140-53.7	E	
DEPTH (m)	55		
Press.	Temp.	Salinity	Sigma-T
5	18.4891	32.0571	22.9003
10	18.4578	32.065	22.914
20	18.3159	32.1679	23.0274
30	17.5484	32.7726	23.6757
40	14.9128	33.0802	24.5109
50	13.3259	33.4186	25.1029
53	12.6163	33.4388	25.259

STATION US16335			
LATITUDE	42-16.7	N	
LONGITUDE	140-35.9	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	18.8313	31.6149	22.478
10	18.0828	31.9061	22.884
20	16.8565	32.6649	23.7563
30	14.9267	32.9089	24.3758
40	12.2068	33.1422	25.1074
50	10.6929	33.2563	25.4718
75	7.9903	33.5537	26.1394
87	5.4011	33.434	26.3876

STATION US16338			
LATITUDE	42-25.8	N	
LONGITUDE	140-37.3	E	
DEPTH (m)	82		
Press.	Temp.	Salinity	Sigma-T
5	18.7317	31.695	22.5638
10	18.3757	31.8375	22.7603
20	18.3368	31.9542	22.859
30	17.7387	32.0789	23.0991
40	14.1858	32.6318	24.3185
50	10.4596	32.8537	25.1986
75	7.7866	33.5791	26.1891
79	7.4118	33.553	26.2221

STATION US16336			
LATITUDE	42-19.0	N	
LONGITUDE	140-30.8	E	
DEPTH (m)	91		
Press.	Temp.	Salinity	Sigma-T
5	19.246	31.4163	22.2228
10	18.5583	31.7802	22.6718
20	18.4858	31.8185	22.7187
30	16.2445	32.0939	23.4582
40	12.344	32.785	24.8043
50	11.1164	33.2078	25.3593
75	7.7343	33.5906	26.2056
88	5.3784	33.41	26.3714

STATION US16339			
LATITUDE	42-31.3	N	
LONGITUDE	140-37.8	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	19.1317	31.4688	22.2916
10	18.6141	31.7507	22.6354
20	17.6965	31.9618	23.0196
30	15.6965	32.3935	23.8112
40	11.7438	32.7585	24.8961
50	10.0789	32.9746	25.3573
56	9.1637	33.1933	25.6777

THE " USHIO MARU "

CRUISE 366

CRUISE 367

CRUISE 368

IN AUGUST 2016

IN SEPTEMBER 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 366

Departure from Hakodate	Aug. 3, 2016
Deploying GPS buoys	4
Observation by XBT	5
Observation by XBT	6
Start hydrographic research (US16341)	6
Retrieval GPS buoys	6
Arrival at Wakkanai	7
Departure from Wakkanai	8
Finish hydrographic research (US16353)	8
Arrival at Iwanai	9
Departure from Iwanai	10
Return to Hakodate	11
Total coverage 1341.8 miles	

Cruise 367

Departure from Hakodate	Aug. 21, 2016
Start hydrographic research (US16354)	22
Arrival at Hakodate	22
Departure from Hakodate	24
Calibration of echo sounder	24
Noise test of echo sounder	25
Retrieval ADCP mooring system	26
Arrival at Usujiri	26
Departure from Usujiri	27
Setting ADCP mooring system	27
Finish hydrographic research (US16366)	27
Arrival at and departure from Usujiri	27
Return to Hakodate	28
Total coverage 611.0 miles	

Cruise 368

Departure from Hakodate	Sep. 4, 2016
Start hydrographic research (US16367)	4
Setting CTD mooring system	4
Arrival at and departure from Hakoate	5
Finish hydrographic research (US14373)	6
Arrival at and departure from Hakodate	6
Arrival at Usujiri	6
Departure from Usujiri	7
Sampling by mud-sampler	7
Sampling by squid jigging	7
Return to Hakodate	8
Total coverage 212.6 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

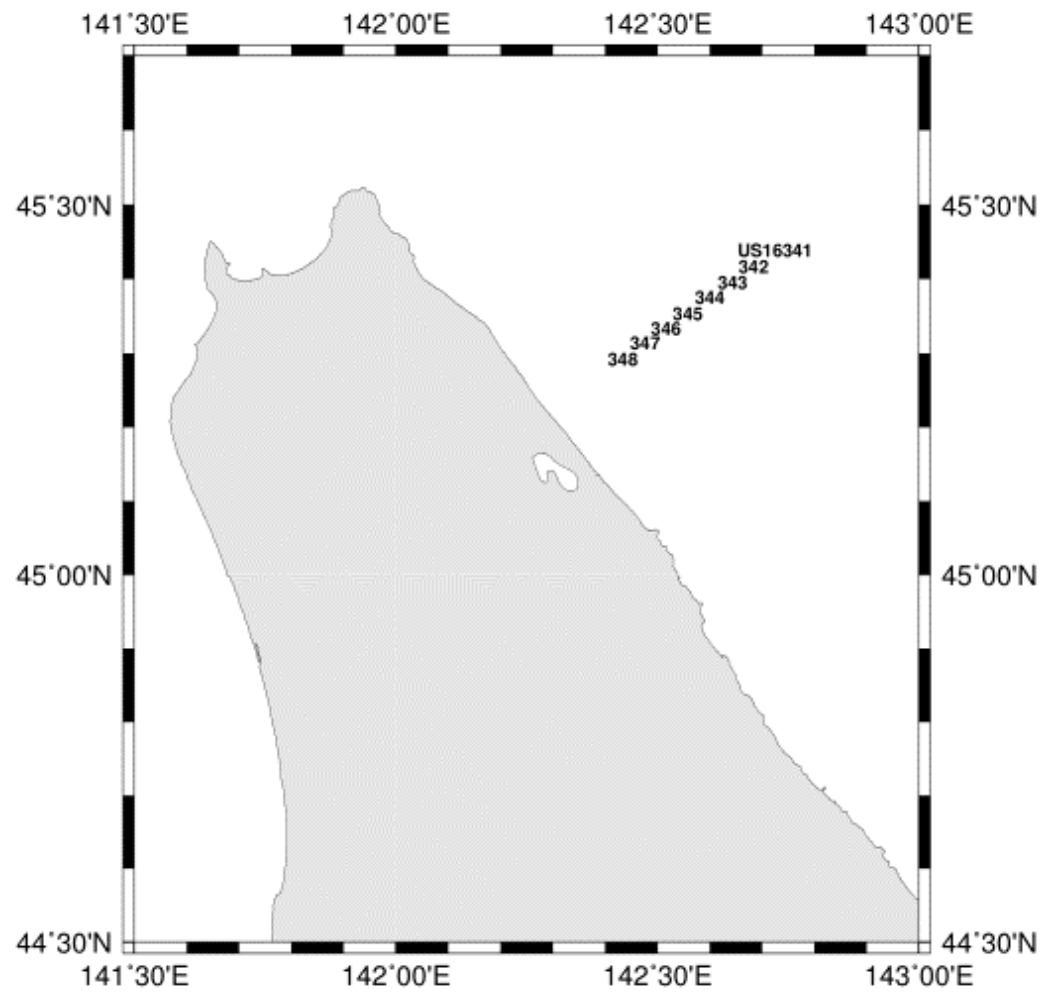


Figure 1. Oceanographic stations (Cruise 366-1)

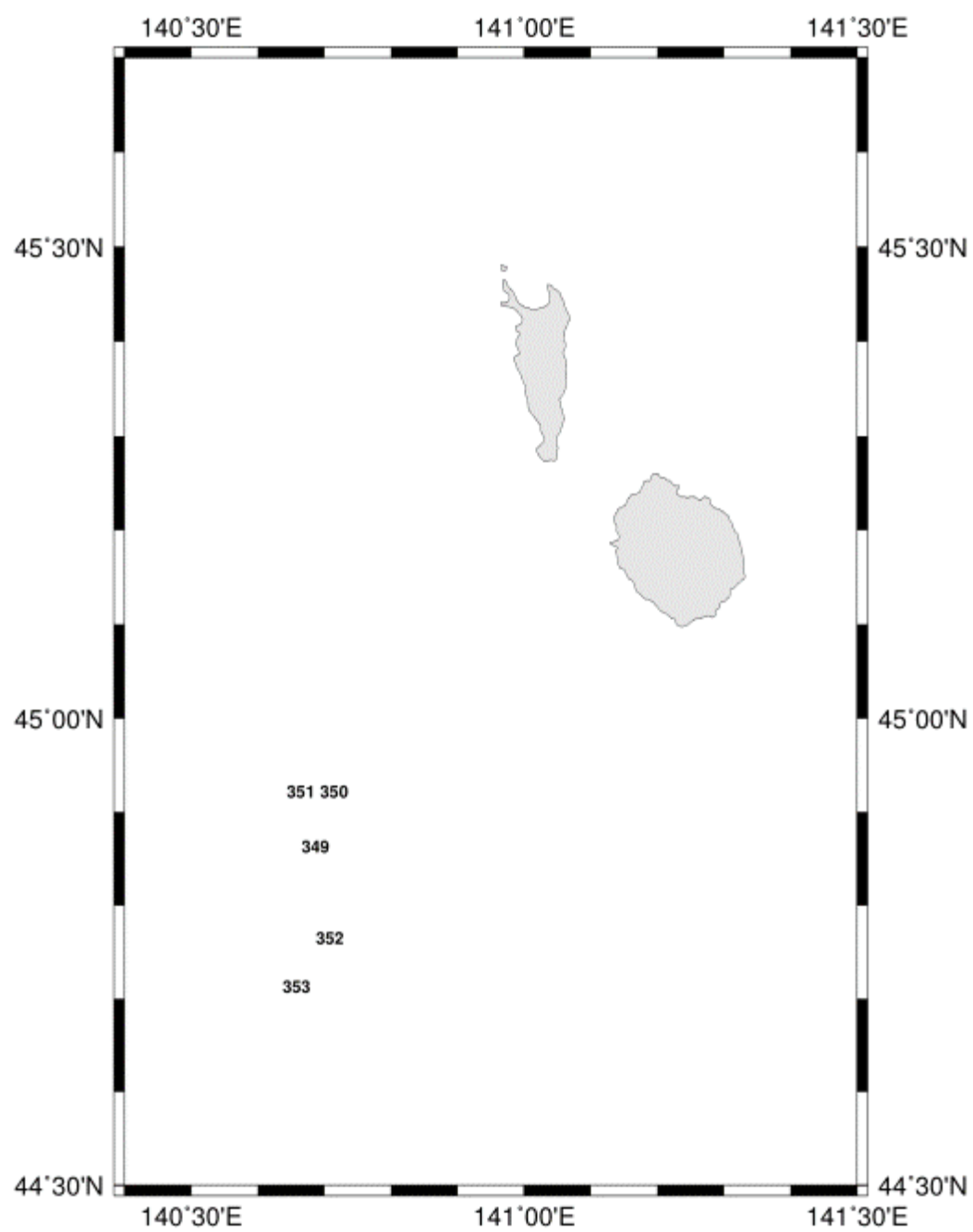


Figure 2. Oceanographic stations (Cruise 366-2)

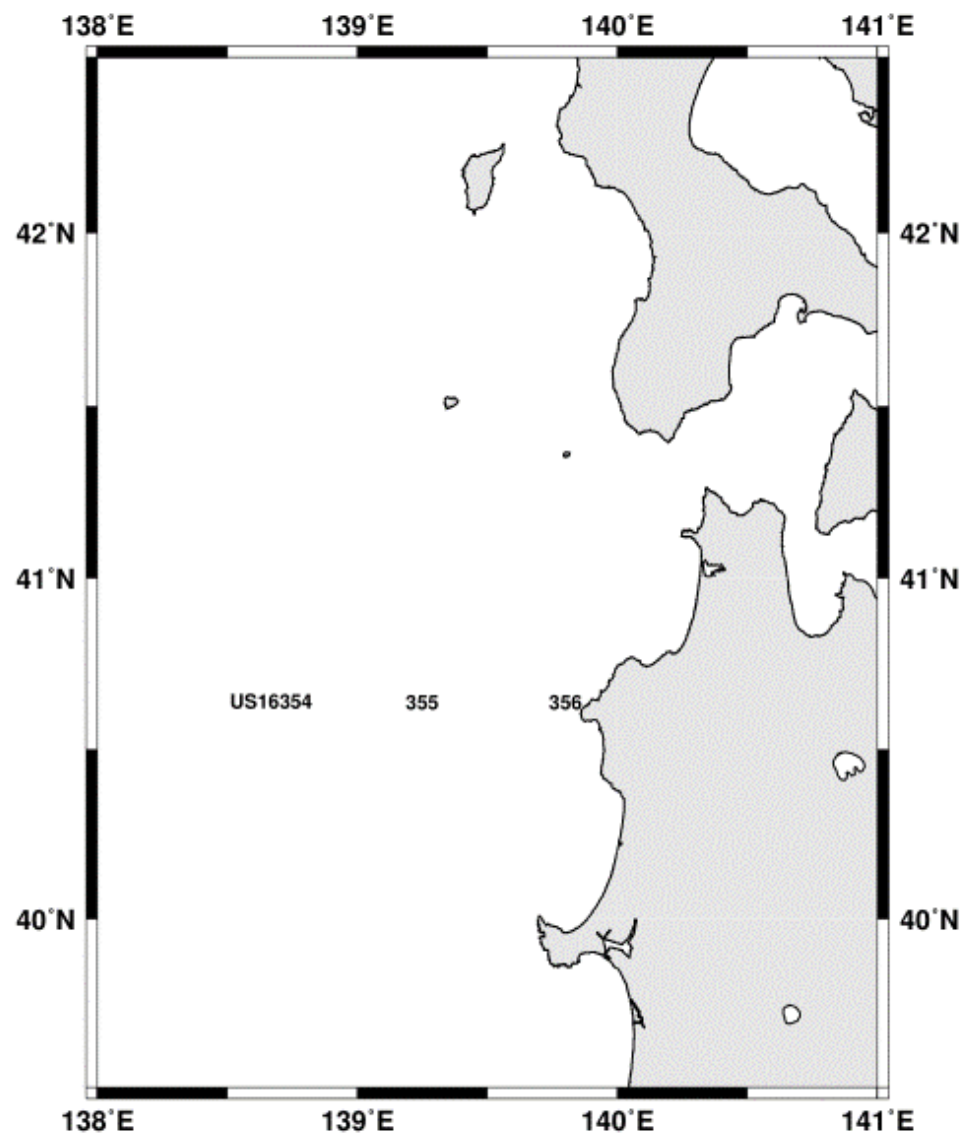


Figure 3. Oceanographic stations (Cruise 367-1)

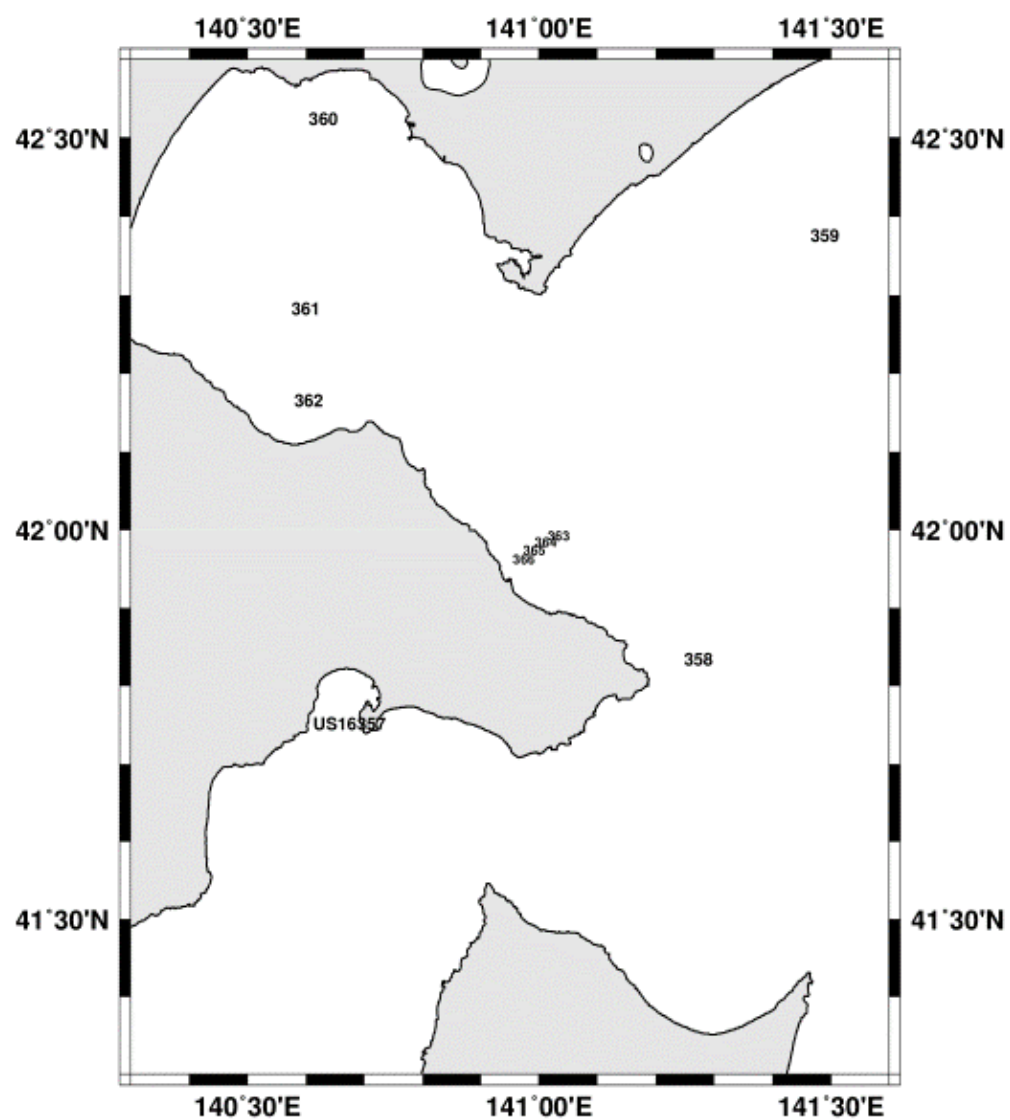


Figure 4. Oceanographic stations (Cruise 367-2)

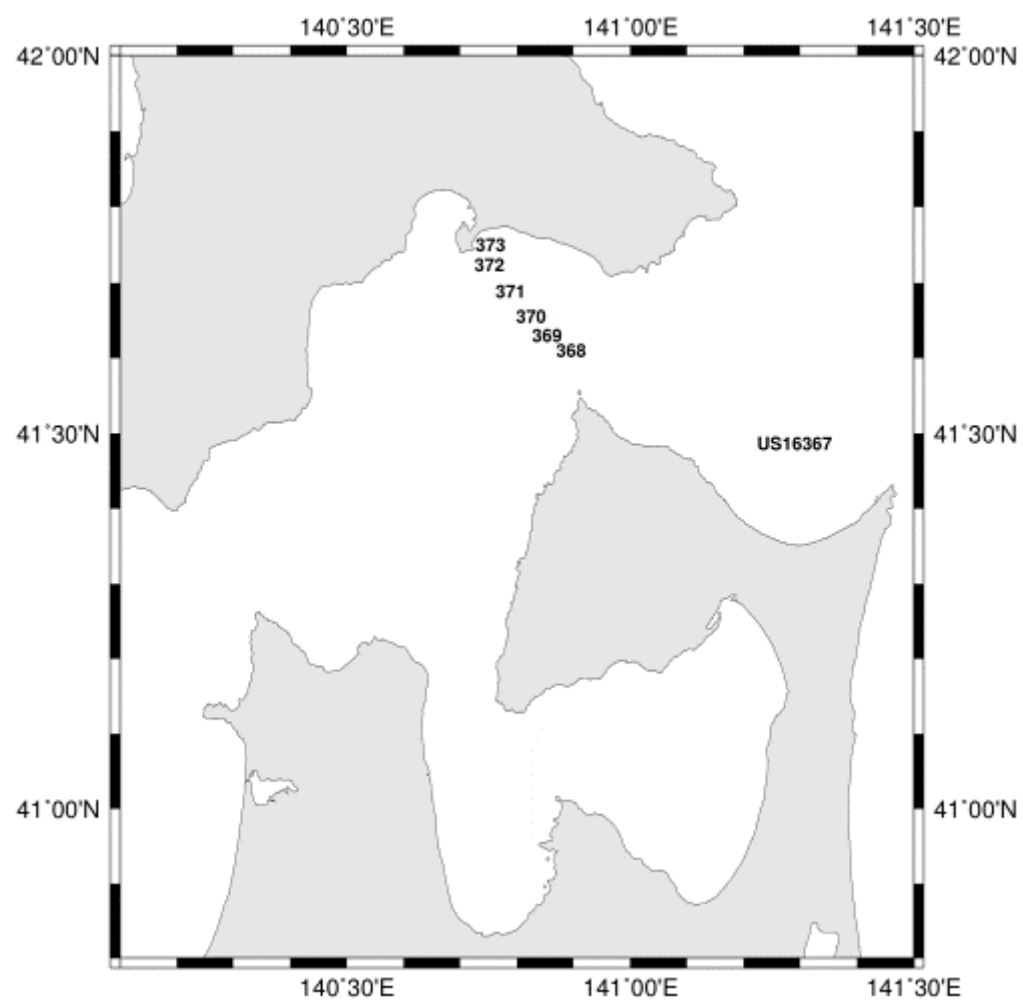


Figure 5. Oceanographic stations (Cruise 368)

able 1. List of Oceanographic Station

Cruise 366												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16341	45-25.8	142-43.5	8/6	0538-0545	105	WSW-2	WNW-1	WSW-4	16.7	15.6	bc	1009.6
US16342	45-24.5	142-41.0	8/6	0600-0607	98	WSW-2	WNW-1	WSW-4	16.8	16.1	bc	1009.5
US16343	45-23.2	142-38.6	8/6	0622-0628	91	WSW-2	WNW-1	WSW-4	15.5	10.3	bc	1009.5
US16344	45-22.0	142-36.0	8/6	0645-0650	86	WSW-2	WNW-1	WSW-4	16.1	11.3	bc	1009.5
US16345	45-20.7	142-33.5	8/6	0706-0712	78	WSW-2	WNW-1	WSW-3	16.8	9.9	bc	1009.6
US16346	45-19.5	142-31.0	8/6	0729-0733	64	WSW-2	WNW-1	WSW-3	18.7	11.1	bc	1009.7
US16347	45-18.3	142-28.6	8/6	0751-0755	57	WSW-2	WNW-1	WSW-3	19.9	16.7	bc	1009.8
US16348	45-17.0	142-26.0	8/6	0811-0815	48	WSW-2	WNW-1	WSW-4	21	17.5	bc	1009.8
US16349	44-51.4	140-41.2	8/7	0735-0745	152	SSE-2	North-1	SSE-4	21.4	21.1	bc	1011.3
US16350	44-54.9	140-42.9	8/8	2055-2105	177	NW-2	SSW-1	NW-3	22.5	21.7	bc	1008.7
US16351	44-54.9	140-39.9	8/8	2144-2158	347	NW-2	SSW-1	NW-3	22.1	21.5	bc	1008.6
US16352	44-45.5	140-42.5	8/8	2315-2326	206	NW-1	SSW-1	NW-3	22.9	22.5	c	1008.7
US16353	44-42.4	140-39.5	8/8	2354-0008	205	NNW-1	SSW-1	NNW-3	22.4	23.1	c	1008.8

Cruise 367												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16354	40-37.2	138-40.0	8/22	0231-0254	3246	North-1	NE-1	North-2	26.9	26.4	c	1007.1
US16354-2	40-37.2	138-39.4	8/22	0301-0311	3246	North-1	NE-1	North-2	28.2	26.4	c	1007
US16354-3	40-37.2	138-39.2	8/22	0317-0328	3246	North-1	NE-1	North-2	28.2	26.4	c	1007
US16354-4	40-37.2	138-39.0	8/22	0335-0346	3230	North-1	NE-1	North-2	28.2	26.4	c	1007
US16355	40-37.0	138-14.9	8/22	0633-0700	2801	NNE-2	NE-1	NNE-3	25.6	25.6	o	1007.1
US16356	40-37.0	139-48.0	8/22	0925-0943	388	NNE-2	NW-1	NNE-4	25.8	26.7	r	1006.9
US16356-1	40-37.0	139-48.2	8/22	0947-1005	373	NNE-2	NW-1	NNE-4	25.8	26.7	r	1006.9
US16356-3	40-37.0	139-48.2	8/22	1014-1027	369	NNE-2	NW-1	NNE-4	25.8	26.7	r	1006.9
US16356-4	40-37.0	139-48.2	8/22	1027-1034	375	NNE-2	NW-1	NNE-4	25.8	26.7	r	1006.9
US16357	41-44.6	140-40.5	8/24	1004-1008	56	NW-1	South-1	NW-3	25.4	23.5	bc	1012.6
US16358	41-49.6	141-16.4	8/24	1929-1942	240	SSE-2	SE-1	SSE-3	23.1	23.2	bc	1011.8
US16359	42-22.1	141-29.4	8/25	1946-2005	363	SE-2	SE-1	SE-4	22.5	21.8	o	1005.6
US16360	42-31.0	140-37.8	8/27	0933-0941	60	North-1	SE-1	North-3	22.6	22.9	bc	1012.1
US16361	42-16.5	140-36.0	8/27	1105-1117	90	NW-1	SE-1	NW-3	23.3	22.6	b	1012.1
US16362	42-09.5	140-36.3	8/27	1238-1246	70	SW-1	East-1	SW-2	23.2	23	bc	1011.7
US16363	41-59.2	141-02.0	8/27	1457-1503	100	NW-1	ENE-1	NW-2	23.7	22.9	b	1011.4
US16364	41-58.7	141-00.7	8/27	1513-1518	93	Calm	ENE-1	Calm	24.1	23	bc	1011.2
US16365	41-58.1	140-59.5	8/27	1528-1533	85	Calm	ENE-1	Calm	24.2	23	bc	1011.3
US16366	41-57.4	140-58.4	8/27	1542-1547	78	Calm	ENE-1	Calm	24.2	23	bc	1011.2

Cruise 368												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16367	41-28.7	141-17.4	9/4	1158-1208	226	SSE-2	East-1	SSE-4	22.1	20.3	bc	1020
US16368	41-36.1	140-53.7	9/4	1440-1446	85	East-2	East-1	East-4	22	22.6	bc	1019.7
US16369	41-37.3	140-51.2	9/4	1510-1517	102	East-3	East-1	East-5	22.9	23.8	bc	1019.1
US16370	41-38.8	140-49.5	9/4	1536-1548	337	East-3	ENE-1	East-5	22.6	23.2	bc	1019.2
US16371	41-40.8	140-47.3	9/4	1608-1618	221	East-2	ENE-1	East-4	22.3	22.7	bc	1019.2
US16372	41-42.9	140-45.1	9/4	1635-1642	83	East-2	ENE-1	East-5	22.3	22.9	o	1019.3
US16373	41-44.5	140-45.2	9/6	0648-0652	56	East-2	ESE-1	East-3	23.1	23	o	1008.8

Table 2. Oceanographic data

STATION US16341			
LATITUDE 45-25.8 N			
LONGITUD 142-43.5 E			
DEPTH (m) 105			
Press.	Temp.	Salinity	Sigma-T
5	16.4704	32.1206	23.4276
10	11.3534	32.3954	24.6851
20	6.7071	33.404	26.2008
30	6.6969	33.5879	26.3471
40	6.9766	33.6669	26.3718
50	7.2063	33.7389	26.397
75	6.4825	33.6936	26.4587
96	7.2247	33.9371	26.5505

STATION US16344			
LATITUDE 45-22.0 N			
LONGITUD 142-36.0 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	6.6641	32.967	25.8619
10	1.5562	32.5711	26.0571
20	6.8152	33.6103	26.349
30	6.5727	33.5881	26.3637
40	6.9008	33.6724	26.3865
50	7.1115	33.8368	26.4871
75	7.125	33.9075	26.541
81	7.1263	33.9073	26.5406

STATION US16347			
LATITUDE 45-18.3 N			
LONGITUD 142-28.6 E			
DEPTH (m) 57			
Press.	Temp.	Salinity	Sigma-T
5	16.9482	33.8862	24.6717
10	16.333	33.8489	24.7862
20	15.7249	33.7959	24.8835
30	14.4988	33.8587	25.2001
40	11.8998	33.9155	25.7657
50	11.5909	33.9488	25.8493
52	11.4866	33.9486	25.8683

STATION US16350			
LATITUDE 44-54.9 N			
LONGITUD 140-42.9 E			
DEPTH (m) 177			
Press.	Temp.	Salinity	Sigma-T
5	21.762	33.7394	23.3262
10	21.769	33.7423	23.3266
20	19.3166	33.7871	24.0132
30	15.4693	33.8336	24.9695
40	13.5474	34.0261	25.528
50	12.2954	34.0865	25.8231
75	9.6723	34.0392	26.2566
100	8.0958	34.0358	26.5023
125	6.4174	34.0177	26.723
150	4.7839	34.0188	26.9217
168	4.3154	34.0422	26.9914

STATION US16342			
LATITUDE 45-24.5 N			
LONGITUD 142-41.0 E			
DEPTH (m) 98			
Press.	Temp.	Salinity	Sigma-T
5	11.1992	33.1751	25.3191
10	9.8738	33.2452	25.6029
20	8.8239	33.9667	26.3368
30	8.4506	33.9826	26.407
40	8.1944	33.9753	26.4401
50	8.086	33.9772	26.4578
75	7.7281	33.9826	26.5146
91	6.8244	33.9435	26.6105

STATION US16345			
LATITUDE 45-20.7 N			
LONGITUD 142-33.5 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	10.2428	33.8455	26.0091
10	9.6281	33.9603	26.2022
20	9.5207	33.9816	26.2366
30	9.4664	33.9758	26.241
40	7.4956	33.6881	26.3163
50	7.3487	33.8281	26.4473
73	7.8526	33.9698	26.4865

STATION US16348			
LATITUDE 45-17.0 N			
LONGITUD 142-26.0 E			
DEPTH (m) 48			
Press.	Temp.	Salinity	Sigma-T
5	18.5891	33.7655	24.1811
10	18.2722	33.7431	24.2427
20	16.9922	33.7423	24.5509
30	16.3676	33.777	24.723
40	14.8668	33.8237	25.0937
43	13.6237	33.8826	25.4014

STATION US16351			
LATITUDE 44-54.9 N			
LONGITUD 140-39.9 E			
DEPTH (m) 347			
Press.	Temp.	Salinity	Sigma-T
5	21.8204	33.7928	23.3507
10	21.7644	33.8	23.3717
20	18.6035	33.7962	24.201
30	15.5335	33.8484	24.9667
40	13.5629	33.9783	25.4878
50	11.7138	34.0036	25.869
75	9.4903	33.989	26.2474
100	7.9819	34.0239	26.5099
125	6.0674	34.0135	26.7647
150	5.0213	34.0268	26.9012
175	4.3283	34.0361	26.9851
200	3.8044	34.0346	27.038
250	2.7168	34.0419	27.1452
300	1.81	34.044	27.2203
321	1.3025	34.0498	27.2613

STATION US16343			
LATITUDE 45-23.2 N			
LONGITUD 142-38.6 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	9.3449	33.9875	26.2698
10	8.4218	33.8868	26.3363
20	7.974	33.9496	26.4527
30	7.8752	33.9639	26.4785
40	7.7711	33.9777	26.5045
50	7.7221	33.9739	26.5087
75	6.8276	33.9251	26.5954
85	6.79	33.923	26.5988

STATION US16346			
LATITUDE 45-19.5 N			
LONGITUD 142-31.0 E			
DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T
5	16.02	33.9226	24.9144
10	14.4125	33.7857	25.1616
20	12.0736	33.9085	25.7274
30	10.2939	33.9546	26.0855
40	9.4639	33.9797	26.2444
50	9.2011	33.9923	26.2969
60	9.1392	33.9952	26.3091

STATION US16349			
LATITUDE 44-51.4 N			
LONGITUD 140-41.2 E			
DEPTH (m) 152			
Press.	Temp.	Salinity	Sigma-T
5	19.008	31.664	22.472
5	21.1981	33.727	23.4714
10	21.1047	33.7192	23.4908
20	20.2665	33.7138	23.7109
30	16.4891	34.0321	24.8909
40	14.0181	34.053	25.4515
50	12.647	34.0876	25.7558
75	9.7051	34.0774	26.281
100	7.9626	34.0546	26.5369
125	6.1998	34.0181	26.7514
144	5.0202	34.0115	26.8892

STATION US16352			
LATITUDE 44-45.5 N			
LONGITUD 140-42.5 E			
DEPTH (m) 206			
Press.	Temp.	Salinity	Sigma-T
5	22.8321	33.709	23.0028
10	22.8412	33.7135	23.0035
20	22.3196	33.9204	23.3083
30	18.7202	34.1563	24.447
40	15.264	34.2288	25.3194
50	12.4433	34.0569	25.7716
75	10.9585	34.1177	26.0959
100	9.4696	34.0977	26.3357
125	7.2806	33.9939	26.5873
150	5.7325	34.0206	26.812
175	4.4729	34.027	26.9624
188	3.5808	34.0352	27.0605

STATION	US16353		
LATITUDE	44-42.4	N	
LONGITUD	140-39.5	E	
DEPTH (m)	205		
Press.	Temp.	Salinity	Sigma-T
5	23.2887	33.8659	22.9906
10	23.2918	33.8622	22.9869
20	21.3145	34.0629	23.6951
30	17.6878	34.1149	24.6703
40	15.0411	34.2262	25.3663
50	13.2357	34.2751	25.784
75	10.2961	34.1119	26.2078
100	9.0234	34.0862	26.3988
125	7.221	34.0041	26.6037
150	5.63	34.0252	26.8281
175	4.3652	34.0355	26.9808
200	3.2555	34.045	27.0993
203	3.1658	34.0403	27.1039

STATION	US16356		
LATITUDE	40-37.0	N	
LONGITUD	139-48.0	E	
DEPTH (m)	388		
Press.	Temp.	Salinity	Sigma-T
5	26.6289	33.33	21.5777
10	26.5432	33.3716	21.6359
20	24.0511	33.9253	22.8128
30	21.9693	34.1487	23.5797
40	20.4521	34.2757	24.0898
50	17.9789	34.2842	24.729
75	15.1056	34.3276	25.4304
100	13.2796	34.2354	25.7444
125	11.6499	34.1788	26.0171
150	10.3138	34.1311	26.2198
175	8.4943	34.0891	26.4839
200	5.9547	34.0357	26.7963
202	5.8633	34.0359	26.8079

STATION	US16359		
LATITUDE	42-22.1	N	
LONGITUD	141-29.4	E	
DEPTH (m)	363		
Press.	Temp.	Salinity	Sigma-T
5	21.9127	32.3461	22.2268
10	21.1614	32.8971	22.8503
20	16.4856	33.5144	24.494
30	13.6971	33.6339	25.1939
40	13.0164	33.8314	25.4843
50	12.1746	33.8704	25.6786
75	10.3185	33.9143	26.0498
100	9.3258	33.892	26.1983
125	7.0453	33.6167	26.3229
150	5.1991	33.4503	26.424
175	4.6258	33.4533	26.4904
200	3.979	33.4363	26.5444
250	3.731	33.4678	26.594
300	3.6256	33.5599	26.6776
327	3.7903	33.6375	26.7233

STATION	US16362		
LATITUDE	42-09.5	N	
LONGITUD	140-36.3	E	
DEPTH (m)	70		
Press.	Temp.	Salinity	Sigma-T
5	22.6852	31.5532	21.4107
10	22.5118	31.5645	21.4679
20	19.5197	32.2057	22.7552
30	13.4982	32.811	24.5983
40	10.6236	32.9998	25.2842
50	8.765	33.1273	25.6884
60	7.8197	33.3253	25.9849

STATION	US16354		
LATITUDE	40-37.2	N	
LONGITUD	138-40.0	E	
DEPTH (m)	3246		
Press.	Temp.	Salinity	Sigma-T
5	26.5314	33.8926	22.0321
10	26.3945	33.8717	22.0593
20	21.9962	34.1086	23.5417
30	18.5379	34.2945	24.5984
40	16.7239	34.4387	25.1485
50	15.323	34.3887	25.4295
75	13.1	34.2746	25.8109
100	11.5715	34.1779	26.031
125	10.146	34.1468	26.2608
150	7.4635	34.0593	26.6129
175	4.3921	33.9562	26.9148
200	3.1566	34.0068	27.078
250	1.7791	34.0292	27.2106
300	1.3617	34.0415	27.2505
302	1.3528	34.0426	27.2521

STATION	US16357		
LATITUDE	41-44.6	N	
LONGITUD	140-40.5	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	23.3006	33.7134	22.8717
10	22.114	33.9251	23.3694
20	18.518	34.0843	24.4427
30	15.8106	34.1382	25.1276
40	15.1147	34.1477	25.2897
50	13.0591	34.1527	25.7247
52	12.8241	34.1536	25.7721

STATION	US16360		
LATITUDE	42-31.0	N	
LONGITUD	140-37.8	E	
DEPTH (m)	60		
Press.	Temp.	Salinity	Sigma-T
5	22.9571	31.2359	21.0939
10	22.5995	31.591	21.4634
20	17.0108	32.322	23.4572
30	13.6862	33.1357	24.8111
40	10.9231	33.2446	25.4224
50	10.4214	33.5275	25.7304
55	9.4394	33.6453	25.9871

STATION	US16363		
LATITUDE	41-59.2	N	
LONGITUD	141-02.0	E	
DEPTH (m)	100		
Press.	Temp.	Salinity	Sigma-T
5	22.1921	31.4793	21.4921
10	21.7264	31.8579	21.9074
20	17.398	33.2022	24.0406
30	14.7477	33.6757	25.0056
40	11.8322	33.641	25.5652
50	12.0463	33.9075	25.7318
75	10.2713	33.9138	26.0576
89	9.6224	33.8806	26.1409

STATION	US16355		
LATITUDE	40-37.0	N	
LONGITUD	138-14.9	E	
DEPTH (m)	2801		
Press.	Temp.	Salinity	Sigma-T
5	25.8022	33.8074	22.1951
10	25.7087	33.84	22.2485
20	21.4336	34.0791	23.6749
30	18.8198	34.2894	24.5237
40	17.017	34.3903	25.0423
50	15.7306	34.3475	25.3067
75	13.9406	34.3183	25.6727
100	12.6863	34.2208	25.8513
125	11.7237	34.134	25.9685
150	11.336	34.1478	26.0509
175	10.6309	34.1287	26.1626
200	8.8193	34.0836	26.429
250	4.0713	34.0096	26.991
300	2.0763	34.02	27.1806
302	2.0204	34.0225	27.187

STATION	US16358		
LATITUDE	41-49.6	N	
LONGITUD	141-16.4	E	
DEPTH (m)	240		
Press.	Temp.	Salinity	Sigma-T
5	23.2071	31.5537	21.2633
10	22.6421	32.055	21.8029
20	18.4464	32.9322	23.579
30	14.0346	33.3509	24.9057
40	13.0901	33.5612	25.2604
50	10.8637	33.3906	25.5465
75	11.3711	34.0323	25.9546
100	9.5532	33.8644	26.1396
125	8.4409	33.7553	26.2303
150	5.7927	33.5122	26.4026
175	4.2809	33.4563	26.5295
200	3.8631	33.4709	26.5835
216	3.7348	33.4911	26.6123

STATION	US16361		
LATITUDE	42-16.5	N	
LONGITUD	140-36.0	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	22.7117	31.5544	21.4041
10	22.6471	31.5046	21.3846
20	20.5524	31.9586	22.2991
30	16.3827	32.755	23.9346
40	11.5735	32.9745	25.0952
50	9.2807	33.1479	25.6235
75	7.2481	33.6272	26.3032
85	6.4099	33.5491	26.3541

STATION	US16364		
LATITUDE	41-58.7	N	
LONGITUD	141-00.7	E	
DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T
5	22.5217	31.4509	21.379
10	22.3918	31.5577	21.4961
20	18.1138	33.1638	23.8382
30	14.4899	33.6628	25.0507
40	12.9617	33.8745	25.5285
50	11.4732	33.8353	25.7826
75	9.7857	33.877	26.111
86	9.328	33.8746	26.1844

STATION	US16365		
LATITUDE	41-58.1	N	
LONGITUD	140-59.5	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	22.4582	31.4737	21.414
10	22.3219	31.5223	21.4888
20	19.6105	33.0582	23.382
30	14.1682	33.1979	24.7598
40	12.994	33.89	25.5342
50	11.239	33.8917	25.8694
75	9.5745	33.8827	26.1505
80	8.869	33.8322	26.2243

STATION	US16366		
LATITUDE	41-57.4	N	
LONGITUD	140-58.4	E	
DEPTH (m)	78		
Press.	Temp.	Salinity	Sigma-T
5	22.5217	31.5192	21.4307
10	22.3728	31.5789	21.5175
20	19.9733	32.4598	22.8318
30	14.1542	33.0405	24.6411
40	12.7424	33.8511	25.5537
50	11.0944	33.8988	25.9011
74	7.4758	33.6485	26.2881

STATION	US16367		
LATITUDE	41-28.7	N	
LONGITUD	141-17.4	E	
DEPTH (m)	226		
Press.	Temp.	Salinity	Sigma-T
5	20.0934	33.5806	23.6549
10	19.3919	33.6671	23.9028
20	18.1424	33.9173	24.408
30	18.1321	34.0458	24.5089
40	18.0461	34.059	24.5401
50	17.8319	34.07	24.6009
75	14.4332	34.0984	25.399
100	13.093	34.1678	25.7296
125	12.938	34.1687	25.7612
150	12.3955	34.1646	25.8645
175	11.1607	34.1528	26.0867
200	10.7234	34.1422	26.1568
207	10.6994	34.1465	26.1644

STATION	US16368		
LATITUDE	41-36.1	N	
LONGITUD	140-53.7	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	23.7166	33.8757	22.8736
10	23.1539	33.8665	23.0298
20	19.8084	34.0002	24.0494
30	18.0283	34.0901	24.5683
40	17.8353	34.1193	24.6379
50	17.4405	34.1326	24.7436
74	15.93	34.1158	25.0839

STATION	US16369		
LATITUDE	41-37.3	N	
LONGITUD	140-51.2	E	
DEPTH (m)	102		
Press.	Temp.	Salinity	Sigma-T
5	23.5393	33.9213	22.9599
10	23.4428	33.9342	22.9977
20	20.214	34.0757	24.0005
30	16.4366	34.162	25.0029
40	16.2365	34.1928	25.0726
50	14.1032	34.171	25.5248
75	12.3499	34.175	25.8813
95	12.0016	34.1983	25.9661

STATION	US16370		
LATITUDE	41-38.8	N	
LONGITUD	140-49.5	E	
DEPTH (m)	337		
Press.	Temp.	Salinity	Sigma-T
5	21.8687	33.9412	23.45
10	20.6132	34.0109	23.8451
20	17.2985	34.1929	24.8238
30	16.516	34.2536	25.0548
40	16.3953	34.2788	25.1022
50	16.0277	34.2721	25.1814
75	12.9526	34.2182	25.7966
100	11.3021	34.1754	26.0786
125	10.6572	34.1577	26.1806
150	10.1284	34.1451	26.2625
175	10.0118	34.1346	26.2741
200	9.2312	34.1044	26.3797
250	9.0375	34.1129	26.4175
261	9.0527	34.1112	26.4137

STATION	US16371		
LATITUDE	41-40.8	N	
LONGITUD	140-47.3	E	
DEPTH (m)	221		
Press.	Temp.	Salinity	Sigma-T
5	22.8293	33.9283	23.1699
10	22.5461	33.9019	23.2303
20	21.2031	33.9496	23.6393
30	19.4157	33.9488	24.1114
40	17.3127	34.0028	24.6746
50	15.0429	34.0419	25.2239
75	11.5762	34.0979	25.9679
100	9.706	34.1088	26.3054
125	9.4706	34.1266	26.3582
150	9.4707	34.1287	26.3598
175	9.3171	34.1235	26.3808
193	9.1782	34.1197	26.4003

STATION	US16372		
LATITUDE	41-42.9	N	
LONGITUD	140-45.1	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	23.0241	33.9449	23.1267
10	22.9626	33.9485	23.147
20	22.1826	33.9595	23.3764
30	19.5836	34.0459	24.1426
40	16.0072	34.015	24.988
50	12.8083	34.0981	25.7321
75	10.8021	34.1457	26.1456
78	10.8013	34.1494	26.1486

STATION	US16373		
LATITUDE	41-44.5	N	
LONGITUD	140-45.2	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	23.2181	33.8759	23.0186
10	23.1898	33.8747	23.0259
20	23.0712	33.8543	23.0445
30	20.6949	33.8462	23.6978
40	17.8046	33.9753	24.5349
50	15.2987	34.0948	25.2085
52	15.1	34.1301	25.2794

THE " USHIO MARU "

CRUISE 369

CRUISE 370

CRUISE 371

IN SEPTEMBER 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 369

Departure from Hakodate	Sep. 12, 2016
Start whales and dolphins watching research	13
Start hydrographic research (US16374)	14
Finish hydrographic research (US16375)	16
Arrival at Kushiro	16
Depart from Kushiro	17
Finish whales and dolphins watching research	18
Return to Hakodate	19
Total coverage 1005.4 miles	

Cruise 370

Departure from Hakodate	Sep. 23, 2016
Start hydrographic research (US16376)	24
Sampling by trawl net	24
Arrival at Muroran	24
Departure from Muroran	25
Sampling by trawl net	25
Arrival at Hakodate	25
Departure from Hakodate	26
Arrival at Hakodate	27
Departure from Hakodate	28
Arrival at Ominato	28
Departure from Ominato	29
Finish hydrographic research (US16426)	29
Return to Hakodate	30
Total coverage 531.8 miles	

Cruise 371

Cancelled by rough weather

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

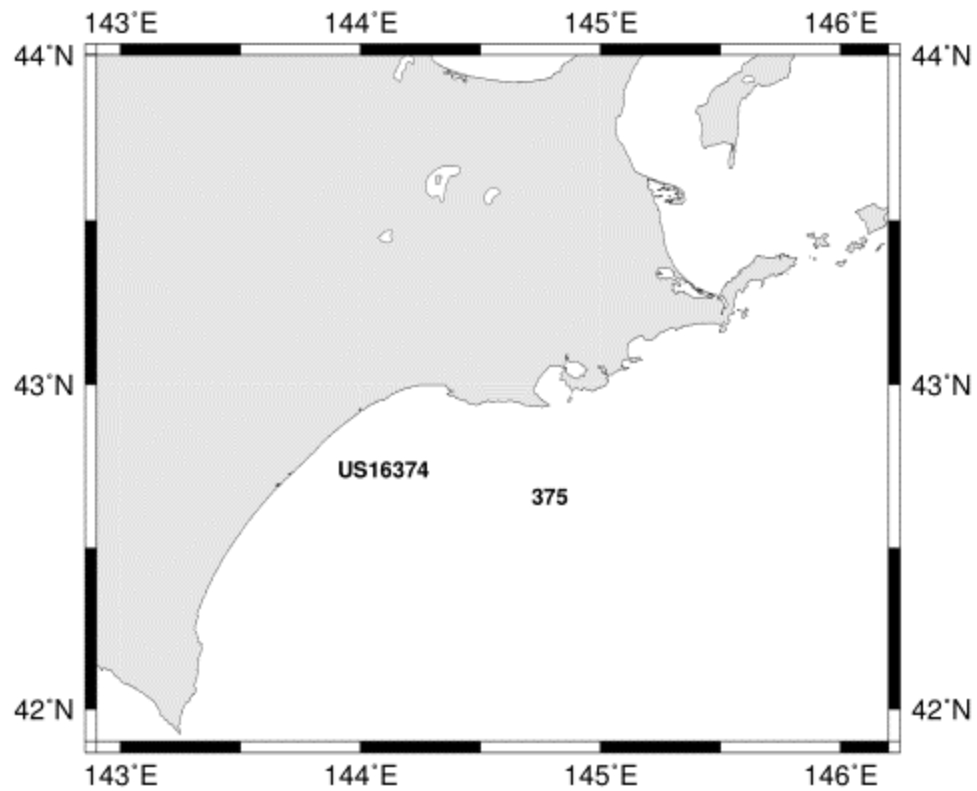


Figure 1. Oceanographic stations (Cruise 369)

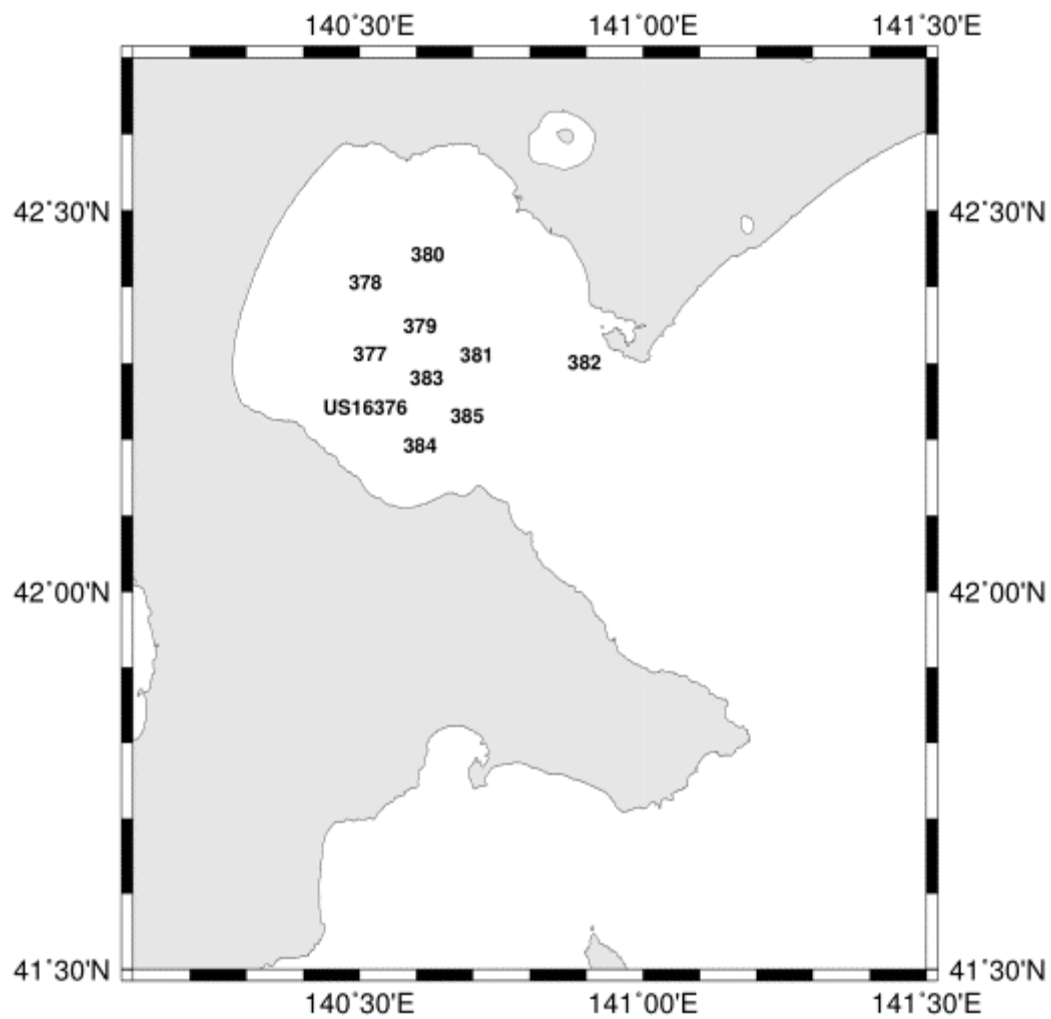


Figure 2. Oceanographic stations (Cruise 370-1)

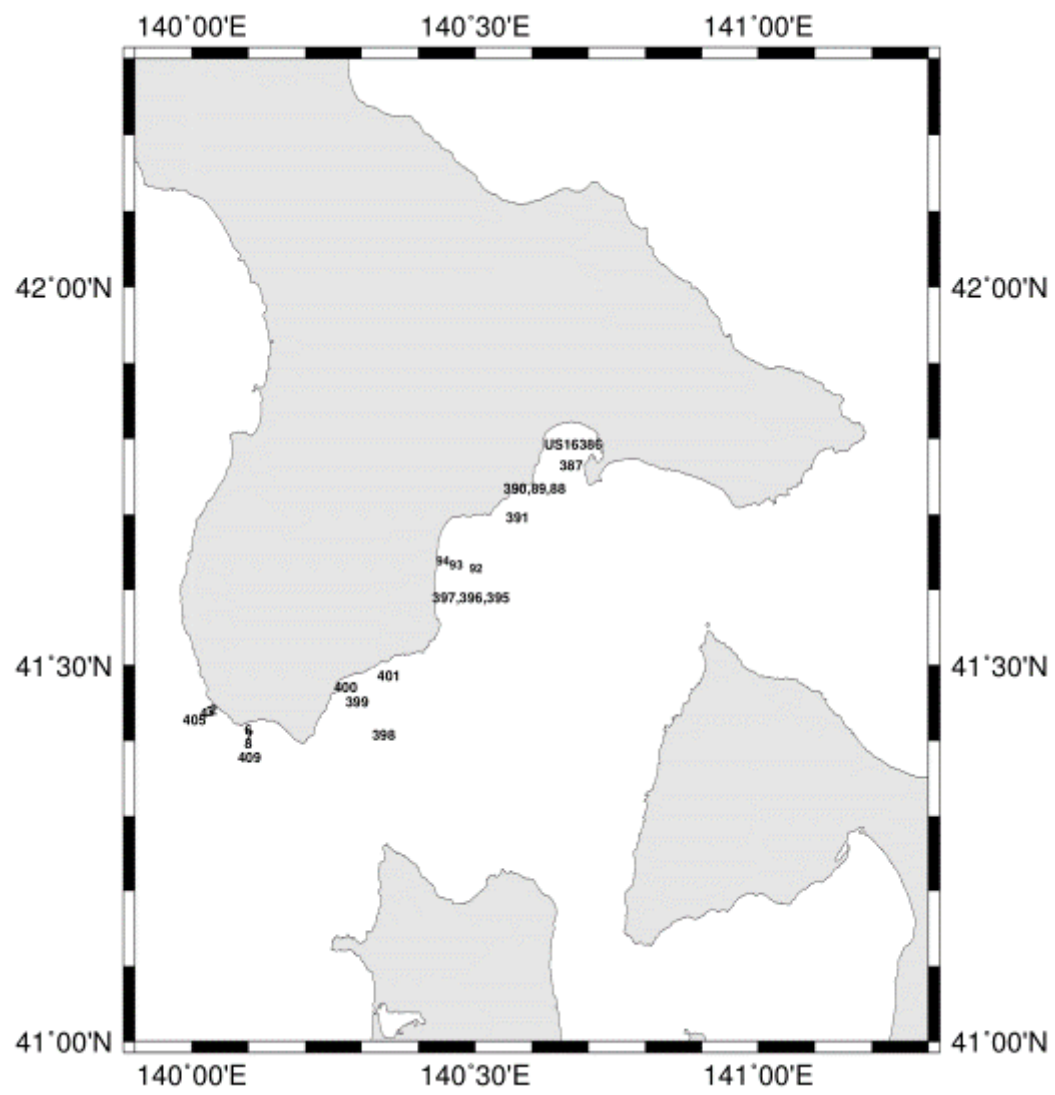


Figure 3. Oceanographic stations (Cruise 370-2)

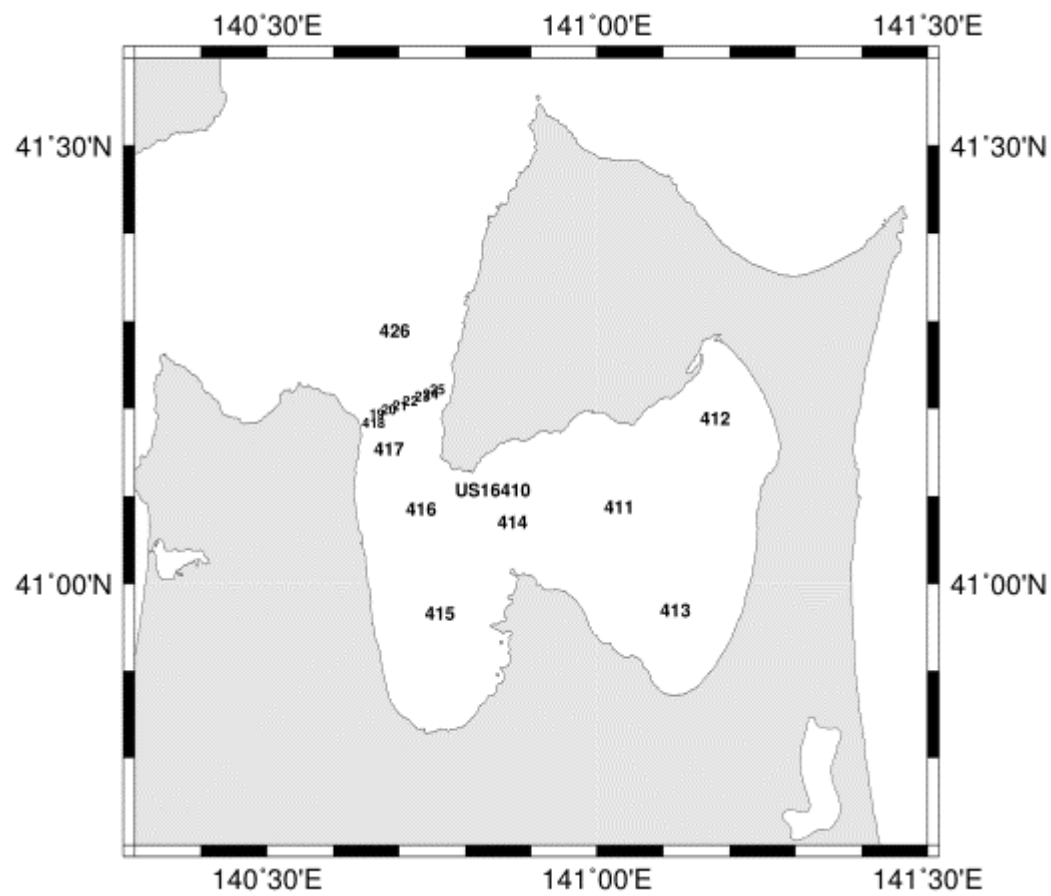


Figure 4. Oceanographic stations (Cruise 370-3)

Table 1. List of Oceanographic Station

Cruise 369												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16374	42-43.0	144-05.6	9/14	0411-0418	136	NNE-2	SE-1	NNE-3	17.6	19.6	o	1023.6
US16375	42-37.9	144-47.3	9/16	0331-0340	721	NE-3	SE-1	NE-4	19.4	20.9	o	1019.4
Cruise 370												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16376	42-14.0	140-30.6	9/24	0633-0639	79	SSW-1	ESE-1	SSW-2	18.6	20.1	bc	1020.1
US16377	42-18.2	140-31.1	9/24	0823-0828	91	West-1	ESE-1	West-2	19.7	20.4	bc	1021.2
US16378	42-23.8	140-30.6	9/24	0951-0956	93	Calm	ESE-1	Calm	20.1	20.8	bc	1020
US16379	42-20.4	140-36.4	9/24	1135-1140	86	East-1	ESE-1	East-2	20.2	21	bc	1020.2
US16380	42-26.0	140-37.2	9/24	1257-1302	82	ESE-2	ESE-1	ESE-2	22.1	21.1	bc	1020.1
US16381	42-18.1	140-42.4	9/24	1431-1435	62	SE-2	ESE-1	SE-4	20.5	20.9	bc	1020.7
US16382	42-17.5	140-53.8	9/24	1530-1534	55	ESE-2	ESE-1	ESE-4	20.9	20.1	bc	1019.9
US16383	42-16.3	140-37.1	9/25	0703-0707	88	SW-2	ESE-1	SW-2	19.7	20.4	bc	1020
US16384	42-11.0	140-36.4	9/25	0838-0843	79	NNE-2	East-1	NNE-2	20.7	20.5	bc	1019.8
US16385	42-13.3	140-41.4	9/25	1052-1057	87	ENE-2	ESE-1	ENE-3	21.5	20.5	bc	1019.6
US16386	41-47.2	140-40.4	9/26	0919-0922	14	Calm	SW-1	Calm	21.9	21.1	c	1021.6
US16387	41-45.5	140-40.2	9/26	0942-0947	38	WSW-1	SSW-1	WSW-3	22.7	21	c	1021.5
US16388	41-43.6	140-40.2	9/26	1000-1007	64	SSW-1	SSW-1	SSW-3	22.7	21.4	c	1021.6
US16389	41-43.6	140-38.1	9/26	1020-1025	56	SW-2	SW-1	SW-4	22.4	21.3	c	1021.6
US16390	41-43.7	140-36.3	9/26	1038-1042	25	SW-2	SW-1	SW-4	22.7	21.1	c	1021.6
US16391	41-41.4	140-34.5	9/26	1100-1104	41	West-1	SW-1	West-3	21.1	23.1	c	1021.6
US16392	41-37.4	140-30.1	9/26	1145-1150	30	SSE-1	South-1	SSE-3	23.8	21.8	c	1021.6
US16393	41-37.7	140-28.0	9/26	1203-1207	19	SSW-1	South-1	SSW-3	23.8	20.5	c	1021.7
US16394	41-38.0	140-26.6	9/26	1223-1227	15	SSW-1	South-1	SSW-2	25.2	21.5	c	1021.7
US16395	41-35.0	140-33.3	9/26	1308-1314	56	SSW-2	South-1	SSW-2	24.5	22.6	c	1021.6
US16396	41-35.0	140-29.6	9/26	1336-1340	39	SW-2	South-1	SW-3	23.2	22.6	c	1021.5
US16397	41-35.1	140-27.2	9/26	1357-1400	20	South-1	South-1	South-3	24.4	21.3	bc	1021.1
US16398	41-24.1	140-20.3	9/26	1516-1523	93	SW-2	SW-1	SW-4	22.1	18.7	bc	1021.1
US16399	41-26.7	140-17.5	9/26	1549-1555	61	WSW-2	SW-1	WSW-4	22	20.9	bc	1021.1
US16400	41-27.9	140-16.3	9/26	1612-1616	26	SW-2	SW-1	SW-4	22.2	21.1	bc	1021.5
US16401	41-28.8	140-20.9	9/26	1639-1645	62	SW-1	SW-1	SW-3	23.5	21	c	1021.2
US16402	41-26.1	140-02.3	9/27	0618-0622	37	NW-1	NW-1	NW-2	20	20	c	1020.6
US16403	41-26.0	140-01.9	9/27	0640-0646	53	East-1	NW-1	East-2	19.8	19.4	o	1020.6
US16404	41-25.8	140-01.3	9/27	0653-0700	79	Calm	NW-1	Calm	20	19.7	o	1020.6
US16405	41-25.3	140-00.3	9/27	0708-0717	103	Calm	NW-1	Calm	20.1	18.8	o	1020.6
US16406	41-24.5	140-06.0	9/27	0745-0750	53	ENE-1	NW-1	ENE-3	19.4	19.9	o	1021
US16407	41-24.0	140-06.1	9/27	0801-0807	75	NE-2	West-1	NE-3	18.9	19.5	o	1021
US16408	41-23.4	140-06.0	9/27	0813-0820	95	East-1	West-1	East-2	19.6	21.3	c	1021
US16409	41-22.3	140-06.1	9/27	0830-0838	118	East-2	West-1	East-4	20.7	21	o	1020.6
US16410	41-06.0	140-50.5	9/28	1115-1125	52	West-2	West-1	West-2	23.1	21.6	c	1012.1
US16411	41-04.8	141-02.0	9/28	1221-1228	46	West-2	West-1	West-2	25.4	21.6	c	1011.8
US16412	41-10.9	141-10.7	9/28	1422-1427	29	West-2	West-1	West-2	23.4	21.6	o	1011
US16413	40-57.7	141-07.1	9/29	0841-0851	37	WSW-2	SW-1	WSW-2	19.4	21.2	o	1013.1
US16414	41-03.8	140-52.3	9/29	1008-1016	50	West-2	WSW-1	West-2	19.6	21.5	c	1013.2
US16415	40-57.5	140-45.7	9/29	1109-1115	49	West-2	WSW-1	West-2	20	21.7	c	1013.1
US16416	41-04.7	140-44.0	9/29	1237-1246	59	West-2	West-1	West-2	21.2	21.8	c	1012.2
US16417	41-08.8	141-41.1	9/29	1314-1319	45	West-2	West-1	West-2	21.5	21.8	c	1011.6
US16418	41-10.7	140-39.7	9/29	1337-1343	47	WNW-2	NW-1	WNW-2	19.8	21.6	c	1011.6
US16419	41-11.3	140-40.0	9/29	1352-1357	53	NW-2	NW-1	NW-2	19.8	21.7	c	1011.8
US16420	41-11.6	140-41.1	9/29	1406-1413	69	NW-2	NW-1	NW-2	19.3	21.7	c	1012
US16421	41-11.9	140-42.1	9/29	1418-1431	73	NW-2	NW-1	NW-2	20.2	22	c	1012
US16422	41-12.2	140-43.0	9/29	1439-1449	72	NW-2	NW-1	NW-2	20.5	21.7	c	1012.2
US16423	41-12.5	140-44.1	9/29	1456-1507	69	NW-2	NW-1	NW-2	20.5	21.7	c	1012.1
US16424	41-12.7	140-44.9	9/29	1515-1525	66	NNW-2	NW-1	NNW-2	20	21.7	c	1012.2
US16425	41-13.0	140-45.5	9/29	1530-1537	65	NW-2	NW-1	NW-2	20.6	21.8	c	1012.4
US16426	41-16.9	140-41.6	9/29	1608-1622	144	WNW-3	WNW-1	WNW-3	19.5	21.3	bc	1012.6
Cruise 371												
Cancelled by rough weather												

Table 2. Oceanographic data

STATION US16374			
LATITUDE 42-43.0 N			
LONGITUD 144-05.6 E			
DEPTH (m) 136			
Press.	Temp.	Salinity	Sigma-T
5	19.882	32.933	23.217
10	19.830	32.962	23.252
20	19.773	33.003	23.298
30	19.896	33.119	23.354
40	17.773	33.000	23.796
50	13.297	33.457	25.139
75	12.911	34.305	25.872
100	10.0991	33.9978	26.1525
122	9.0262	33.8685	26.2279

STATION US16377			
LATITUDE 42-18.2 N			
LONGITUD 140-31.1 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	20.5334	31.8377	22.2123
10	20.5308	31.8396	22.2144
20	20.5844	31.9723	22.3012
30	19.5648	33.3133	23.5884
40	17.1162	33.1841	24.0936
50	13.5363	33.1677	24.8662
75	8.208	33.5519	26.1058
88	7.2748	33.6051	26.2822

STATION US16380			
LATITUDE 42-26.0 N			
LONGITUD 140-37.2 E			
DEPTH (m) 82			
Press.	Temp.	Salinity	Sigma-T
5	20.9063	31.9238	22.1789
10	20.6976	31.9314	22.2401
20	20.6466	31.9688	22.2821
30	19.9913	33.01	23.2468
40	16.535	33.1178	24.1783
50	12.7506	33.1679	25.0227
75	9.9094	33.7834	26.0172
79	8.8316	33.5807	26.0333

STATION US16383			
LATITUDE 42-16.3 N			
LONGITUD 140-37.1 E			
DEPTH (m) 88			
Press.	Temp.	Salinity	Sigma-T
5	20.6001	31.8463	22.2012
10	20.6041	31.8479	22.2014
20	20.2656	32.1587	22.5268
30	20.6232	33.4081	23.3835
40	18.1019	33.6515	24.2146
50	13.9027	33.6871	25.1927
75	8.1328	33.5748	26.135
85	7.5353	33.6265	26.2624

STATION US16386			
LATITUDE 41-47.2 N			
LONGITUD 140-40.4 E			
DEPTH (m) 16			
Press.	Temp.	Salinity	Sigma-T
5	21.4937	33.0659	22.8884
10	21.4531	33.4362	23.1809
15	20.6735	33.7537	23.6334

STATION US16375			
LATITUDE 42-37.9 N			
LONGITUD 144-47.3 E			
DEPTH (m) 721			
Press.	Temp.	Salinity	Sigma-T
5	21.093	33.5375	23.3558
10	21.0533	33.5348	23.3645
20	20.5118	33.5587	23.5277
30	15.6499	34.2578	25.2558
40	14.134	34.3788	25.6788
50	12.9112	34.3148	25.8797
75	11.055	34.1947	26.1385
100	9.8907	34.1322	26.2928
125	8.6934	33.9798	26.3674
150	6.9816	33.7748	26.4561
175	6.837	33.8312	26.5201
198	5.452	33.6539	26.5557

STATION US16378			
LATITUDE 42-23.8 N			
LONGITUD 140-30.6 E			
DEPTH (m) 93			
Press.	Temp.	Salinity	Sigma-T
5	20.602	31.8969	22.2392
10	20.5065	31.9051	22.2706
20	20.6214	32.055	22.3543
30	19.731	33.2258	23.4789
40	16.4895	33.1045	24.1784
50	14.6156	33.3952	24.8174
75	8.4732	33.5922	26.0975
91	6.5745	33.5637	26.3442

STATION US16381			
LATITUDE 42-18.1 N			
LONGITUD 140-42.4 E			
DEPTH (m) 62			
Press.	Temp.	Salinity	Sigma-T
5	20.5323	31.8339	22.2096
10	20.3319	31.8691	22.289
20	20.4596	32.7968	22.9616
30	20.3007	33.3762	23.4447
40	17.5769	33.6661	24.3532
50	15.2027	33.7656	24.976
60	12.4075	33.8273	25.6005

STATION US16384			
LATITUDE 42-11.0 N			
LONGITUD 140-36.4 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	20.6645	31.8675	22.2003
10	20.6666	31.8733	22.2042
20	20.4708	32.0574	22.3959
30	18.9753	33.0515	23.5385
40	15.5944	33.051	24.3395
50	12.3214	33.3104	25.216
75	8.9515	33.5868	26.0192
76	8.9436	33.595	26.0269

STATION US16387			
LATITUDE 41-45.5 N			
LONGITUD 140-40.2 E			
DEPTH (m) 38			
Press.	Temp.	Salinity	Sigma-T
5	21.4418	33.6186	23.3226
10	21.4807	33.7041	23.3769
20	20.9571	33.7924	23.5864
30	19.9554	33.9084	23.941
33	19.72	33.9227	24.0132

STATION US16376			
LATITUDE 42-14.0 N			
LONGITUD 140-30.6 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	20.3634	31.729	22.1741
10	20.3877	31.7571	22.1892
20	20.4181	32.5412	22.7779
30	19.2823	33.0558	23.4643
40	16.766	33.0161	24.0466
50	13.4536	33.2206	24.9236
75	9.6219	33.5926	25.9159
77	9.559	33.609	25.9391

STATION US16379			
LATITUDE 42-20.4 N			
LONGITUD 140-36.4 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	20.6756	31.8414	22.1775
10	20.5851	31.8516	22.2092
20	20.6658	31.9634	22.2729
30	20.9041	33.0646	23.047
40	19.1841	33.1588	23.5679
50	13.7378	33.0672	24.7477
75	9.0926	33.6285	26.0295
84	7.3502	33.6185	26.2823

STATION US16382			
LATITUDE 42-17.5 N			
LONGITUD 140-53.8 E			
DEPTH (m) 55			
Press.	Temp.	Salinity	Sigma-T
5	20.2548	32.6584	22.9101
10	20.1964	32.7727	23.0125
20	20.1732	32.9612	23.1621
30	20.1791	33.1312	23.29
40	18.4066	33.7392	24.2064
50	16.5099	33.8577	24.7521
53	16.1988	33.8472	24.8156

STATION US16385			
LATITUDE 42-13.3 N			
LONGITUD 140-41.4 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	20.6811	31.8129	22.1544
10	20.5937	31.8127	22.1773
20	19.4883	32.7883	23.2077
30	18.5748	33.399	23.9046
40	15.8065	33.3371	24.5122
50	12.7238	33.4948	25.2812
75	9.2953	33.6427	26.0081
85	7.9644	33.5602	26.1493

STATION US16388			
LATITUDE 41-43.6 N			
LONGITUD 140-40.2 E			
DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T
5	21.3182	33.6534	23.3828
10	21.1215	33.7532	23.5121
20	20.6439	33.8548	23.718
30	19.7501	33.9335	24.0136
40	17.3421	34.0769	24.7245
50	15.7949	34.1784	25.1621
60	14.8977	34.2166	25.3902

	STATION	US16389		
	LATITUDE	41-43.6	N	
	LONGITUD	140-38.1	E	
	DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T	
5	22.3712	33.7986	23.2013	
10	20.5809	33.8567	23.7364	
20	18.2265	34.038	24.4796	
30	16.0996	34.1788	25.0932	
40	15.3081	34.2589	25.3328	
50	13.5481	34.18	25.6468	
51	13.4235	34.1794	25.6719	

	STATION	US16392		
	LATITUDE	41-37.4	N	
	LONGITUD	140-30.1	E	
	DEPTH (m)	30		
Press.	Temp.	Salinity	Sigma-T	
5	22.0004	33.7674	23.2814	
10	20.0541	33.8205	23.848	
20	15.3741	34.1151	25.2074	
25	15.2253	34.1469	25.2648	

	STATION	US16395		
	LATITUDE	41-35.0	N	
	LONGITUD	140-33.3	E	
	DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T	
5	22.3712	33.7986	23.2013	
10	20.5809	33.8567	23.7364	
20	18.2265	34.038	24.4796	
30	16.0996	34.1788	25.0932	
40	15.3081	34.2589	25.3328	
50	13.5481	34.18	25.6468	
51	13.4235	34.1794	25.6719	

	STATION	US16398		
	LATITUDE	41-24.1	N	
	LONGITUD	140-20.3	E	
	DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T	
5	18.5297	34.1528	24.4922	
10	17.4229	34.0513	24.6855	
20	16.4009	34.069	24.9397	
30	15.9319	34.0914	25.0642	
40	15.4604	34.0909	25.1696	
50	10.7122	34.0904	26.1184	
75	6.4566	34.0544	26.7467	
89	6.3896	34.0732	26.7703	

	STATION	US16401		
	LATITUDE	41-28.8	N	
	LONGITUD	140-20.9	E	
	DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T	
5	20.7678	33.8101	23.6509	
10	20.6521	33.8116	23.6829	
20	16.8835	34.0536	24.8153	
30	13.06	34.0398	25.6364	
40	10.1843	34.1258	26.2379	
50	10.0152	34.1537	26.2885	
57	9.9643	34.1565	26.2993	

	STATION	US16404		
	LATITUDE	41-25.8	N	
	LONGITUD	140-01.3	E	
	DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T	
5	17.92	34.0177	24.5394	
10	17.7558	34.0432	24.5989	
20	17.5121	34.0531	24.6654	
30	15.0139	34.12	25.2905	
40	13.8122	34.1497	25.569	
50	13.1359	34.1645	25.7184	
75	9.0761	34.1181	26.4155	
75	9.0761	34.1181	26.4155	

	STATION	US16390		
	LATITUDE	41-43.7	N	
	LONGITUD	140-36.3	E	
	DEPTH (m)	25		
Press.	Temp.	Salinity	Sigma-T	
5	21.1294	33.1523	23.0531	
10	21.4505	33.6897	23.3742	
20	20.1976	33.8734	23.8507	

	STATION	US16393		
	LATITUDE	41-37.7	N	
	LONGITUD	140-28.0	E	
	DEPTH (m)	19		
Press.	Temp.	Salinity	Sigma-T	
5	21.5168	33.5449	23.246	
10	20.6868	33.7942	23.6604	
14	18.3066	33.9923	24.425	

	STATION	US16396		
	LATITUDE	41-35.0	N	
	LONGITUD	140-29.6	E	
	DEPTH (m)	39		
Press.	Temp.	Salinity	Sigma-T	
5	21.6168	33.8358	23.4396	
10	20.6764	33.8944	23.7395	
20	17.6641	34.077	24.6471	
30	14.1401	34.1407	25.4937	
35	13.7481	34.1913	25.6145	

	STATION	US16399		
	LATITUDE	41-26.7	N	
	LONGITUD	140-17.5	E	
	DEPTH (m)	61		
Press.	Temp.	Salinity	Sigma-T	
5	20.8561	33.8145	23.6305	
10	20.3528	33.8529	23.794	
20	17.3571	34.0747	24.7192	
30	15.0428	34.1113	25.2773	
40	13.1232	34.1637	25.7203	
50	12.1942	34.172	25.909	
57	12.0092	34.1819	25.9519	

	STATION	US16402		
	LATITUDE	41-26.1	N	
	LONGITUD	140-02.3	E	
	DEPTH (m)	37		
Press.	Temp.	Salinity	Sigma-T	
5	19.5127	33.9485	24.0866	
10	18.6957	33.988	24.3246	
20	18.1988	34.0139	24.468	
30	18.1759	34.0178	24.4767	
33	18.1761	34.0186	24.4772	

	STATION	US16405		
	LATITUDE	41-25.3	N	
	LONGITUD	140-00.3	E	
	DEPTH (m)	103		
Press.	Temp.	Salinity	Sigma-T	
5	20.4272	33.8959	23.8069	
10	18.8086	33.8923	24.223	
20	17.6613	33.9505	24.5508	
30	15.3287	34.1254	25.2254	
40	12.466	34.1256	25.8205	
50	10.9643	34.1317	26.1057	
75	7.7338	34.0934	26.6009	
95	5.8837	34.059	26.8237	

	STATION	US16391		
	LATITUDE	41-41.4	N	
	LONGITUD	140-34.5	E	
	DEPTH (m)	41		
Press.	Temp.	Salinity	Sigma-T	
5	21.2714	33.5315	23.3028	
10	21.1871	33.5565	23.3447	
20	21.059	33.6246	23.4313	
30	20.5223	33.8455	23.7434	
37	19.2857	33.9748	24.1649	

	STATION	US16394		
	LATITUDE	41-38.0	N	
	LONGITUD	140-26.6	E	
	DEPTH (m)	15		
Press.	Temp.	Salinity	Sigma-T	
5	21.1592	33.5838	23.3731	
10	21.0129	33.6805	23.4863	

	STATION	US16397		
	LATITUDE	41-35.1	N	
	LONGITUD	140-27.2	E	
	DEPTH (m)	20		
Press.	Temp.	Salinity	Sigma-T	
5	21.4145	33.6622	23.3632	
10	21.3462	33.6598	23.38	
15	21.2303	33.6508	23.4047	

	STATION	US16400		
	LATITUDE	41-27.9	N	
	LONGITUD	140-16.3	E	
	DEPTH (m)	26		
Press.	Temp.	Salinity	Sigma-T	
5	20.986	33.6924	23.5025	
10	18.7881	33.9592	24.2793	
20	16.8971	34.0822	24.8341	
21	16.7505	34.0904	24.8749	

	STATION	US16403		
	LATITUDE	41-26.0	N	
	LONGITUD	140-01.9	E	
	DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T	
5	19.2656	33.9281	24.1345	
10	17.7364	34.0129	24.5804	
20	17.0963	34.0538	24.7653	
30	15.6124	34.1142	25.1537	
40	14.2964	34.1341	25.4556	
48	13.3506	34.1509	25.6646	

	STATION	US16406		
	LATITUDE	41-24.5	N	
	LONGITUD	140-06.0	E	
	DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T	
5	19.6537	33.9231	24.0307	
10	19.6857	33.939	24.0346	
20	18.4001	34.0046	24.4111	
30	15.8971	34.1449	25.1132	
40	14.193	34.2017	25.5296	
48	13.5992	34.225	25.6713	

STATION	US16407		
LATITUDE	41-24.0	N	
LONGITUD	140-06.1	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	20.8355	33.8677	23.6765
10	20.2123	33.9023	23.8688
20	19.4399	33.9528	24.1086
30	16.0059	34.1404	25.085
40	12.4136	34.1727	25.8672
50	10.3456	34.1345	26.2169
70	8.7907	34.117	26.4597

STATION	US16410		
LATITUDE	41-06.0	N	
LONGITUD	140-50.5	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	21.822	33.0669	22.7989
10	21.8152	33.079	22.81
20	21.6027	33.2191	22.9748
30	19.998	33.6279	23.716
40	18.5997	33.9873	24.3481
48	17.124	34.0721	24.7728

STATION	US16413		
LATITUDE	40-57.7	N	
LONGITUD	141-07.1	E	
DEPTH (m)	37		
Press.	Temp.	Salinity	Sigma-T
5	21.6522	33.0544	22.8362
10	21.6484	33.0538	22.8368
20	21.6429	33.0748	22.8543
30	20.2121	33.5424	23.5947
32	19.2783	33.4686	23.7809

STATION	US16416		
LATITUDE	41-04.7	N	
LONGITUD	140-44.0	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	21.7874	33.2423	22.9417
10	21.812	33.2961	22.9758
20	21.9206	33.5088	23.1073
30	21.5687	33.7079	23.3556
40	19.6877	33.8846	23.9925
50	17.7536	34.0384	24.5957
55	17.1375	34.1488	24.8284

STATION	US16419		
LATITUDE	41-11.3	N	
LONGITUD	140-40.0	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	21.3473	33.2345	23.0564
10	21.3229	33.3348	23.1393
20	21.6511	33.703	23.3292
30	21.5447	33.7508	23.3948
40	21.2859	33.7596	23.4724
48	18.951	33.9149	24.204

STATION	US16422		
LATITUDE	41-12.2	N	
LONGITUD	140-43.0	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	21.8583	33.4757	23.0994
10	21.8983	33.5078	23.1126
20	21.9528	33.5939	23.1629
30	21.5992	33.7498	23.3791
40	20.1317	33.8407	23.8431
50	15.6751	34.1266	25.1492
68	13.1662	34.2272	25.7609

STATION	US16408		
LATITUDE	41-23.4	N	
LONGITUD	140-06.0	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	20.6081	33.8921	23.7559
10	20.247	33.9146	23.869
20	18.6179	34.0595	24.3986
30	14.0933	34.1997	25.5491
40	12.7929	34.1509	25.7759
50	10.112	34.0799	26.2143
75	8.0725	34.1007	26.5567
90	7.9521	34.1033	26.5767

STATION	US16411		
LATITUDE	41-04.8	N	
LONGITUD	141-02.0	E	
DEPTH (m)	46		
Press.	Temp.	Salinity	Sigma-T
5	21.7952	33.0582	22.7997
10	21.782	33.1395	22.8651
20	21.7828	33.2253	22.9301
30	19.857	33.3814	23.5648
40	18.6379	33.6734	24.0986
42	18.5313	33.902	24.2999

STATION	US16414		
LATITUDE	41-03.8	N	
LONGITUD	140-52.3	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	21.6536	33.0842	22.8585
10	21.6568	33.0837	22.8572
20	21.6305	33.2092	22.9598
30	20.2327	33.7134	23.7195
40	19.0549	33.9463	24.2021
46	18.0892	34.0272	24.5053

STATION	US16417		
LATITUDE	41-08.8	N	
LONGITUD	141-41.1	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	22.3472	33.7011	23.134
10	22.2285	33.7156	23.1784
20	22.1015	33.7233	23.2198
30	21.538	33.765	23.4075
40	20.1661	33.8521	23.8427

STATION	US16420		
LATITUDE	41-11.6	N	
LONGITUD	140-41.1	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	22.1372	33.6002	23.1163
10	22.1525	33.6497	23.1496
20	22.0591	33.7311	23.2375
30	21.8794	33.7395	23.2938
40	20.3957	33.8244	23.761
50	17.8339	34.0206	24.5626
65	14.5344	34.2214	25.4724

STATION	US16423		
LATITUDE	41-12.5	N	
LONGITUD	140-44.1	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	21.9408	33.5288	23.1168
10	22.0038	33.604	23.1564
20	21.8162	33.7192	23.296
30	21.3778	33.7701	23.4552
40	20.0334	33.8598	23.8835
50	18.1558	33.9948	24.4639
67	13.7255	34.2274	25.6473

STATION	US16409		
LATITUDE	41-22.3	N	
LONGITUD	140-06.1	E	
DEPTH (m)	118		
Press.	Temp.	Salinity	Sigma-T
5	20.0529	33.9182	23.9229
10	19.4379	33.9336	24.0944
20	18.2036	34.049	24.4937
30	15.2629	34.1891	25.2887
40	11.338	34.0152	25.9466
50	9.0327	34.1067	26.4134
75	7.6635	34.0787	26.5995
100	6.7699	34.0739	26.7205
105	6.7325	34.0742	26.7257

STATION	US16412		
LATITUDE	41-10.9	N	
LONGITUD	141-10.7	E	
DEPTH (m)	29		
Press.	Temp.	Salinity	Sigma-T
5	21.7693	32.7885	22.6021
10	21.7514	32.8645	22.6647
20	21.4992	33.1177	22.9262
24	21.4644	33.1474	22.9583

STATION	US16415		
LATITUDE	40-57.5	N	
LONGITUD	140-45.7	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	21.972	33.1628	22.8303
10	21.9762	33.1662	22.8317
20	21.7227	33.5014	23.1564
30	20.7515	33.7438	23.6047
40	19.2612	33.9081	24.1203
45	17.8826	34.0059	24.5396

STATION	US16418		
LATITUDE	41-10.7	N	
LONGITUD	140-39.7	E	
DEPTH (m)	47		
Press.	Temp.	Salinity	Sigma-T
5	21.7537	33.32	23.01
10	21.8511	33.6081	23.2019
20	21.8033	33.7247	23.3037
30	21.6564	33.7396	23.3556
40	20.4854	33.8347	23.745
42	20.2998	33.8612	23.8144

STATION	US16421		
LATITUDE	41-11.9	N	
LONGITUD	140-42.1	E	
DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T
5	21.8696	33.4837	23.1023
10	22.0209	33.5944	23.1444
20	22.0378	33.7341	23.2457
30	21.4488	33.7482	23.4191
40	19.3626	33.8799	24.0727
50	16.3488	34.0958	24.9722
68	14.214	34.2369	25.5524

STATION	US16424		
LATITUDE	41-12.7	N	
LONGITUD	140-44.9	E	
DEPTH (m)	66		
Press.	Temp.	Salinity	Sigma-T
5	21.9602	33.5649	23.1389
10	21.9767	33.5752	23.142
20	21.7929	33.7155	23.2996
30	21.2436	33.729	23.4606
40	20.0034	33.8528	23.8859
50	18.3733	33.956	24.3806
62	16.4682	34.1197	24.9631

STATION	US16425		
LATITUDE	41-13.0	N	
LONGITUDE	140-45.5	E	
DEPTH (m)	65		
Press.	Temp.	Salinity	Sigma-T
5	22.037	33.6106	23.1522
10	22.0441	33.6112	23.1507
20	21.7166	33.6585	23.2774
30	20.9382	33.7656	23.5711
40	19.421	33.9096	24.0804
50	18.454	33.9872	24.3844
61	16.6297	34.1099	24.918

STATION	US16426		
LATITUDE	41-16.9	N	
LONGITUDE	140-41.6	E	
DEPTH (m)	144		
Press.	Temp.	Salinity	Sigma-T
5	21.6645	33.802	23.4008
10	21.5626	33.7988	23.4264
20	21.3247	33.8067	23.4975
30	21.0111	33.8337	23.6033
40	20.9262	33.8286	23.6223
50	19.9566	33.9105	23.9423
75	16.988	34.1353	24.8534
100	14.3364	34.2095	25.5053
125	12.6696	34.2248	25.8577
135	11.9553	34.2207	25.9923

THE " USHIO MARU "

CRUISE 372

CRUISE 373

CRUISE 374

IN OCTOBER 2016

IN NOVEMBER 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 372

Departure from Hakodate	Oct. 12, 2016
Arrival at and departure from Muroran	12
Start whales and dolphins watching research	13
Arrival at Kushiro	15
Departure from Kushiro	16
Hydrographic research (US16427)	17
Finish whales and dolphins watching research	18
Return to Hakodate	19
Total coverage 1006.4 miles	

Cruise 373

Departure from Hakodate	Oct. 23, 2016
Arrival at Fukushima	24
Departure from Fukushima	25
Start hydrographic research (US16428)	25
Sampling by tuna long-line	25
Finish hydrographic research (US16434)	26
Return to Hakodate	26
Total coverage 197.5 miles	

Cruise 374

Departure from Hakodate	Oct. 31, 2016
Start hydrographic research (US16435)	Nov. 1, 2016
Retrieving mooring ADCP system	1
Setting mooring ADCP system	1
Arrival at Mori	1
Departure from Mori	2
Sampling by trawl net	2
Finish hydrographic research (US16448)	2
Arrival at Muroran	2
Departure from Muroran	3
Return to Hakodate	4
Total coverage 252.5 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

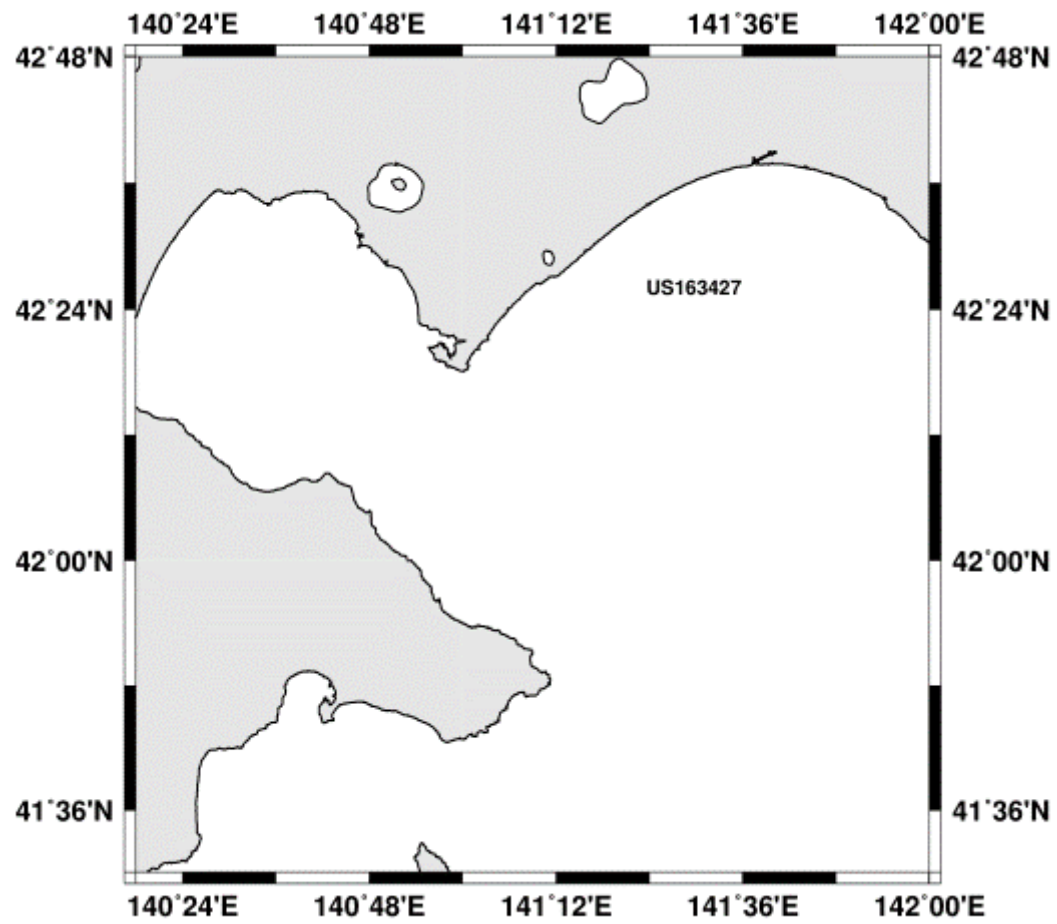


Figure 1. Oceanographic stations (Cruise 372)

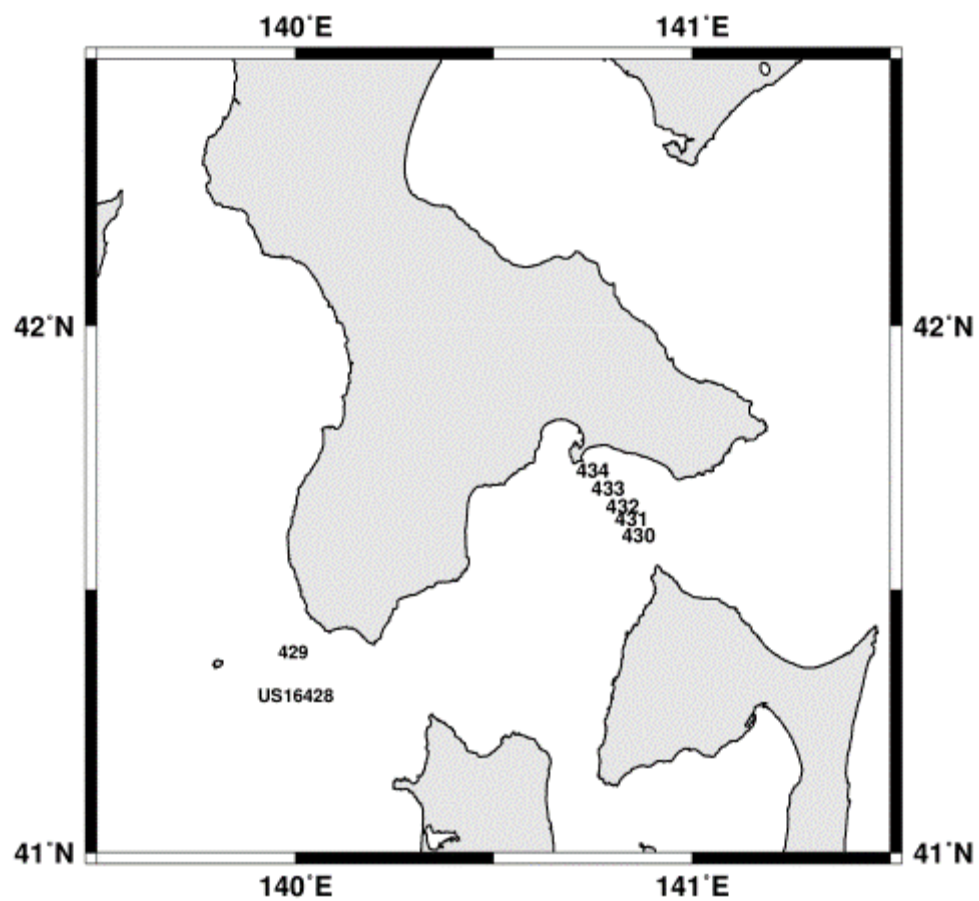


Figure 2. Oceanographic stations (Cruise 373)

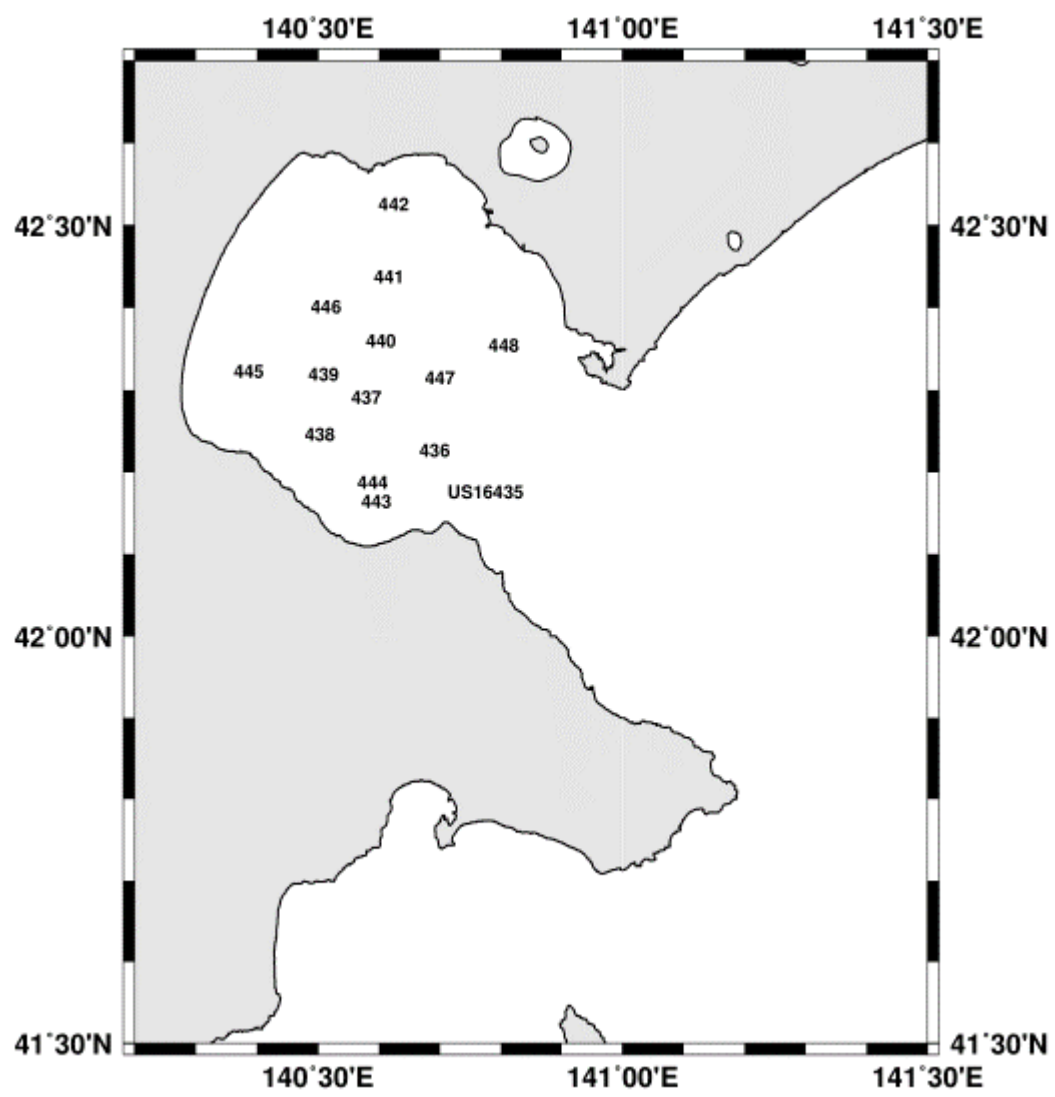


Figure 3. Oceanographic stations (Cruise 374)

Table 1. List of Oceanographic Station

Cruise 372												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16427	42-25.4	141-29.7	10/17	1630-1638	120	South-2	South-1	South-3	16.5	15.3	o	1015
Cruise 373												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16428	41-17.2	140-00.0	10/25	1059-1108	180	East-2	WNW-1	East-2	13.3	15.5	bc	1019.8
US16429	41-22.2	139-59.7	10/25	1229-1234	125	East-2	NW-1	East-3	12.5	13.2	o	1018.1
US16430	41-35.4	140-51.9	10/26	0421-0424	54	West-2	West-1	West-3	14	17.5	o	1012
US16431	41-37.3	140-50.9	10/26	0443-0447	99	West-2	West-1	West-4	15.1	17.3	c	1012.1
US16432	41-38.7	140-49.5	10/26	0507-0521	299	West-2	West-1	West-4	14.7	17.8	bc	1012.5
US16433	41-40.7	140-47.3	10/26	0548-0559	228	West-2	West-1	West-3	14.8	14.5	bc	1012.6
US16434	41-42.8	140-45.0	10/26	0619-0625	84	West-2	West-1	West-3	14.2	13.7	bc	1012.7
Cruise 374												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16435	42-10.1	140-46.5	11/1	0528-0534	94	NW-2	WNW-1	NW-3	5.2	12.1	o	1022.6
US16436	42-13.1	140-41.5	11/1	0604-0609	88	WNW-2	WNW-1	West-4	5.3	12	o	1022.2
US16437	42-17.0	140-34.8	11/1	0715-0725	90	West-2	ESE-1	West-4	5	12.3	c	1021.1
US16438	42-14.3	140-30.2	11/1	0841-0847	79	WNW-3	WNW-1	WNW-5	5.2	12.1	c	1022.4
US16439	42-18.7	140-30.6	11/1	0920-0926	91	WNW-3	WNW-1	WNW-5	5.7	12.2	c	1022.2
US16440	42-21.1	140-36.2	11/1	1015-1024	87	NW-3	NW-1	NW-5	6	12.1	o	1023
US16441	42-25.8	140-37.0	11/1	1055-1101	83	NW-3	NW-1	NW-5	4.6	10.7	o	1022.6
US16442	42-31.1	140-37.5	11/1	1158-1205	61	WNW-3	NW-1	NNW-4	3.8	10.8	o	1021.6
US16443	42-09.4	140-35.8	11/1	1430-1439	69	NW-3	NW-1	NW-5	4.7	12	o	1021.1
US16444	42-10.8	140-35.4	11/2	0659-0705	78	WNW-3	NW-1	WNW-4	5.4	11.7	c	1026.9
US16445	42-18.9	140-23.2	11/2	1006-1011	53	West-2	NW-1	West-3	6	11.8	c	1027.1
US16446	42-23.6	140-30.8	11/2	1121-1127	94	WNW-2	NW-1	WNW-3	7.4	11.8	c	1027.1
US16447	42-18.4	140-42.0	11/2	1304-1310	66	West-2	NW-1	West-4	7.9	11.9	bc	1026.1
US16448	42-20.8	140-48.3	11/2	1453-1458	52	WNW-3	West-1	WNW-4	7.9	11.8	bc	1025.5

Table 2. Oceanographic data

STATION	US16427		
LATITUDE	42-25.4	N	
LONGITUD	141-29.7	E	
DEPTH (m)	120		
Press.	Temp.	Salinity	Sigma-T
5	15.4287	33.6511	24.8381
10	15.2711	33.8747	25.0451
20	14.2155	34.069	25.4224
30	13.5559	34.121	25.5996
40	12.6409	34.0969	25.7642
50	12.4288	34.1053	25.812
75	11.3799	34.061	25.9754
100	10.1761	34.007	26.1466
111	9.8504	33.9906	26.1889

STATION	US16430		
LATITUDE	41-35.4	N	
LONGITUD	140-51.9	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	16.9562	33.9241	24.6989
10	16.8167	33.9332	24.7387
20	16.4764	33.9912	24.8624
30	15.7261	34.0536	25.0816
40	15.3764	34.0757	25.1766
42	15.3473	34.0804	25.1866

STATION	US16433		
LATITUDE	41-40.7	N	
LONGITUD	140-47.3	E	
DEPTH (m)	228		
Press.	Temp.	Salinity	Sigma-T
5	14.0821	34.0602	25.4436
10	14.0028	34.0743	25.4711
20	14.0398	34.0754	25.4643
30	13.9231	34.0847	25.4958
40	13.9604	34.0817	25.4857
50	13.951	34.086	25.491
75	12.6506	34.1151	25.7764
100	11.1074	34.1368	26.084
125	10.8106	34.158	26.1536
150	10.5206	34.1574	26.2044
175	10.2785	34.1584	26.2471
200	9.3095	34.1339	26.3902
204	9.2365	34.136	26.4036

STATION	US16436		
LATITUDE	42-13.1	N	
LONGITUD	140-41.5	E	
DEPTH (m)	88		
Press.	Temp.	Salinity	Sigma-T
5	12.291	33.6359	25.4744
10	12.2925	33.6355	25.4738
20	12.2926	33.6347	25.4732
30	12.2801	33.6354	25.4761
40	12.2208	33.6448	25.4947
50	12.2425	33.662	25.5039
75	10.1859	33.9614	26.1093
86	9.6787	33.9075	26.1526

STATION	US16428		
LATITUDE	41-17.2	N	
LONGITUD	140-00.0	E	
DEPTH (m)	180		
Press.	Temp.	Salinity	Sigma-T
5	16.0718	34.0732	25.0184
10	15.93	34.0865	25.0609
20	15.2171	34.0331	25.1789
30	14.7213	34.1171	25.3517
40	14.6106	34.1912	25.4327
50	14.474	34.2033	25.4712
75	13.2288	34.275	25.7852
100	11.4516	34.1969	26.0679
125	10.4848	34.1679	26.2188
150	9.5126	34.131	26.3547
158	8.9464	34.1271	26.4431

STATION	US16431		
LATITUDE	41-37.3	N	
LONGITUD	140-50.9	E	
DEPTH (m)	99		
Press.	Temp.	Salinity	Sigma-T
5	17.6664	33.9144	24.5219
10	17.1024	33.9223	24.6629
20	16.4579	33.9714	24.8515
30	16.202	34.0354	24.9596
40	15.8734	34.0942	25.0796
50	15.2393	34.0965	25.2229
75	12.8093	34.1444	25.7679
82	12.577	34.1771	25.8388

STATION	US16434		
LATITUDE	41-42.8	N	
LONGITUD	140-45.0	E	
DEPTH (m)	84		
Press.	Temp.	Salinity	Sigma-T
5	14.4402	34.1261	25.4189
10	14.2753	34.1123	25.4432
20	14.1609	34.1287	25.48
30	13.6531	34.1311	25.5875
40	12.5447	34.133	25.8109
50	12.3214	34.1529	25.8697
75	11.5996	34.1486	26.003
79	11.4259	34.1509	26.0369

STATION	US16437		
LATITUDE	42-17.0	N	
LONGITUD	140-34.8	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	12.5255	33.6299	25.4246
10	12.5862	33.705	25.471
20	12.5919	33.6964	25.4633
30	12.5961	33.6954	25.4616
40	12.5991	33.6958	25.4614
50	12.6081	33.7026	25.4649
75	9.3114	33.838	26.1584
86	8.6138	33.7741	26.2186

STATION	US16429		
LATITUDE	41-22.2	N	
LONGITUD	139-59.7	E	
DEPTH (m)	125		
Press.	Temp.	Salinity	Sigma-T
5	13.5302	34.1044	25.592
10	13.0806	34.1018	25.681
20	12.7582	34.1709	25.7985
30	11.7382	34.1707	25.9943
40	10.9332	34.155	26.1294
50	10.3693	34.1408	26.2177
75	8.0198	34.0465	26.522
100	4.8075	34.0244	26.9235
105	4.7177	34.0301	26.9381

STATION	US16432		
LATITUDE	41-38.7	N	
LONGITUD	140-49.5	E	
DEPTH (m)	299		
Press.	Temp.	Salinity	Sigma-T
5	17.8642	33.7732	24.3657
10	17.1502	34.0237	24.7294
20	16.8897	34.0447	24.8071
30	16.0728	34.0687	25.0147
40	15.3252	34.0298	25.1526
50	14.5111	34.0527	25.3471
75	11.1102	34.1085	26.0614
100	10.4557	34.1407	26.2027
125	10.3445	34.1472	26.227
150	10.1928	34.1511	26.2562
175	9.7215	34.1388	26.3263
200	9.53	34.1394	26.3584
250	9.0658	34.1298	26.4262
262	9.03	34.1294	26.4316

STATION	US16435		
LATITUDE	42-10.1	N	
LONGITUD	140-46.5	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	12.0664	33.6726	25.5456
10	12.0688	33.6719	25.5446
20	12.0757	33.6727	25.544
30	12.0789	33.6742	25.5445
40	12.0832	33.6759	25.545
50	12.1208	33.6976	25.5547
75	9.9452	33.8977	26.1005
92	9.0242	33.8403	26.2062

STATION	US16438		
LATITUDE	42-14.3	N	
LONGITUD	140-30.2	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	12.4324	33.7031	25.4993
10	12.4365	33.7025	25.4981
20	12.4497	33.7012	25.4945
30	12.4486	33.7014	25.4949
40	12.4268	33.706	25.5028
50	10.4948	33.9233	26.0263
75	8.116	33.7556	26.2794
77	8.1175	33.7632	26.2851

STATION US16439			
LATITUDE 42-18.7 N			
LONGITUD 140-30.6 E			
DEPTH (m) 91			
Press.	Temp.	Salinity	Sigma-T
5	12.4711	33.6989	25.4886
10	12.4829	33.6988	25.4863
20	12.486	33.6981	25.4851
30	12.4874	33.6976	25.4845
40	12.4678	33.698	25.4885
50	10.7292	33.9377	25.9965
75	9.5493	33.9114	26.177
89	7.7672	33.722	26.3043

STATION US16442			
LATITUDE 42-31.1 N			
LONGITUD 140-37.5 E			
DEPTH (m) 61			
Press.	Temp.	Salinity	Sigma-T
5	11.298	33.5859	25.6208
10	11.4234	33.7272	25.7078
20	11.329	33.7741	25.7615
30	10.2804	33.8886	26.0364
40	9.497	33.843	26.1321
50	9.1995	33.8575	26.1917
56	9.197	33.8615	26.1952

STATION US16445			
LATITUDE 42-18.9 N			
LONGITUD 140-23.2 E			
DEPTH (m) 53			
Press.	Temp.	Salinity	Sigma-T
5	12.0317	33.6547	25.5383
10	12.0344	33.6595	25.5415
20	12.0426	33.6955	25.5679
30	10.9048	33.8991	25.9352
40	10.5059	33.9438	26.0404
50	10.0206	33.9211	26.1059
52	9.8704	33.9172	26.1283

STATION US16448			
LATITUDE 42-20.8 N			
LONGITUD 140-48.3 E			
DEPTH (m) 52			
Press.	Temp.	Salinity	Sigma-T
5	12.2398	33.6784	25.5172
10	12.2436	33.677	25.5153
20	12.2098	33.6742	25.5196
30	12.1329	33.6693	25.5305
40	11.3126	33.8497	25.8233
50	10.6429	33.8478	25.9415
51	10.1023	33.8865	26.0657

STATION US16440			
LATITUDE 42-21.1 N			
LONGITUD 140-36.2 E			
DEPTH (m) 87			
Press.	Temp.	Salinity	Sigma-T
5	12.3042	33.6546	25.4864
10	12.3161	33.6544	25.4839
20	12.3191	33.6539	25.483
30	12.3203	33.6539	25.4828
40	11.6409	33.7201	25.6622
50	11.3497	33.7901	25.7702
75	9.3993	33.8428	26.1479
86	8.412	33.7658	26.2429

STATION US16443			
LATITUDE 42-09.4 N			
LONGITUD 140-35.8 E			
DEPTH (m) 69			
Press.	Temp.	Salinity	Sigma-T
5	12.226	33.673	25.5156
10	12.2504	33.6689	25.5078
20	12.2559	33.6683	25.5062
30	12.2554	33.6702	25.5078
40	11.3937	33.7958	25.7665
50	10.2553	33.9265	26.0702
65	9.7159	33.9429	26.1741

STATION US16446			
LATITUDE 42-23.6 N			
LONGITUD 140-30.8 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	12.1294	33.6708	25.5323
10	12.1081	33.6695	25.5354
20	12.1237	33.6744	25.5362
30	12.1603	33.6931	25.5437
40	11.8114	33.7894	25.6844
50	10.4856	33.906	26.0144
75	8.7356	33.8237	26.2385
92	7.8009	33.7413	26.3144

STATION US16441			
LATITUDE 42-25.8 N			
LONGITUD 140-37.0 E			
DEPTH (m) 83			
Press.	Temp.	Salinity	Sigma-T
5	10.9703	33.8728	25.9031
10	10.9697	33.8732	25.9035
20	10.9727	33.8747	25.9042
30	10.9755	33.8747	25.9036
40	10.9411	33.8886	25.9206
50	10.6049	33.8919	25.9826
75	8.0691	33.7368	26.2716
80	8.023	33.7471	26.2865

STATION US16444			
LATITUDE 42-10.8 N			
LONGITUD 140-35.4 E			
DEPTH (m) 78			
Press.	Temp.	Salinity	Sigma-T
5	12.0618	33.682	25.5538
10	12.071	33.6824	25.5524
20	12.1253	33.7021	25.5574
30	12.1864	33.7408	25.5757
40	11.6479	33.7818	25.7089
50	9.7883	33.8707	26.1057
75	8.2638	33.7885	26.2831
76	8.2644	33.7906	26.2847

STATION US16447			
LATITUDE 42-18.4 N			
LONGITUD 140-42.0 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	12.2719	33.6725	25.5064
10	12.2716	33.6719	25.506
20	12.257	33.6707	25.5079
30	12.2484	33.6704	25.5094
40	11.9667	33.6784	25.569
50	11.3197	33.7379	25.7351
64	10.637	33.8779	25.9662

STATION	US16407		
LATITUDE	41-24.0	N	
LONGITUD	140-06.1	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	20.8355	33.8677	23.6765
10	20.2123	33.9023	23.8688
20	19.4399	33.9528	24.1086
30	16.0059	34.1404	25.085
40	12.4136	34.1727	25.8672
50	10.3456	34.1345	26.2169
70	8.7907	34.117	26.4597

STATION	US16410		
LATITUDE	41-06.0	N	
LONGITUD	140-50.5	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	21.822	33.0669	22.7989
10	21.8152	33.079	22.81
20	21.6027	33.2191	22.9748
30	19.998	33.6279	23.716
40	18.5997	33.9873	24.3481
48	17.124	34.0721	24.7728

STATION	US16413		
LATITUDE	40-57.7	N	
LONGITUD	141-07.1	E	
DEPTH (m)	37		
Press.	Temp.	Salinity	Sigma-T
5	21.6522	33.0544	22.8362
10	21.6484	33.0538	22.8368
20	21.6429	33.0748	22.8543
30	20.2121	33.5424	23.5947
32	19.2783	33.4686	23.7809

STATION	US16416		
LATITUDE	41-04.7	N	
LONGITUD	140-44.0	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	21.7874	33.2423	22.9417
10	21.812	33.2961	22.9758
20	21.9206	33.5088	23.1073
30	21.5687	33.7079	23.3556
40	19.6877	33.8846	23.9925
50	17.7536	34.0384	24.5957
55	17.1375	34.1488	24.8284

STATION	US16419		
LATITUDE	41-11.3	N	
LONGITUD	140-40.0	E	
DEPTH (m)	53		
Press.	Temp.	Salinity	Sigma-T
5	21.3473	33.2345	23.0564
10	21.3229	33.3348	23.1393
20	21.6511	33.703	23.3292
30	21.5447	33.7508	23.3948
40	21.2859	33.7596	23.4724
48	18.951	33.9149	24.204

STATION	US16422		
LATITUDE	41-12.2	N	
LONGITUD	140-43.0	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	21.8583	33.4757	23.0994
10	21.8983	33.5078	23.1126
20	21.9528	33.5939	23.1629
30	21.5992	33.7498	23.3791
40	20.1317	33.8407	23.8431
50	15.6751	34.1266	25.1492
68	13.1662	34.2272	25.7609

STATION	US16408		
LATITUDE	41-23.4	N	
LONGITUD	140-06.0	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	20.6081	33.8921	23.7559
10	20.247	33.9146	23.869
20	18.6179	34.0595	24.3986
30	14.0933	34.1997	25.5491
40	12.7929	34.1509	25.7759
50	10.112	34.0799	26.2143
75	8.0725	34.1007	26.5567
90	7.9521	34.1033	26.5767

STATION	US16411		
LATITUDE	41-04.8	N	
LONGITUD	141-02.0	E	
DEPTH (m)	46		
Press.	Temp.	Salinity	Sigma-T
5	21.7952	33.0582	22.7997
10	21.782	33.1395	22.8651
20	21.7828	33.2253	22.9301
30	19.857	33.3814	23.5648
40	18.6379	33.6734	24.0986
42	18.5313	33.902	24.2999

STATION	US16414		
LATITUDE	41-03.8	N	
LONGITUD	140-52.3	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	21.6536	33.0842	22.8585
10	21.6568	33.0837	22.8572
20	21.6305	33.2092	22.9598
30	20.2327	33.7134	23.7195
40	19.0549	33.9463	24.2021
46	18.0892	34.0272	24.5053

STATION	US16417		
LATITUDE	41-08.8	N	
LONGITUD	141-41.1	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	22.3472	33.7011	23.134
10	22.2285	33.7156	23.1784
20	22.1015	33.7233	23.2198
30	21.538	33.765	23.4075
40	20.1661	33.8521	23.8427

STATION	US16420		
LATITUDE	41-11.6	N	
LONGITUD	140-41.1	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	22.1372	33.6002	23.1163
10	22.1525	33.6497	23.1496
20	22.0591	33.7311	23.2375
30	21.8794	33.7395	23.2938
40	20.3957	33.8244	23.761
50	17.8339	34.0206	24.5626
65	14.5344	34.2214	25.4724

STATION	US16423		
LATITUDE	41-12.5	N	
LONGITUD	140-44.1	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	21.9408	33.5288	23.1168
10	22.0038	33.604	23.1564
20	21.8162	33.7192	23.296
30	21.3778	33.7701	23.4552
40	20.0334	33.8598	23.8835
50	18.1558	33.9948	24.4639
67	13.7255	34.2274	25.6473

STATION	US16409		
LATITUDE	41-22.3	N	
LONGITUD	140-06.1	E	
DEPTH (m)	118		
Press.	Temp.	Salinity	Sigma-T
5	20.0529	33.9182	23.9229
10	19.4379	33.9336	24.0944
20	18.2036	34.049	24.4937
30	15.2629	34.1891	25.2887
40	11.338	34.0152	25.9466
50	9.0327	34.1067	26.4134
75	7.6635	34.0787	26.5995
100	6.7699	34.0739	26.7205
105	6.7325	34.0742	26.7257

STATION	US16412		
LATITUDE	41-10.9	N	
LONGITUD	141-10.7	E	
DEPTH (m)	29		
Press.	Temp.	Salinity	Sigma-T
5	21.7693	32.7885	22.6021
10	21.7514	32.8645	22.6647
20	21.4992	33.1177	22.9262
24	21.4644	33.1474	22.9583

STATION	US16415		
LATITUDE	40-57.5	N	
LONGITUD	140-45.7	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	21.972	33.1628	22.8303
10	21.9762	33.1662	22.8317
20	21.7227	33.5014	23.1564
30	20.7515	33.7438	23.6047
40	19.2612	33.9081	24.1203
45	17.8826	34.0059	24.5396

STATION	US16418		
LATITUDE	41-10.7	N	
LONGITUD	140-39.7	E	
DEPTH (m)	47		
Press.	Temp.	Salinity	Sigma-T
5	21.7537	33.32	23.01
10	21.8511	33.6081	23.2019
20	21.8033	33.7247	23.3037
30	21.6564	33.7396	23.3556
40	20.4854	33.8347	23.745
42	20.2998	33.8612	23.8144

STATION	US16421		
LATITUDE	41-11.9	N	
LONGITUD	140-42.1	E	
DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T
5	21.8696	33.4837	23.1023
10	22.0209	33.5944	23.1444
20	22.0378	33.7341	23.2457
30	21.4488	33.7482	23.4191
40	19.3626	33.8799	24.0727
50	16.3488	34.0958	24.9722
68	14.214	34.2369	25.5524

STATION	US16424		
LATITUDE	41-12.7	N	
LONGITUD	140-44.9	E	
DEPTH (m)	66		
Press.	Temp.	Salinity	Sigma-T
5	21.9602	33.5649	23.1389
10	21.9767	33.5752	23.142
20	21.7929	33.7155	23.2996
30	21.2436	33.729	23.4606
40	20.0034	33.8528	23.8859
50	18.3733	33.956	24.3806
62	16.4682	34.1197	24.9631

	STATION	US16425		
	LATITUDE	41-13.0	N	
	LONGITUDE	140-45.5	E	
	DEPTH (m)	65		
Press.	Temp.	Salinity	Sigma-T	
5	22.037	33.6106	23.1522	
10	22.0441	33.6112	23.1507	
20	21.7166	33.6585	23.2774	
30	20.9382	33.7656	23.5711	
40	19.421	33.9096	24.0804	
50	18.454	33.9872	24.3844	
61	16.6297	34.1099	24.918	

	STATION	US16426		
	LATITUDE	41-16.9	N	
	LONGITUDE	140-41.6	E	
	DEPTH (m)	144		
Press.	Temp.	Salinity	Sigma-T	
5	21.6645	33.802	23.4008	
10	21.5626	33.7988	23.4264	
20	21.3247	33.8067	23.4975	
30	21.0111	33.8337	23.6033	
40	20.9262	33.8286	23.6223	
50	19.9566	33.9105	23.9423	
75	16.988	34.1353	24.8534	
100	14.3364	34.2095	25.5053	
125	12.6696	34.2248	25.8577	
135	11.9553	34.2207	25.9923	

THE " USHIO MARU "

CRUISE 375

CRUISE 376

CRUISE 377

CRUISE 378

IN NOVEMBER 2016

IN DECEMBER 2016

1.Cruise Itinerary

1. Cruise Itinerary

Cruise 375

Departure from Hakodate	Nov. 7, 2016
Start hydrographic research (US16449)	7
Finish hydrographic research (US16456)	8
Return to Hakodate	8
Total coverage 128.8 miles	

Cruise 376

Departure from Hakodate	Nov. 14, 2016
Start hydrographic research (US16457)	14
Arrival at Hakodate	15
Departure from Hakodate	17
Arrival at Muroran	17
Depart from Muroran	18
Sampling by trawl net	18
Arrival at Muroran	18
Departure from Muroran	19
Sampling by trawl net	19
Finish hydrographic research (US16480)	19
Return to Hakodate	20
Total coverage 349.3 miles	

Cruise 377

Departure from Hakodate	Dec. 12, 2016
Start hydrographic research (US16481)	13
Retrieval ADCP mooring system	13
Setting ADCP mooring system	14
Arrival at Usujiri	14
Departure from Usujiri	15
Finish hydrographic research (US16509)	15
Return to Hakodate	16
Total coverage 330.9 miles	

Cruise 378

Departure from Hakodate	Dec. 20, 2016
Start hydrographic research (US16510)	20
Finish hydrographic research (US14527)	21
Return to Hakodate	21
Total coverage 116.2 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-19Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.



Figure 1. Oceanographic stations (Cruise 375)

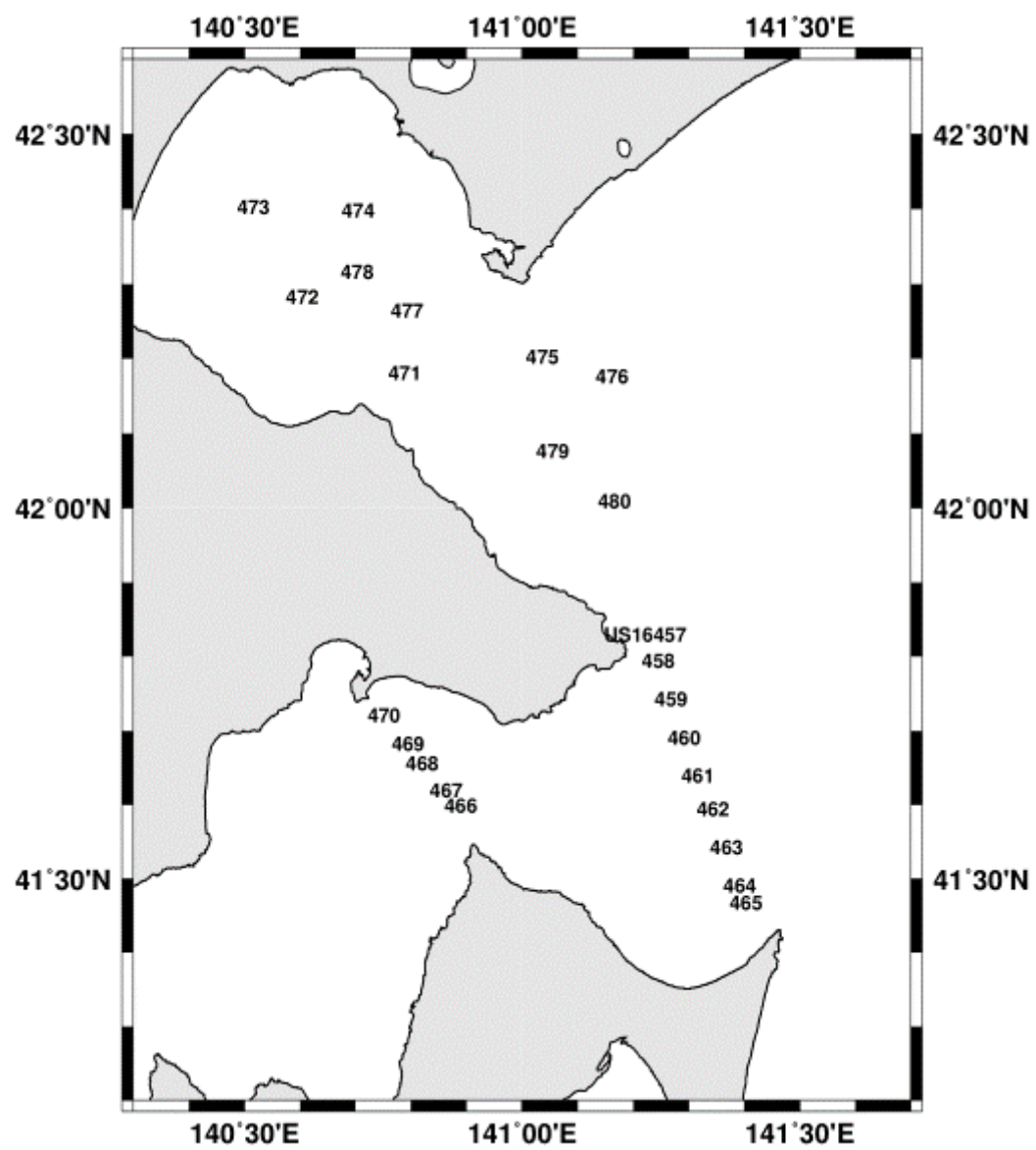


Figure 2. Oceanographic stations (Cruise 376)

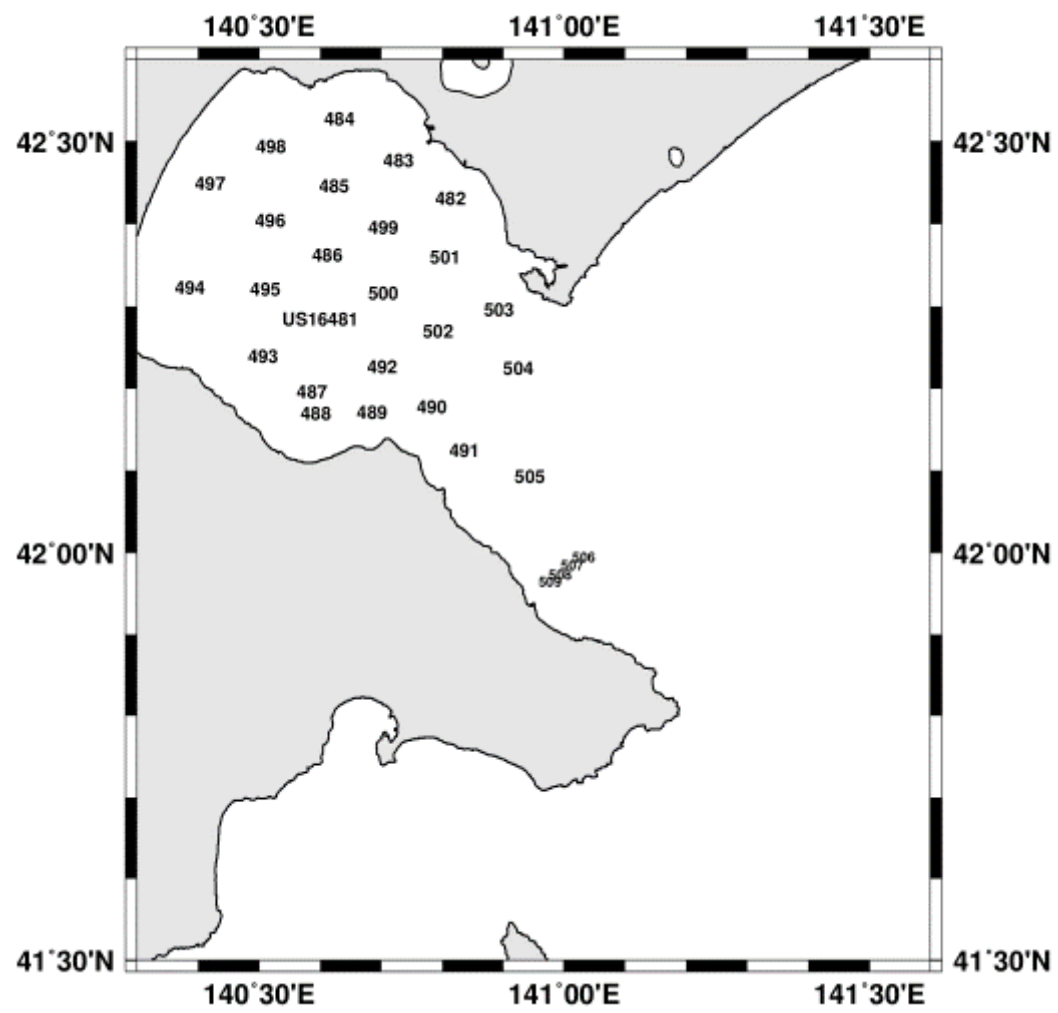


Figure 3. Oceanographic stations (Cruise 377)

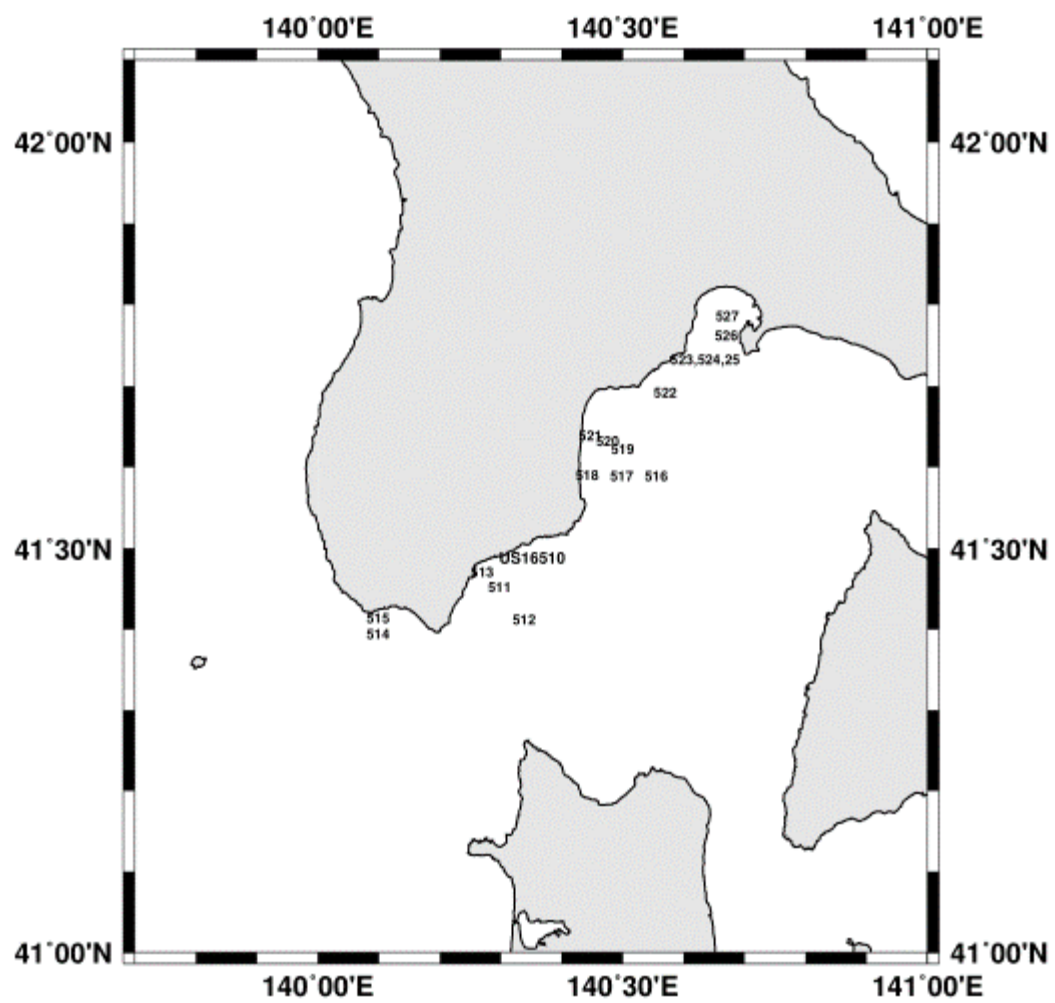


Figure 3. Oceanographic stations (Cruise 378)

Table 1. List of Oceanographic Station

Cruise 375												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16449	41-04.7	141-02.3	11/7	1232-1238	46	Calm	WNW-1	Calm	8.1	14.1	bc	1030.7
US16450	41-03.7	140-52.6	11/7	1417-1424	50	East-1	NNW-1	East-2	8.4	14.4	bc	1029.3
US16451	40-57.2	140-45.6	11/7	1557-1609	49	East-2	NE-1	East-3	8.1	14.8	bc	1028.1
US16452	40-05.1	140-44.1	11/8	0534-0542	59	WSW-1	ESE-1	WSW-2	7.9	14.7	c	1018.1
US16453	41-11.3	140-40.1	11/8	0624-0632	54	SE-2	ESE-1	SE-3	8.7	15.1	c	1018
US16454	41-12.0	140-41.9	11/8	0643-0650	74	SSE-2	ESE-1	SSE-3	8.9	15.4	o	1017.9
US16455	41-12.3	140-43.4	11/8	0702-0713	69	ESE-3	ESE-1	ESE-4	9.3	15.2	o	1017.2
US16456	41-12.8	140-45.1	11/8	0720-0730	62	SE-3	ESE-1	SE-5	9.3	15.1	o	1016.8

Cruise 376												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16457	41-49.2	141-13.3	11/14	1204-1219	174	SSE-2	South-1	SSE-3	10.9	11.9	bc	1023.8
US16458	41-47.1	141-14.7	11/14	1310-1326	200	SSE-3	SE-1	SSE-5	11.5	11.1	bc	1021.4
US16459	41-44.0	141-16.1	11/14	1348-1406	227	SE-3	SE-1	SE-5	12.1	13.5	bc	1020.7
US16460	41-40.9	141-17.5	11/14	1428-1445	230	SSE-3	SE-1	SSE-5	12.3	14	bc	1020
US16461	41-37.8	141-19.0	11/14	1509-1525	214	SSE-3	SE-1	SSE-6	12.9	14	bc	1019.8
US16462	41-35.1	141-20.6	11/14	1546-1610	309	SSE-3	SE-1	SSE-6	13	14.1	bc	1019.3
US16463	41-32.0	141-22.1	11/14	1637-1647	253	SSE-3	SE-1	SSE-6	12.9	14.8	bc	1018
US16464	41-28.9	141-23.5	11/14	1712-1719	90	SSE-3	SE-1	SSE-7	13.4	14.7	bc	1017.5
US16465	41-27.5	141-24.2	11/14	1731-1735	49	SSE-3	SE-1	SSE-6	13.7	14.7	bc	1017.3
US16466	41-35.4	140-53.4	11/14	2013-2019	50	SE-1	East-1	SE-1	13.3	14.9	c	1016.1
US16467	41-36.6	140-51.8	11/14	2037-2046	72	East-1	East-1	Calm	13	14.9	c	1015.4
US16468	41-38.8	140-49.2	11/14	2115-2137	300	NE-1	East-1	Calm	13	14.2	bc	1014.5
US16469	41-40.4	140-47.7	11/14	2211-2235	253	SW-1	East-1	WSW-2	12.7	13.4	bc	1013.5
US16470	41-42.7	140-45.1	11/14	2259-2308	85	Calm	East-1	Calm	11.8	14.2	bc	1012.5
US16471	42-10.3	140-47.3	11/17	1135-1143	92	NW-3	NW-1	NW-6	3	10.3	bc	1020.7
US16472	42-16.4	140-36.3	11/17	1252-1300	90	WNW-3	NW-1	WNW-6	3.2	10	bc	1020.7
US16473	42-23.6	140-31.0	11/17	1352-1400	94	West-3	WNW-1	West-6	3	9.8	bc	1020.4
US16474	42-23.3	140-42.3	11/17	1452-1458	63	West-3	WNW-1	West-6	3.4	9.8	bc	1021
US16475	42-11.6	141-02.2	11/18	0756-0802	79	WSW-3	WSW-1	WSW-4	6.6	10.6	bc	1022.8
US16476	42-10.0	141-09.7	11/18	0914-0921	120	SW-3	WSW-1	SW-4	7.6	11	c	1023
US16477	42-15.3	140-47.6	11/18	1136-1145	70	WSW-3	WSW-1	WSW-5	9.7	10.3	c	1020
US16478	42-18.4	140-42.2	11/19	0813-0818	64	South-1	West-1	South-2	10.9	9.6	o	1018
US16479	42-04.0	141-03.3	11/19	1056-1101	96	South-2	SE-1	South-4	12.5	11.1	o	1017.3
US16480	42-00.0	141-10.0	11/19	1218-1227	134	SW-2	SE-1	SW-4	13.2	11.3	c	1016.2

Table 1. List of Oceanographic Station(continued)

Cruise 377												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16481	42-16.6	140-36.0	12/12	1455-1505	90	NW-2	NW-1	NW-4	0.8	8.2	bc	1027
US16482	42-25.4	140-48.8	12/13	0717-0721	42	SE-3	SE-1	SE-6	5.7	7.8	r	1016
US16483	42-28.2	140-43.7	12/13	0802-0806	58	SSE-3	SSE-2	SSE-6	6	8	o	1015.7
US16484	42-31.2	140-37.9	12/13	0840-0847	60	SSE-3	SSE-2	SSE-5	6.1	7.8	o	1014.5
US16485	42-26.3	140-37.4	12/13	0931-0936	81	SSW-3	SSE-1	SSW-5	6.1	7.9	r	1014.1
US16486	42-21.3	140-36.7	12/13	1020-1027	86	West-3	ESE-1	West-5	5.1	7.8	r	1014.6
US16487	42-11.3	140-35.2	12/13	1152-1157	80	West-2	West-1	West-4	6	8	c	1014.2
US16488	42-09.7	140-35.6	12/13	1211-1219	72	West-2	West-1	West-4	6	8.2	c	1014.1
US16489	42-09.8	140-41.1	12/13	1258-1304	79	West-2	West-1	West-4	6.6	8.4	c	1014.2
US16490	42-10.2	140-47.0	12/13	1342-1349	94	West-3	West-1	West-5	6.5	8.5	o	1014.4
US16491	42-07.0	140-50.2	12/13	1422-1425	63	WNW-3	West-1	WNW-4	5.9	8.6	o	1014.6
US16492	42-13.1	140-42.1	12/14	0900-0907	89	West-2	NW-1	West-4	1.2	8.1	o	1010.6
US16493	42-13.9	140-30.4	12/14	1013-1018	79	West-1	NW-1	West-2	1.5	8	c	1009.7
US16494	42-18.9	140-23.2	12/14	1111-1115	54	NW-1	NW-1	NW-1	1.7	7.8	c	1008.1
US16495	42-18.8	140-30.6	12/14	1202-1209	92	West-1	NW-1	West-2	2.2	7.9	bc	1007.5
US16496	42-23.8	140-31.1	12/14	1250-1258	95	NNW-1	NW-1	NNW-2	2.2	8	bc	1006.4
US16497	42-26.5	140-25.2	12/14	1331-1337	63	NNW-1	NW-1	NNW-2	1.8	7.9	bc	1005.8
US16498	42-29.2	140-31.2	12/14	1422-1429	73	NNW-1	NW-1	NNW-2	3.4	7.9	bc	1005.3
US16499	42-23.3	140-42.2	12/14	1534-1539	63	WNW-1	NW-1	WNW-2	2.1	7.9	bc	1005.1
US16500	42-18.5	140-42.2	12/15	0706-0710	64	NNW-2	ESE-1	NNW-4	-0.4	9	c	1010.6
US16501	42-21.1	140-48.3	12/15	0746-0751	51	West-2	SE-1	West-2	-0.6	8.2	bc	1010.9
US16502	42-15.7	140-47.6	12/15	0830-0836	70	WSW-2	SE-1	WSW-4	-0.6	9	c	1010.8
US16503	42-17.3	140-53.6	12/15	0919-0924	58	WNW-2	ESE-1	WNW-3	1.2	9.4	bc	1011.1
US16504	42-13.0	140-55.5	12/15	1001-1007	67	West-2	ESE-1	West-4	0.8	9.4	c	1011.1
US16505	42-05.1	140-56.6	12/15	1104-1111	83	West-2	ESE-1	West-4	0.7	9.5	bc	1010.6
US16506	41-59.3	141-01.9	12/15	1201-1206	100	NW-2	ESE-1	NW-2	1.2	9.6	bc	1010.1
US16507	41-58.7	141-00.8	12/15	1214-1219	94	Calm	ESE-1	Calm	1.5	9.7	c	1010.1
US16508	41-58.0	140-59.6	12/15	1229-1233	86	Calm	ESE-1	Calm	1.2	9.7	c	1010.1
US16509	41-57.5	140-58.6	12/15	1242-1247	81	SW-2	ESE-1	SW-4	0.7	9.7	o	1009.7
Cruise 378												
station	Lat. (N)°	Long. (E)°	Date	Hour	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar (hPa)
US16510	41-28.9	140-21.1	12/20	1025-1031	63	West-2	SW-1	West-4	8.3	10.6	c	1025.5
US16511	41-26.8	140-17.9	12/20	1100-1106	65	WNW-2	SW-1	WNW-4	8.5	10.8	c	1025.5
US16512	41-24.4	140-20.3	12/20	1135-1143	95	West-3	SW-1	West-5	8.2	10.9	bc	1025.4
US16513	41-27.9	140-16.2	12/20	1214-1218	24	West-2	SW-1	West-5	8.1	10.7	bc	1025.5
US16514	41-23.3	140-05.9	12/20	1343-1350	100	WNW-3	West-1	WNW-6	6.5	10.9	bc	1025.5
US16515	41-24.5	140-05.9	12/20	1407-1414	52	NW-3	West-1	NW-6	6.4	10.4	bc	1025.6
US16516	41-35.0	140-33.3	12/21	0715-0722	56	WNW-2	SW-1	WNW-3	7.5	11	c	1029.3
US16517	41-35.0	140-29.9	12/21	0757-0804	45	NNW-2	South-1	NNW-3	5.2	11	c	1029.9
US16518	41-35.1	140-26.5	12/21	0822-0825	13	NNW-2	South-1	NNW-3	3.7	10.7	c	1029.8
US16519	41-37.0	140-30.0	12/21	0907-0912	32	NNW-2	South-1	NNW-3	5.4	10.7	c	1030.5
US16520	41-37.6	140-28.5	12/21	0932-0937	23	WNW-2	South-1	WNW-3	5	10.1	c	1030.7
US16521	41-38.0	140-26.8	12/21	0947-0952	16	SW-2	South-1	SW-3	5.2	9.6	c	1030.7
US16522	41-41.2	140-34.2	12/21	1054-1100	39	SSW-2	South-1	SSW-2	7.3	10.9	c	1030.5
US16523	41-43.7	140-36.6	12/21	1121-1126	33	SSW-1	SW-1	SSW-2	7.5	10.8	c	1030
US16524	41-43.6	140-38.1	12/21	1154-1201	57	SW-2	SW-1	SW-4	8	10.9	o	1029.7
US16525	41-43.5	140-40.0	12/21	1222-1230	67	West-2	SW-1	West-4	8.2	10.7	c	1029.6
US16526	41-45.4	140-40.2	12/21	1254-1259	41	Calm	South-1	Calm	7.2	10	o	1029.5
US16527	41-46.8	140-40.3	12/21	1320-1325	20	Calm	Calm	Calm	6.9	8.8	o	1029.5

Table 2. Oceanographic data

STATION	US16449		
LATITUDE	41-04.7	N	
LONGITUD	141-02.3	E	
DEPTH (m)	46		
Press.	Temp.	Salinity	Sigma-T
5	14.4548	33.5262	24.9529
10	14.3809	33.5256	24.9681
20	14.3994	33.5346	24.971
30	14.4	33.5364	24.9723
40	14.3733	33.5294	24.9726
42	14.3658	33.5288	24.9736

STATION	US16452		
LATITUDE	40-05.1	N	
LONGITUD	140-44.1	E	
DEPTH (m)	59		
Press.	Temp.	Salinity	Sigma-T
5	15.0861	33.7641	25.0004
10	15.0861	33.7614	24.9983
20	15.0954	33.7601	24.9953
30	15.0935	33.7596	24.9953
40	15.094	33.7595	24.9952
50	15.0924	33.7597	24.9956
55	15.0847	33.763	24.9998

STATION	US16455		
LATITUDE	41-12.3	N	
LONGITUD	140-43.4	E	
DEPTH (m)	69		
Press.	Temp.	Salinity	Sigma-T
5	15.4067	33.9214	25.051
10	15.4067	33.9175	25.0481
20	15.3901	33.9146	25.0496
30	15.3582	33.9088	25.0521
40	15.3265	33.9019	25.0538
50	15.1719	33.8668	25.0607
65	14.8863	33.9429	25.1816

STATION	US16458		
LATITUDE	41-47.1	N	
LONGITUD	141-14.7	E	
DEPTH (m)	200		
Press.	Temp.	Salinity	Sigma-T
5	11.6239	33.9802	25.8675
10	11.6119	33.9636	25.8569
20	11.5862	33.9602	25.859
30	11.5822	33.9602	25.8598
40	11.5898	33.9615	25.8593
50	11.4113	33.9853	25.9107
75	11.3834	33.9861	25.9165
100	11.3251	34.0012	25.9389
125	11.2596	34.0189	25.9646
150	11.0677	34.0143	25.9958
175	10.6941	34.0101	26.0591
191	10.6299	34.0051	26.0664

STATION	US16450		
LATITUDE	41-03.7	N	
LONGITUD	140-52.6	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	14.6579	33.6727	25.0226
10	14.6453	33.6615	25.0166
20	14.9581	33.8002	25.0561
30	14.9386	33.8239	25.0786
40	14.9038	33.8404	25.0989
46	14.8701	33.869	25.1281

STATION	US16453		
LATITUDE	41-11.3	N	
LONGITUD	140-40.1	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	15.6628	33.8616	24.948
10	15.6676	33.8601	24.9457
20	15.6635	33.8585	24.9455
30	15.6054	33.8631	24.962
40	15.4858	33.8833	25.0042
50	15.4411	33.8935	25.022

STATION	US16456		
LATITUDE	41-12.8	N	
LONGITUD	140-45.1	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	15.0272	33.8893	25.1098
10	15.0353	33.8861	25.1055
20	15.0519	33.884	25.1003
30	15.0557	33.8846	25.0999
40	15.0555	33.8842	25.0997
50	15.0282	33.8871	25.1078
58	14.9514	33.8841	25.1222

STATION	US16459		
LATITUDE	41-44.0	N	
LONGITUD	141-16.1	E	
DEPTH (m)	227		
Press.	Temp.	Salinity	Sigma-T
5	14.4405	33.8895	25.2362
10	14.4164	33.9029	25.2517
20	13.061	33.9188	25.5432
30	12.1627	33.9605	25.7508
40	11.6516	33.9656	25.851
50	11.5459	33.9699	25.874
75	11.4543	33.9685	25.8897
100	11.4228	33.971	25.8975
125	11.3868	33.9789	25.9102
150	11.3194	34.0084	25.9455
175	10.4932	33.9949	26.0825
200	10.0696	33.9808	26.1443
221	8.1657	33.8337	26.3333

STATION	US16451		
LATITUDE	40-57.2	N	
LONGITUD	140-45.6	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	14.96	33.6753	24.9594
10	14.956	33.6725	24.9581
20	14.9454	33.6702	24.9587
30	14.9451	33.6748	24.9623
40	14.9457	33.6778	24.9644
45	15.1406	34.0873	25.2376

STATION	US16454		
LATITUDE	41-12.0	N	
LONGITUD	140-41.9	E	
DEPTH (m)	74		
Press.	Temp.	Salinity	Sigma-T
5	15.4401	33.9043	25.0305
10	15.4448	33.9006	25.0266
20	15.4431	33.8998	25.0264
30	15.4402	33.904	25.0302
40	15.4412	33.9046	25.0304
50	15.4242	33.9209	25.0468
70	14.5271	34.0327	25.3283

STATION	US16457		
LATITUDE	41-49.2	N	
LONGITUD	141-13.3	E	
DEPTH (m)	174		
Press.	Temp.	Salinity	Sigma-T
5	11.4132	33.986	25.9109
10	11.389	33.985	25.9146
20	11.3753	33.9948	25.9247
30	11.3319	34.0085	25.9433
40	11.3422	34.0163	25.9475
50	11.2934	34.0265	25.9643
75	10.9127	34.0088	26.0193
100	10.8262	34.0102	26.0358
125	10.8237	34.0104	26.0363
150	10.8284	34.0142	26.0385
160	10.7947	34.0162	26.046

STATION	US16460		
LATITUDE	41-40.9	N	
LONGITUD	141-17.5	E	
DEPTH (m)	230		
Press.	Temp.	Salinity	Sigma-T
5	14.2774	33.8948	25.2748
10	13.5993	33.9443	25.4541
20	11.9782	33.9407	25.7705
30	11.8677	33.9596	25.806
40	11.7841	33.957	25.8197
50	11.8034	33.9587	25.8173
75	11.6446	33.9627	25.8501
100	11.3777	33.9876	25.9187
125	11.205	33.9944	25.9554
150	11.1555	34.0117	25.9779
175	10.5442	34.0002	26.0777
200	9.867	33.9637	26.1651
221	8.5382	33.8681	26.3038

STATION	US16461		
LATITUDE	41-37.8	N	
LONGITUD	141-19.0	E	
DEPTH (m)	214		
Press.	Temp.	Salinity	Sigma-T
5	14.2927	33.8984	25.2744
10	14.2953	33.8982	25.2737
20	14.1505	33.8987	25.3046
30	12.9341	33.9039	25.5568
40	12.4441	33.91	25.6575
50	12.1775	33.9436	25.7349
75	11.8024	34.0146	25.861
100	11.3653	34.0054	25.9348
125	10.8245	33.9478	25.9875
150	10.6545	33.9423	26.0132
175	10.4294	33.9471	26.0562
200	9.4023	33.9307	26.2162

STATION	US16464		
LATITUDE	41-28.9	N	
LONGITUD	141-23.5	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	15.0278	33.8851	25.1063
10	15.0293	33.8849	25.1059
20	15.0153	33.8858	25.1097
30	14.9948	33.8854	25.1138
40	14.8456	33.8969	25.155
50	14.8065	33.904	25.169
75	14.5115	33.9246	25.2482
80	14.5139	33.9257	25.2485

STATION	US16467		
LATITUDE	41-36.6	N	
LONGITUD	140-51.8	E	
DEPTH (m)	72		
Press.	Temp.	Salinity	Sigma-T
5	14.6082	33.8045	25.1348
10	14.9606	33.821	25.0716
20	14.9714	33.8194	25.068
30	14.915	33.8234	25.0834
40	14.6805	33.8419	25.1482
50	14.6002	33.8547	25.1753
61	14.6241	33.8514	25.1677

STATION	US16470		
LATITUDE	41-42.7	N	
LONGITUD	140-45.1	E	
DEPTH (m)	85		
Press.	Temp.	Salinity	Sigma-T
5	14.5112	33.7989	25.1512
10	14.5155	33.796	25.1481
20	14.4921	33.8143	25.1672
30	14.1955	33.8565	25.2625
40	13.7423	33.863	25.3619
50	13.0736	33.9467	25.5622
75	12.9436	33.9772	25.6117
76	12.9301	33.9814	25.6177

STATION	US16473		
LATITUDE	42-23.6	N	
LONGITUD	140-31.0	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	10.1823	33.7793	25.9679
10	10.1841	33.7795	25.9677
20	10.199	33.779	25.9648
30	10.2001	33.7787	25.9644
40	10.2001	33.7804	25.9657
50	10.1995	33.7809	25.9662
75	9.1065	33.8345	26.1885
93	8.2407	33.7877	26.2859

STATION	US16462		
LATITUDE	41-35.1	N	
LONGITUD	141-20.6	E	
DEPTH (m)	309		
Press.	Temp.	Salinity	Sigma-T
5	15.3062	33.8233	24.9977
10	15.086	33.8383	25.0576
20	14.6444	33.8672	25.1755
30	14.2888	33.8878	25.267
40	14.1686	33.8959	25.2986
50	14.1604	33.8978	25.3018
75	13.2601	33.9098	25.4963
100	12.4011	33.916	25.6705
125	11.8398	33.9237	25.7833
150	11.5546	33.9767	25.8776
175	10.3881	33.9867	26.0943
200	8.6173	33.8783	26.2996
250	7.2028	33.7728	26.4241
300	5.1022	33.6599	26.6012

STATION	US16465		
LATITUDE	41-27.5	N	
LONGITUD	141-24.2	E	
DEPTH (m)	49		
Press.	Temp.	Salinity	Sigma-T
5	14.9719	33.8892	25.1217
10	14.9778	33.8893	25.1205
20	14.9839	33.889	25.119
30	14.7863	33.8977	25.1684
40	14.7325	33.9017	25.1832
41	14.6914	33.9036	25.1934

STATION	US16468		
LATITUDE	41-38.8	N	
LONGITUD	140-49.2	E	
DEPTH (m)	300		
Press.	Temp.	Salinity	Sigma-T
5	13.8574	33.8897	25.3587
10	13.8349	33.8897	25.3634
20	13.5074	33.9177	25.4522
30	13.324	33.9483	25.5131
40	13.3743	33.9422	25.4982
50	13.4307	33.9348	25.4811
75	12.2293	34.0945	25.8421
100	11.7585	34.1024	25.9374
125	11.1881	34.0847	26.0288
150	10.6874	34.0823	26.1165
175	10.2971	34.0969	26.1959
200	10.262	34.0986	26.2034
250	10.0024	34.0951	26.2449
270	9.821	34.0945	26.275

STATION	US16471		
LATITUDE	42-10.3	N	
LONGITUD	140-47.3	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	10.5267	33.919	26.0174
10	10.5324	33.9194	26.0167
20	10.5355	33.9197	26.0165
30	10.5317	33.9188	26.0163
40	10.5332	33.9194	26.0166
50	10.5437	33.9216	26.0165
75	10.5483	33.9219	26.0159
90	9.0548	33.827	26.1909

STATION	US16474		
LATITUDE	42-23.3	N	
LONGITUD	140-42.3	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	10.0718	33.8147	26.0143
10	10.0769	33.8142	26.013
20	10.0782	33.8141	26.0127
30	10.0792	33.8145	26.0129
40	10.0822	33.8147	26.0125
50	10.083	33.8148	26.0125
60	10.0684	33.8156	26.0156

STATION	US16463		
LATITUDE	41-32.0	N	
LONGITUD	141-22.1	E	
DEPTH (m)	253		
Press.	Temp.	Salinity	Sigma-T
5	14.971	33.8876	25.1207
10	14.9613	33.8882	25.1233
20	14.9403	33.89	25.1292
30	14.9477	33.8898	25.1275
40	14.9246	33.8909	25.1333
50	14.9211	33.8918	25.1347
75	14.9204	33.8925	25.1355
100	14.2741	33.9336	25.3055
125	13.7504	33.9828	25.4528
150	12.9428	34.0478	25.6666
175	12.3903	34.0236	25.756
200	11.3187	34.0912	26.0101
228	11.3014	34.095	26.0161

STATION	US16466		
LATITUDE	41-35.4	N	
LONGITUD	140-53.4	E	
DEPTH (m)	50		
Press.	Temp.	Salinity	Sigma-T
5	15.1847	33.799	25.0058
10	15.1864	33.7989	25.0052
20	15.1827	33.7989	25.0061
30	15.1812	33.7992	25.0067
40	15.1769	33.7992	25.0076

STATION	US16469		
LATITUDE	41-40.4	N	
LONGITUD	140-47.7	E	
DEPTH (m)	253		
Press.	Temp.	Salinity	Sigma-T
5	13.6391	33.9038	25.4146
10	13.5085	33.9096	25.4458
20	13.4183	33.919	25.4714
30	13.3891	33.9207	25.4786
40	13.3678	33.9214	25.4835
50	13.3751	33.9218	25.4823
75	12.6322	34.0051	25.6947
100	11.9552	34.0709	25.8759
125	10.8087	34.0855	26.0975
150	10.7252	34.093	26.1182
175	10.5976	34.0959	26.1429
200	10.3911	34.0939	26.1774
231	9.6299	34.0957	26.3078

STATION	US16472		
LATITUDE	42-16.4	N	
LONGITUD	140-36.3	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	10.3702	33.85	25.9908
10	10.3768	33.85	25.9896
20	10.3896	33.8534	25.9901
30	10.3845	33.8508	25.9889
40	10.3872	33.8514	25.989
50	10.4061	33.8563	25.9895
75	9.1649	33.8564	26.1964
87	8.5067	33.8046	26.2589

STATION	US16475		
LATITUDE	42-11.6	N	
LONGITUD	141-02.2	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	11.2227	34.0458	25.9922
10	11.2069	34.0447	25.9943
20	11.2105	34.0438	25.9929
30	11.1989	34.0406	25.9925
40	11.2211	34.0459	25.9926
50	11.2059	34.0401	25.9909
75	10.9984	33.9993	25.9966
77	10.9118	33.9859	26.0016

STATION US16476			
LATITUDE 42-10.0 N			
LONGITUD 141-09.7 E			
DEPTH (m) 120			
Press.	Temp.	Salinity	Sigma-T
5	12.0766	34.0243	25.8167
10	12.0756	34.0233	25.8162
20	11.7751	33.9855	25.8435
30	11.3838	33.9509	25.889
40	11.3421	33.9478	25.8943
50	11.3557	33.9502	25.8936
75	11.3161	33.948	25.8991
100	11.2215	33.9599	25.9256
116	10.6702	33.9875	26.0456

STATION US16479			
LATITUDE 42-04.0 N			
LONGITUD 141-03.3 E			
DEPTH (m) 96			
Press.	Temp.	Salinity	Sigma-T
5	11.4419	33.9536	25.8805
10	11.4416	33.9555	25.882
20	11.4464	33.9565	25.8819
30	11.4455	33.9561	25.8817
40	11.4458	33.9557	25.8813
50	11.4339	33.9531	25.8816
75	11.4252	33.9525	25.8827
94	11.2186	34.0105	25.9655

STATION US16482			
LATITUDE 42-25.4 N			
LONGITUD 140-48.8 E			
DEPTH (m) 42			
Press.	Temp.	Salinity	Sigma-T
5	8.3571	33.872	26.3345
10	8.3459	33.8705	26.3351
20	8.3276	33.8668	26.3349
30	8.3166	33.8644	26.3346
40	8.2665	33.8533	26.3336
41	8.222	33.8448	26.3335

STATION US16485			
LATITUDE 42-26.3 N			
LONGITUD 140-37.4 E			
DEPTH (m) 81			
Press.	Temp.	Salinity	Sigma-T
5	8.262	33.8414	26.3249
10	8.266	33.8424	26.3251
20	8.2666	33.8416	26.3243
30	8.2611	33.8405	26.3243
40	8.2602	33.8407	26.3246
50	8.2595	33.8406	26.3246
75	8.2479	33.8385	26.3247
79	8.2273	33.8382	26.3276

STATION US16488			
LATITUDE 42-09.7 N			
LONGITUD 140-35.6 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	8.2953	33.8688	26.3413
10	8.2965	33.8655	26.3385
20	8.2973	33.8639	26.3372
30	8.2938	33.8627	26.3368
40	8.2943	33.8623	26.3364
50	8.2957	33.8624	26.3363
65	8.2984	33.8625	26.336

STATION US16477			
LATITUDE 42-15.3 N			
LONGITUD 140-47.6 E			
DEPTH (m) 70			
Press.	Temp.	Salinity	Sigma-T
5	10.5586	33.9486	26.0349
10	10.5563	33.9487	26.0354
20	10.5556	33.9488	26.0356
30	10.547	33.9512	26.0389
40	10.5482	33.9514	26.0389
50	10.5496	33.9514	26.0387
68	10.5467	33.9525	26.04

STATION US16480			
LATITUDE 42-00.0 N			
LONGITUD 141-10.0 E			
DEPTH (m) 134			
Press.	Temp.	Salinity	Sigma-T
5	11.6271	34.0364	25.9107
10	11.5738	34.0315	25.9167
20	11.4486	34.023	25.9332
30	11.4045	34.0223	25.9408
40	11.405	34.0269	25.9442
50	11.3973	34.0264	25.9453
75	11.2987	34.0208	25.9589
100	11.1012	34.0203	25.9944
125	10.0523	33.9639	26.134
128	9.6439	33.9279	26.1743

STATION US16483			
LATITUDE 42-28.2 N			
LONGITUD 140-43.7 E			
DEPTH (m) 58			
Press.	Temp.	Salinity	Sigma-T
5	8.3011	33.8361	26.3148
10	8.2905	33.8324	26.3135
20	8.2713	33.8288	26.3136
30	8.2571	33.8242	26.3121
40	8.2576	33.8233	26.3114
50	8.2583	33.8235	26.3114
57	8.2627	33.8254	26.3122

STATION US16486			
LATITUDE 42-21.3 N			
LONGITUD 140-36.7 E			
DEPTH (m) 86			
Press.	Temp.	Salinity	Sigma-T
5	8.1961	33.8317	26.3271
10	8.2022	33.832	26.3264
20	8.2035	33.8313	26.3257
30	8.2029	33.831	26.3256
40	8.1989	33.8298	26.3252
50	8.1871	33.8274	26.3251
75	8.1906	33.8278	26.3249
84	8.1917	33.828	26.3249

STATION US16489			
LATITUDE 42-09.8 N			
LONGITUD 140-41.1 E			
DEPTH (m) 79			
Press.	Temp.	Salinity	Sigma-T
5	8.7505	33.9134	26.3065
10	8.7563	33.9146	26.3066
20	8.6348	33.8851	26.3023
30	8.4661	33.8603	26.3088
40	8.3721	33.8479	26.3134
50	8.3814	33.8516	26.3148
75	8.4126	33.8614	26.3177
77	8.4287	33.8653	26.3184

STATION US16478			
LATITUDE 42-18.4 N			
LONGITUD 140-42.2 E			
DEPTH (m) 64			
Press.	Temp.	Salinity	Sigma-T
5	9.9946	33.7958	26.0126
10	9.9892	33.7966	26.0141
20	9.9754	33.7972	26.0169
30	9.9733	33.7978	26.0177
40	9.9709	33.7985	26.0187
50	9.982	33.8029	26.0202
62	9.9779	33.8045	26.0221

STATION US16481			
LATITUDE 42-16.6 N			
LONGITUD 140-36.0 E			
DEPTH (m) 90			
Press.	Temp.	Salinity	Sigma-T
5	8.4047	33.8729	26.328
10	8.4086	33.8692	26.3245
20	8.422	33.8687	26.322
30	8.4253	33.8696	26.3223
40	8.426	33.8696	26.3222
50	8.4258	33.8699	26.3225
75	8.4126	33.8699	26.3244
85	8.4045	33.8698	26.3256

STATION US16484			
LATITUDE 42-31.2 N			
LONGITUD 140-37.9 E			
DEPTH (m) 60			
Press.	Temp.	Salinity	Sigma-T
5	7.7275	33.7567	26.3372
10	7.7278	33.7563	26.3368
20	7.7429	33.7582	26.3362
30	7.7289	33.7558	26.3363
40	7.7159	33.7533	26.3362
50	7.7098	33.752	26.3361
55	7.7101	33.752	26.336

STATION US16487			
LATITUDE 42-11.3 N			
LONGITUD 140-35.2 E			
DEPTH (m) 80			
Press.	Temp.	Salinity	Sigma-T
5	8.5323	33.8882	26.3205
10	8.5312	33.8878	26.3204
20	8.5267	33.8879	26.3211
30	8.5188	33.8878	26.3222
40	8.5021	33.8851	26.3227
50	8.4829	33.8833	26.3242
75	8.4534	33.8785	26.325
78	8.45	33.8783	26.3253

STATION US16490			
LATITUDE 42-10.2 N			
LONGITUD 140-47.0 E			
DEPTH (m) 94			
Press.	Temp.	Salinity	Sigma-T
5	8.9012	33.937	26.3013
10	8.9038	33.9371	26.301
20	8.9145	33.9422	26.3033
30	8.9216	33.943	26.3029
40	8.9113	33.9429	26.3044
50	8.8808	33.939	26.3062
75	8.8624	33.9402	26.31
91	8.8434	33.9366	26.3101

STATION	US16491		
LATITUDE	42-07.0	N	
LONGITUD	140-50.2	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	8.8815	33.9136	26.2862
10	8.8802	33.9135	26.2862
20	8.8769	33.9129	26.2863
30	8.8332	33.9079	26.2892
40	8.8376	33.9158	26.2947
50	8.8488	33.9188	26.2953
60	8.8524	33.9195	26.2954

STATION	US16494		
LATITUDE	42-18.9	N	
LONGITUD	140-23.2	E	
DEPTH (m)	54		
Press.	Temp.	Salinity	Sigma-T
5	8.0448	33.8185	26.3393
10	8.0379	33.8179	26.3399
20	8.0335	33.8171	26.3399
30	8.0348	33.8169	26.3396
40	8.0344	33.8173	26.3399
50	8.0341	33.817	26.3397
52	8.0345	33.8169	26.3394

STATION	US16497		
LATITUDE	42-26.5	N	
LONGITUD	140-25.2	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	8.2007	33.8457	26.3374
10	8.1794	33.843	26.3385
20	8.1304	33.8403	26.3437
30	8.0802	33.8362	26.348
40	8.0285	33.8321	26.3524
50	8.01	33.8302	26.3537
60	8.0032	33.8299	26.3545

STATION	US16500		
LATITUDE	42-18.5	N	
LONGITUD	140-42.2	E	
DEPTH (m)	64		
Press.	Temp.	Salinity	Sigma-T
5	9.2769	34.0031	26.2931
10	9.2761	34.0025	26.2928
20	9.2702	34.0022	26.2935
30	9.1756	33.9949	26.3031
40	9.1439	33.997	26.3097
50	9.1166	33.9959	26.3133
61	9.0919	33.993	26.315

STATION	US16503		
LATITUDE	42-17.3	N	
LONGITUD	140-53.6	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	9.4404	34.0315	26.2888
10	9.4465	34.0315	26.2878
20	9.4532	34.0316	26.2867
30	9.453	34.0305	26.2859
40	9.4526	34.0292	26.285
50	9.4458	34.0289	26.2859
57	9.4409	34.0274	26.2855

STATION	US16492		
LATITUDE	42-13.1	N	
LONGITUD	140-42.1	E	
DEPTH (m)	89		
Press.	Temp.	Salinity	Sigma-T
5	8.4449	33.8966	26.3405
10	8.4448	33.8969	26.3407
20	8.4444	33.8975	26.3412
30	8.4521	33.8983	26.3407
40	8.4561	33.8982	26.34
50	8.4494	33.8978	26.3407
75	8.4528	33.8974	26.3399
87	8.4514	33.8976	26.3403

STATION	US16495		
LATITUDE	42-18.8	N	
LONGITUD	140-30.6	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	8.4561	33.89	26.3336
10	8.4513	33.8892	26.3337
20	8.4433	33.8876	26.3336
30	8.4568	33.8905	26.3338
40	8.4571	33.8905	26.3338
50	8.4586	33.8905	26.3335
75	8.4582	33.8895	26.3329
89	8.462	33.8905	26.3331

STATION	US16498		
LATITUDE	42-29.2	N	
LONGITUD	140-31.2	E	
DEPTH (m)	73		
Press.	Temp.	Salinity	Sigma-T
5	8.2085	33.843	26.3342
10	8.2083	33.8427	26.334
20	8.2003	33.8421	26.3347
30	8.1841	33.8408	26.3361
40	8.1696	33.8397	26.3374
50	8.1444	33.8372	26.3392
71	8.0625	33.832	26.3473

STATION	US16501		
LATITUDE	42-21.1	N	
LONGITUD	140-48.3	E	
DEPTH (m)	51		
Press.	Temp.	Salinity	Sigma-T
5	8.4747	33.9309	26.3628
10	8.4754	33.9312	26.3629
20	8.4781	33.9303	26.3618
30	8.4452	33.9239	26.3619
40	8.41	33.9214	26.3652
49	8.3632	33.9144	26.3668

STATION	US16504		
LATITUDE	42-13.0	N	
LONGITUD	140-55.5	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	9.6842	34.0118	26.2332
10	9.7034	34.0128	26.2308
20	9.4083	33.976	26.2506
30	9.2998	33.9735	26.2662
38	9.2967	33.9796	26.2716

STATION	US16493		
LATITUDE	42-13.9	N	
LONGITUD	140-30.4	E	
DEPTH (m)	79		
Press.	Temp.	Salinity	Sigma-T
5	8.2718	33.8684	26.3446
10	8.2797	33.8687	26.3436
20	8.2966	33.8686	26.341
30	8.2863	33.8672	26.3414
40	8.2855	33.8671	26.3415
50	8.2851	33.8666	26.3412
75	8.2915	33.8672	26.3406
77	8.2914	33.867	26.3405

STATION	US16496		
LATITUDE	42-23.8	N	
LONGITUD	140-31.1	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	8.5296	33.8994	26.3296
10	8.5284	33.8992	26.3297
20	8.5257	33.8979	26.3291
30	8.5194	33.8982	26.3303
40	8.5206	33.8983	26.3302
50	8.5234	33.8987	26.3301
75	8.5229	33.8978	26.3295
90	8.514	33.8963	26.3296

STATION	US16499		
LATITUDE	42-23.3	N	
LONGITUD	140-42.2	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	8.3012	33.8788	26.3483
10	8.2985	33.8784	26.3484
20	8.3085	33.8784	26.3469
30	8.3117	33.8792	26.347
40	8.3693	33.8937	26.3497
50	8.4421	33.9102	26.3515
62	8.5418	33.9319	26.3533

STATION	US16502		
LATITUDE	42-15.7	N	
LONGITUD	140-47.6	E	
DEPTH (m)	70		
Press.	Temp.	Salinity	Sigma-T
5	9.044	33.9833	26.315
10	9.0441	33.9827	26.3145
20	9.0253	33.9747	26.3112
30	8.8716	33.9516	26.3175
40	8.7321	33.9313	26.3234
50	8.6745	33.9237	26.3264
69	8.5493	33.8968	26.3246

STATION	US16505		
LATITUDE	42-05.1	N	
LONGITUD	140-56.6	E	
DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T
5	9.8864	34.0241	26.2091
10	9.8876	34.0229	26.2079
20	9.8859	34.0222	26.2076
30	9.8778	34.0217	26.2086
40	9.7769	34.0134	26.219
50	9.3611	33.982	26.263
75	8.8952	33.9315	26.2981
81	8.901	33.9335	26.2987

STATION US16506			
LATITUDE	41-59.3	N	
LONGITUD	141-01.9	E	
DEPTH (m)	100		
Press.	Temp.	Salinity	Sigma-T
5	9.9326	34.025	26.2019
10	9.9325	34.0252	26.2022
20	9.9377	34.025	26.2011
30	9.9355	34.0239	26.2007
40	9.9291	34.0227	26.2008
50	9.9238	34.0217	26.2009
75	9.9253	34.0219	26.2008
96	9.899	34.0186	26.2026

STATION US16509			
LATITUDE	41-57.5	N	
LONGITUD	140-58.6	E	
DEPTH (m)	81		
Press.	Temp.	Salinity	Sigma-T
5	10.013	34.0261	26.1893
10	10.0172	34.0257	26.1883
20	10.0154	34.0242	26.1874
30	9.9156	34.0172	26.1988
40	9.482	33.9825	26.2436
50	9.2147	33.9647	26.2732
75	9.0754	33.9635	26.2945
78	9.0754	33.9639	26.2948

STATION US16510			
LATITUDE	41-28.9	N	
LONGITUD	140-21.1	E	
DEPTH (m)	63		
Press.	Temp.	Salinity	Sigma-T
5	10.819	33.9528	25.9923
10	10.3806	33.9397	26.0589
20	9.8405	33.9583	26.1653
30	9.6294	33.9585	26.2007
40	9.5448	33.9587	26.2147
50	9.4897	33.9598	26.2247
61	9.4564	33.9602	26.2304

STATION US16513			
LATITUDE	41-27.9	N	
LONGITUD	140-16.2	E	
DEPTH (m)	24		
Press.	Temp.	Salinity	Sigma-T
5	11.0618	33.947	25.9444
10	11.064	33.9463	25.9435
20	11.0647	33.9457	25.9429
24	11.0627	33.9455	25.9431

STATION US16516			
LATITUDE	41-35.0	N	
LONGITUD	140-33.3	E	
DEPTH (m)	56		
Press.	Temp.	Salinity	Sigma-T
5	11.4431	33.9968	25.9139
10	11.4582	33.9957	25.9102
20	11.2414	33.9799	25.9375
30	11.1137	33.9752	25.957
40	10.7039	33.9605	26.0187
50	10.5187	33.9591	26.0501
55	10.3915	33.9599	26.0728

STATION US16507			
LATITUDE	41-58.7	N	
LONGITUD	141-00.8	E	
DEPTH (m)	94		
Press.	Temp.	Salinity	Sigma-T
5	10.0014	34.0263	26.1914
10	10.016	34.0259	26.1886
20	9.9956	34.0227	26.1896
30	9.9972	34.0258	26.1917
40	9.9888	34.0251	26.1926
50	9.94	34.021	26.1976
75	9.9091	34.019	26.2013
90	9.2938	33.9709	26.2652

STATION US16511			
LATITUDE	41-26.8	N	
LONGITUD	140-17.9	E	
DEPTH (m)	65		
Press.	Temp.	Salinity	Sigma-T
5	11.041	33.9526	25.9525
10	10.9489	33.9496	25.9667
20	10.8403	33.949	25.9856
30	10.7518	33.9483	26.0007
40	10.6782	33.9481	26.0135
50	10.5924	33.9495	26.0297
63	9.2537	33.9198	26.2322

STATION US16514			
LATITUDE	41-23.3	N	
LONGITUD	140-05.9	E	
DEPTH (m)	100		
Press.	Temp.	Salinity	Sigma-T
5	10.797	33.9617	26.0031
10	10.7921	33.9619	26.0042
20	10.7784	33.9617	26.0065
30	10.7563	33.9626	26.0111
40	10.5728	33.9638	26.0443
50	9.8991	33.9322	26.1352
75	9.1041	33.939	26.2707
99	8.9629	33.9448	26.2978

STATION US16517			
LATITUDE	41-35.0	N	
LONGITUD	140-29.9	E	
DEPTH (m)	45		
Press.	Temp.	Salinity	Sigma-T
5	17.387	33.787	24.491
5	11.2139	33.9694	25.9344
10	11.2176	33.9684	25.933
20	11.2202	33.9687	25.9327
30	11.1461	33.9525	25.9335
40	10.8928	33.9251	25.9576
44	10.6598	33.9078	25.9854

STATION US16508			
LATITUDE	41-58.0	N	
LONGITUD	140-59.6	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	10.0601	34.0228	26.1787
10	10.0614	34.022	26.1779
20	10.0585	34.0217	26.1781
30	10.0597	34.0214	26.1777
40	10.0558	34.0213	26.1783
50	10.0527	34.0211	26.1786
75	9.0977	33.9529	26.2826
83	9.0651	33.9552	26.2897

STATION US16512			
LATITUDE	41-24.4	N	
LONGITUD	140-20.3	E	
DEPTH (m)	95		
Press.	Temp.	Salinity	Sigma-T
5	12.1422	33.9315	25.7322
10	11.7598	33.931	25.804
20	11.3458	33.9418	25.8889
30	10.9495	33.9534	25.9695
40	10.3743	33.9552	26.0721
50	10.1458	33.9639	26.1181
75	9.0224	33.9722	26.3098
92	9.0513	33.9749	26.3073

STATION US16515			
LATITUDE	41-24.5	N	
LONGITUD	140-05.9	E	
DEPTH (m)	52		
Press.	Temp.	Salinity	Sigma-T
5	10.7897	33.9567	26.0005
10	10.8013	33.9565	25.9983
20	10.7749	33.9545	26.0015
30	10.6664	33.9464	26.0143
40	10.3059	33.9342	26.0675
50	10.0067	33.9375	26.1211
52	9.9791	33.934	26.1231

STATION US16518			
LATITUDE	41-35.1	N	
LONGITUD	140-26.5	E	
DEPTH (m)	13		
Press.	Temp.	Salinity	Sigma-T
5	10.9206	33.9369	25.9619
10	10.9343	33.9368	25.9593
12	10.9335	33.9367	25.9594

STATION	US16519		
LATITUDE	41-37.0	N	
LONGITUD	140-30.0	E	
DEPTH (m)	32		
Press.	Temp.	Salinity	Sigma-T
5	11.2055	33.9713	25.9374
10	11.2138	33.9708	25.9355
20	10.6915	33.9162	25.9863
30	10.4287	33.8977	26.0178
31	10.418	33.8984	26.0202

STATION	US16522		
LATITUDE	41-41.2	N	
LONGITUD	140-34.2	E	
DEPTH (m)	39		
Press.	Temp.	Salinity	Sigma-T
5	11.1879	33.949	25.9232
10	11.1821	33.9487	25.9241
20	11.1821	33.9487	25.924
30	11.1733	33.9486	25.9256
38	11.0838	33.9435	25.9377

STATION	US16525		
LATITUDE	41-43.5	N	
LONGITUD	140-40.0	E	
DEPTH (m)	67		
Press.	Temp.	Salinity	Sigma-T
5	10.7878	33.8917	25.9503
10	10.7799	33.8869	25.9479
20	10.8151	33.8966	25.9492
30	10.8928	33.9157	25.9503
40	10.8331	33.9238	25.9672
50	10.8304	33.9395	25.9799
66	10.6815	33.9546	26.018

STATION	US16520		
LATITUDE	41-37.6	N	
LONGITUD	140-28.5	E	
DEPTH (m)	23		
Press.	Temp.	Salinity	Sigma-T
5	10.3086	33.8436	25.9964
10	10.3562	33.859	26.0002
20	10.0538	33.8671	26.0582
22	10.079	33.8736	26.059

STATION	US16523		
LATITUDE	41-43.7	N	
LONGITUD	140-36.6	E	
DEPTH (m)	33		
Press.	Temp.	Salinity	Sigma-T
5	10.8673	33.9344	25.9694
10	10.8701	33.9343	25.9688
20	10.8322	33.9232	25.967
30	10.4918	33.8748	25.989
32	10.3821	33.8564	25.9937

STATION	US16526		
LATITUDE	41-45.4	N	
LONGITUD	140-40.2	E	
DEPTH (m)	41		
Press.	Temp.	Salinity	Sigma-T
5	9.9609	33.7103	25.9515
10	10.2302	33.7593	25.9441
20	10.7583	33.8891	25.9534
30	10.8526	33.9129	25.9553
38	10.7841	33.9055	25.9617

STATION	US16521		
LATITUDE	41-38.0	N	
LONGITUD	140-26.8	E	
DEPTH (m)	16		
Press.	Temp.	Salinity	Sigma-T
5	9.8324	33.8013	26.0441
10	9.8205	33.8028	26.0472
15	9.8239	33.8212	26.061

STATION	US16524		
LATITUDE	41-43.6	N	
LONGITUD	140-38.1	E	
DEPTH (m)	57		
Press.	Temp.	Salinity	Sigma-T
5	11.118	33.9497	25.9364
10	11.1084	33.9471	25.9361
20	11.0887	33.9454	25.9383
30	11.0093	33.9353	25.9448
40	10.976	33.938	25.9528
50	10.7711	33.9077	25.9657
56	10.7649	33.9094	25.9681

STATION	US16527		
LATITUDE	41-46.8	N	
LONGITUD	140-40.3	E	
DEPTH (m)	20		
Press.	Temp.	Salinity	Sigma-T
5	9.535	33.5373	25.887
10	10.4458	33.811	25.9473
20	10.8339	33.9133	25.9589
20	10.8339	33.9133	25.9589

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