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PART I

OSHORO MARU CRUISES FROM MARCH TO DECEMBER 2016

1

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

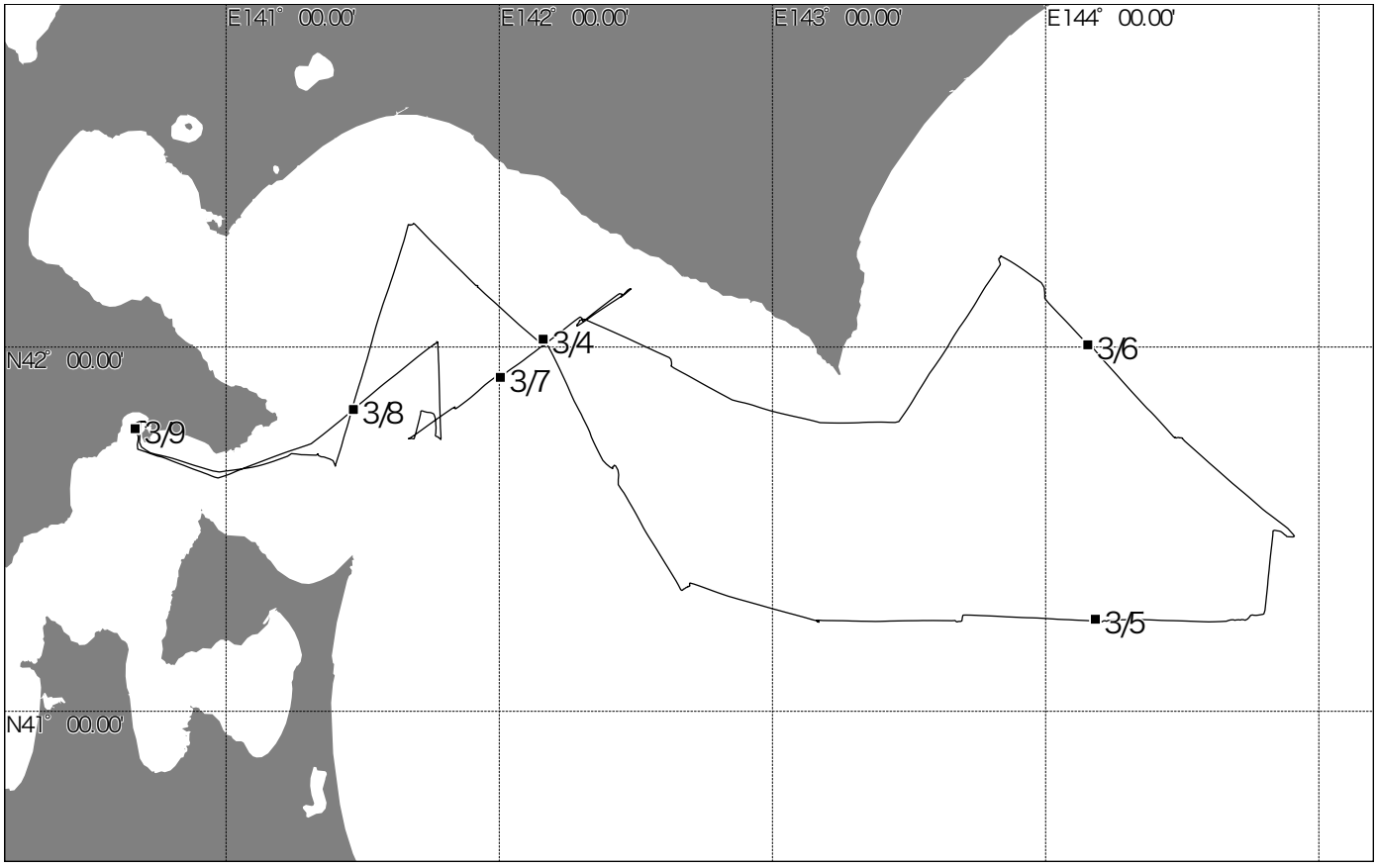


Fig.1: Noon Position

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

2

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

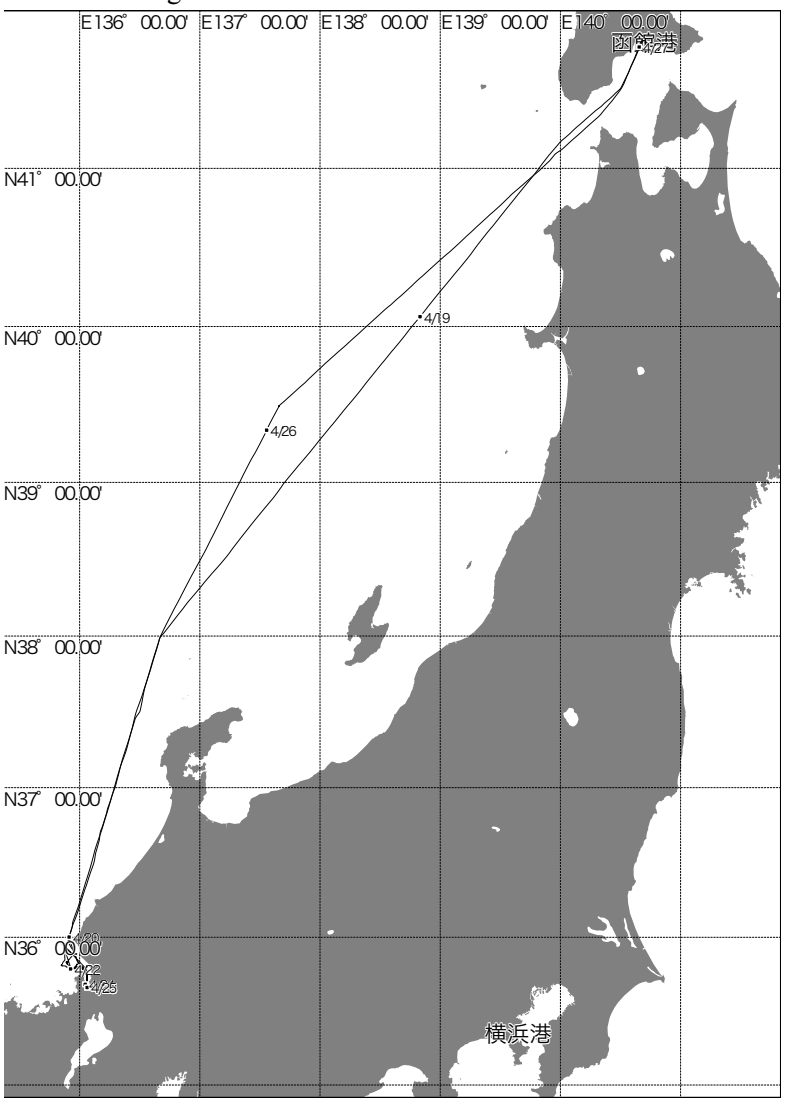


Fig.1.1: Noon Position(1)

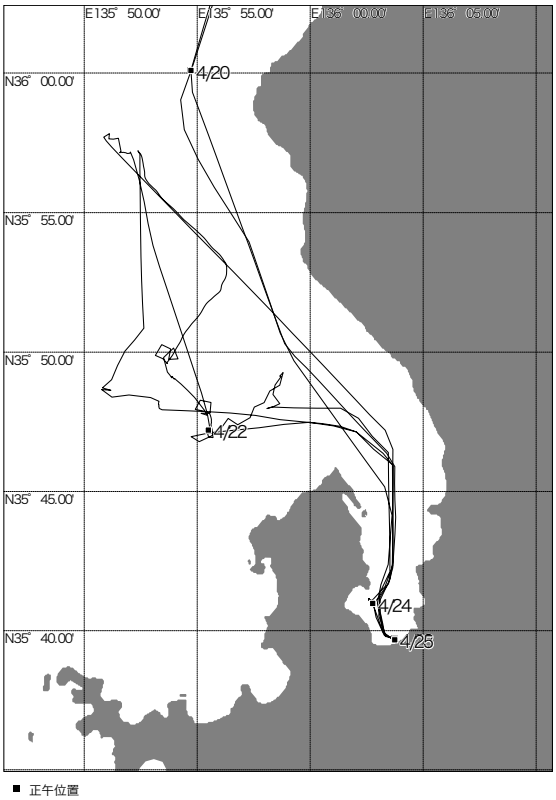


Fig.1.2: Noon Position(2)

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)

3

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

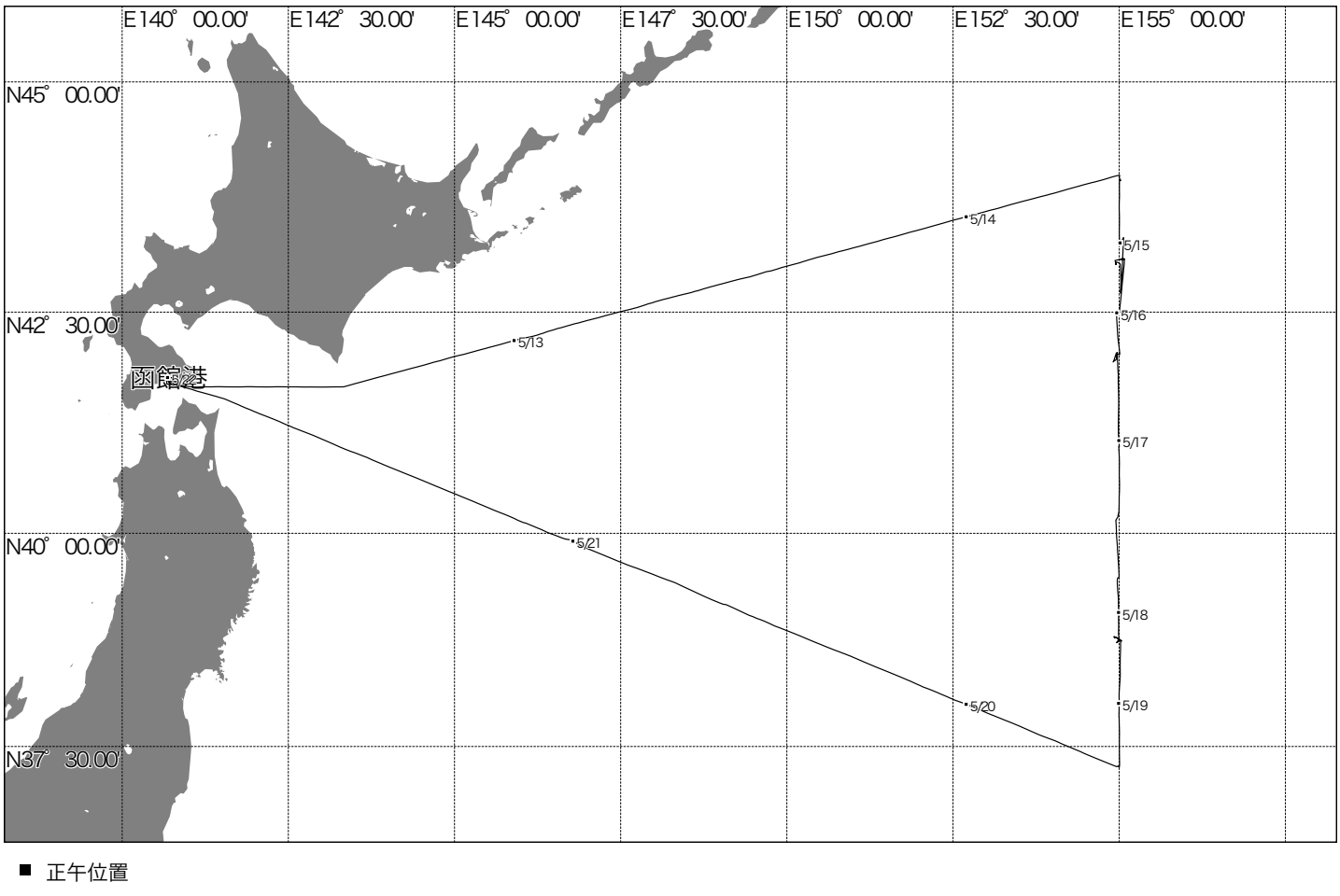


Fig.1: Noon Position

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)

Atsuchi 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 surpervised 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

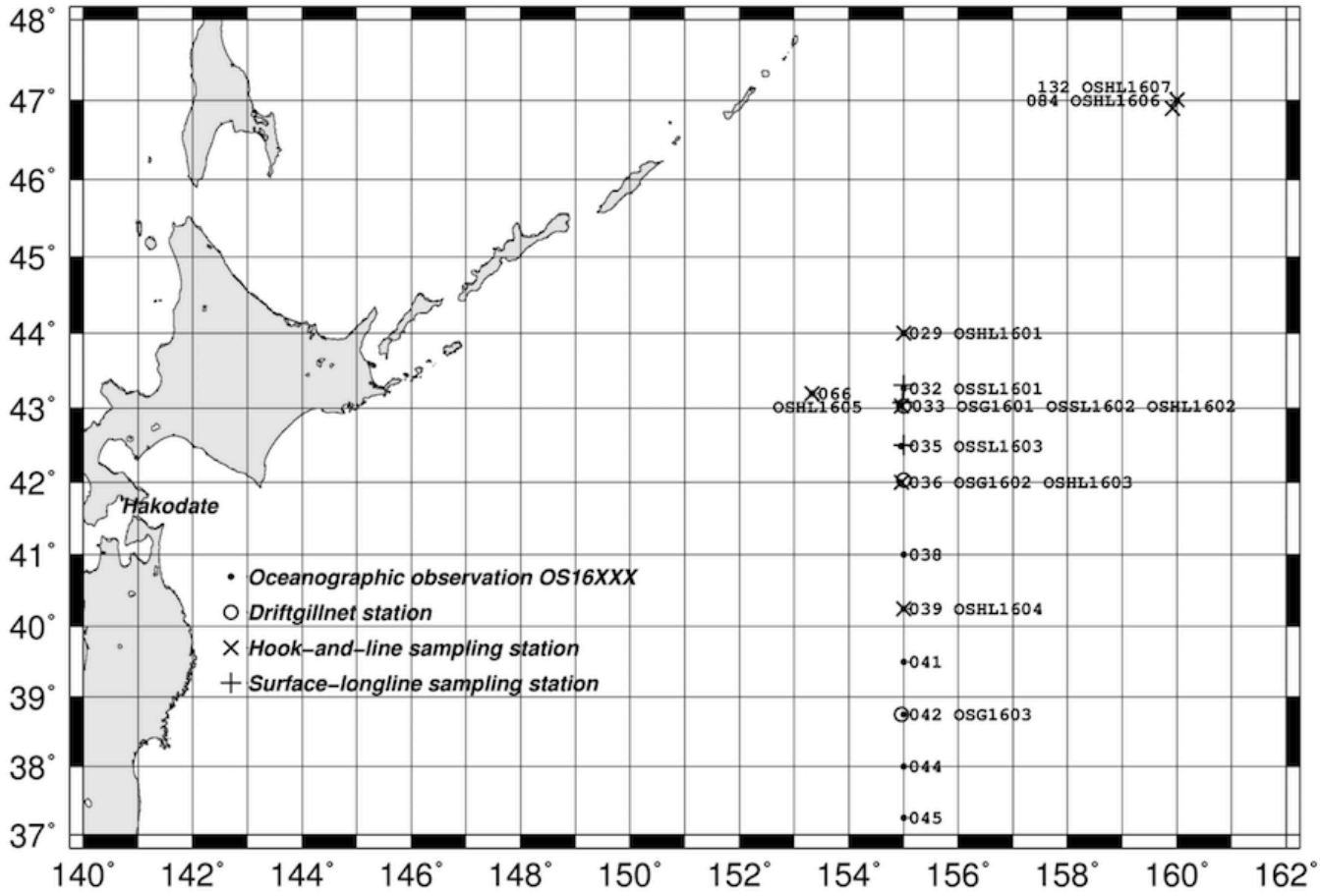


Fig.2: research stations

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	Wr*4	Wind	S.T.*5
	Net set	Net haul		Lat.	Long.		depth(m)		(Force)	(℃)
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	bottom	Wr*4	Wind	S.T.*5
	Line set	Line haul		Lat.	Long.		baskets	depth(m)		(Force)	(℃)
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.

Common name	Scientific name	Station / Gear	OSG 1601 C	CPUE	(%)	A	Total	OSG 1602 C	CPUE	(%)	A	Total	OSG 1603 C	CPUE	(%)	A	Total
Sockeye salmon	*Oncorhynchus nerka*		1	0.0	(0.5)	0	1	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Chum salmon	*Oncorhynchus keta*		1	0.0	(0.5)	2	3	12	0.4	(4.7)	17	29	0	0.0	(0.0)	0	0
Pink salmon	*Oncorhynchus gorbuscha*		204	6.8	(96.2)	0	204	234	7.8	(91.4)	1	235	0	0.0	(0.0)	0	0
Coho salmon	*Oncorhynchus kisutch*		0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Chinook salmon	*Oncorhynchus tshawytscha*		0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0
Steelhead	*Oncorhynchus mykiss*		0	0.0	(0.0)	0	0	2	0.1	(0.8)	0	2	0	0.0	(0.0)	0	0
Tufted Puffin	*Fratercula cirrhata*		0	0.0	(0.0)	0	0	1	0.0	(0.4)	0	1	0	0.0	(0.0)	0	0
Boreal clubhook squid	*Onychoteuthis borealijaponica*		4	0.1	(1.9)	0	4	5	0.2	(2.0)	0	5	2	0.1	(1.0)	0	2
Boreopacific gonate squid	*Gonatopsis borealis*		2	0.067	(0.9)	0	2	1	0.0	(0.4)	0	1	0	0.0	(0.0)	0	0
Horned puffin	*Fratercula corniculata*		0	0.0	(0.0)	0	0	1	0.033	(0.4)	0	1	0	0	(0.0)	0	0
Neon flying squid	*Ommastrephes bartramii*		0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	11	0.367	(5.7)	14	25
Pacific pomfret	*Brama japonica*		0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	172	5.733	(89.6)	109	281
Albacore tuna	*Thunnus alalunga*		0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	0	0	(0.0)	1	1
Blue shark	*Prionace glauca*		0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	6	0.2	(3.1)	2	8
Shortfin mako shark	*Isurus oxyrinchus*		0	0.0	(0.0)	0	0	0	0	(0.0)	0	0	0	0	(0.0)	1	1
Salmon shark	*Lamna ditropis*		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: Sockeye	Chum	Pink	Coho	Chinook	Stellhead	D.immutabilis	B.J.Hilgendorf	Scomber	Total
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 Lat.	Long.	Remark CTD	CTD depth(db)
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	
LATITUDE	43-59.8	N
LONGITUDE	155-00.2	E
DEPTH (m)	5300	

Press.	Temp.	Salinity	Sigma-T
5	3.9084	33.0129	26.2147
10	3.6221	33.0066	26.2373
20	3.5745	33.0054	26.2409
30	3.5687	33.0081	26.2436
40	3.5577	33.007	26.2438
50	3.5446	33.0063	26.2444
75	3.3634	33.0093	26.2636
100	3.0182	33.0632	26.3376
125	3.5846	33.4017	26.5555
150	3.4628	33.4814	26.6306
175	3.0416	33.5336	26.7109
200	2.9084	33.5739	26.7547
250	3.0205	33.6839	26.8327
300	3.236	33.8272	26.9274
400	3.4751	34.028	27.065
500	3.386	34.1264	27.1519
600	3.2363	34.2114	27.2338
700	3.1716	34.2839	27.2977
800	3.0112	34.3232	27.3438
900	2.8685	34.3783	27.4007
1000	2.6319	34.4041	27.4421
1200	2.4211	34.4594	27.5043
1500	2.1742	34.5286	27.58
2000	1.845	34.603	27.6657
2500	1.6425	34.6444	27.7143
3000	1.528	34.6654	27.7396
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	OS16032	
LATITUDE	43-15.9	N
LONGITUDE	155-00.3	E
DEPTH (m)	5500	

Press.	Temp.	Salinity	Sigma-T
5	4.9942	33.0621	26.1397
10	4.9641	33.0636	26.1442
20	4.7951	33.0535	26.1549
30	4.5042	33.0296	26.1671
40	4.5893	33.0552	26.1785
50	4.566	33.0974	26.2144
75	4.7542	33.2792	26.3383
100	5.062	33.3831	26.3865
125	3.1179	33.3066	26.5229
150	3.4905	33.4049	26.567
175	4.0629	33.5401	26.6185
200	3.4843	33.5156	26.6558
250	4.1778	33.7417	26.767
300	4.4142	33.874	26.8472
400	4.5124	34.0642	26.9877
500	3.8026	34.1032	27.0928
600	3.436	34.1597	27.1737
700	3.2323	34.2355	27.2534
800	3.1467	34.3039	27.316
900	2.9612	34.3502	27.3699
1000	2.8244	34.3875	27.4119
1200	2.4969	34.4437	27.4853
1500	2.2377	34.5126	27.562

STATION	OS16033	
LATITUDE	43-01.7	N
LONGITUDE	154-57.3	E
DEPTH (m)	5300	

Press.	Temp.	Salinity	Sigma-T
5	7.5456	33.6118	26.2494
10	7.5478	33.6116	26.2489
20	7.2216	33.5788	26.2689
30	7.0884	33.577	26.2858
40	7.1095	33.5839	26.2883
50	7.1424	33.5922	26.2904
75	7.2382	33.6227	26.3011
100	7.0673	33.6253	26.3267
125	5.2837	33.4893	26.4452
150	3.4174	33.3248	26.51
175	3.1359	33.3314	26.5411
200	3.2492	33.4145	26.5971
250	5.1946	33.8192	26.7168
300	4.3884	33.8154	26.8034
400	3.7114	33.9075	26.946
500	3.9779	34.0791	27.0559
600	3.8273	34.1715	27.1447
700	3.3978	34.2085	27.2162
800	3.205	34.2816	27.2927
900	3.1679	34.3521	27.3525
1000	2.8812	34.3736	27.3957
1200	2.5881	34.4418	27.476
1500	2.2749	34.5056	27.5534
2000	1.9461	34.5912	27.6484
2500	1.7039	34.6359	27.7028
3000	1.5586	34.6612	27.734

STATION	OS16035	
LATITUDE	42-29.6	N
LONGITUDE	154-57.7	E
DEPTH (m)	5200	

Press.	Temp.	Salinity	Sigma-T
5	7.5188	33.6202	26.2598
10	7.5174	33.6204	26.2601
20	8.0393	33.8221	26.343
30	8.0574	33.828	26.3449
40	8.3036	33.885	26.3528
50	8.2774	33.8827	26.355
75	8.2785	33.8891	26.3598
100	8.0653	33.8845	26.3881
125	7.4994	33.8122	26.4135
150	7.0848	33.7732	26.4407
175	6.5236	33.7142	26.4696
200	5.8137	33.6867	26.538
250	5.312	33.7064	26.6138
300	5.3019	33.8315	26.714
400	4.4803	33.9274	26.8825
500	3.7308	33.9869	27.0073
600	3.5651	34.083	27.1001
700	3.4869	34.193	27.1953
800	3.3245	34.2669	27.2698
900	3.1599	34.3151	27.3236
1000	2.9709	34.3554	27.3731
1200	2.7091	34.4217	27.4494
1500	2.372	34.4992	27.5403

STATION	OS16036	
LATITUDE	41-59.5	N
LONGITUDE	154-57.8	E
DEPTH (m)	5400	

Press.	Temp.	Salinity	Sigma-T
5	7.7017	33.6265	26.2386
10	7.6959	33.6266	26.2395
20	7.3963	33.6267	26.2822
30	7.2652	33.6295	26.3027
40	7.2478	33.6298	26.3054
50	7.1261	33.6388	26.3293
75	6.6961	33.6667	26.4094
100	6.7065	33.6696	26.4103
125	6.7303	33.6759	26.4121
150	6.1128	33.6847	26.4992
175	4.6108	33.6093	26.6158
200	4.0447	33.6261	26.6887
250	3.1599	33.6491	26.7924
300	3.2064	33.7432	26.8631
400	3.7696	33.9736	26.9929
500	3.532	34.0766	27.0982
600	3.6076	34.1903	27.1815
700	3.4611	34.2776	27.2652
800	3.2527	34.3238	27.3219
900	3.0203	34.3597	27.3721
1000	2.8509	34.3862	27.4085
1200	2.5701	34.4557	27.4887
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
LATITUDE 40-14.9 N
LONGITUDE 154-59.8 E
DEPTH (m) 5500

Press.	Temp.	Salinity	Sigma-T
5	13.0144	34.3855	25.9139
10	13.0162	34.3853	25.9134
20	13.0016	34.385	25.9161
30	12.9643	34.384	25.9228
40	12.7479	34.3733	25.9574
50	12.4751	34.3456	25.9894
75	12.1615	34.3515	26.0546
100	10.9639	34.2573	26.2036
125	10.3113	34.1914	26.2672
150	9.3883	34.0538	26.3147
175	8.6989	33.9611	26.3519
200	8.0354	33.8902	26.397
250	4.397	33.4325	26.4984
300	5.4947	33.6993	26.5866
400	5.7881	33.9612	26.7581
500	4.9563	34.0492	26.9264
600	4.3294	34.1029	27.0381
700	3.9394	34.1892	27.1473
800	3.6536	34.2542	27.2278
900	3.4123	34.3209	27.3045
1000	3.053	34.3499	27.3612
1200	2.7251	34.4169	27.4442
1500	2.3791	34.4928	27.5345
2000	1.9927	34.5849	27.6397
2500	1.7455	34.6309	27.6957
3000	1.5986	34.6569	27.7276

STATION OS16041
LATITUDE 38-45.0 N
LONGITUDE 155-00.0 E
DEPTH (m) 5600

Press.	Temp.	Salinity	Sigma-T
5	11.1669	34.0266	25.9875
10	11.1109	34.0248	25.9962
20	10.9515	34.0256	26.0254
30	10.6486	34.0304	26.0829
40	10.4303	34.0185	26.1118
50	10.26	34.0059	26.1313
75	9.7514	33.9895	26.2046
100	8.7822	33.9388	26.3215
125	8.5463	33.944	26.3621
150	8.5139	33.9493	26.3712
175	7.804	33.8351	26.3877
200	7.1727	33.7595	26.4179
250	5.9572	33.6827	26.5171
300	5.1686	33.6732	26.6041
400	4.5277	33.811	26.785
500	4.0544	33.9072	26.9113
600	3.7905	34.0369	27.0412
700	3.6627	34.1572	27.1496
800	3.6025	34.2503	27.2297
900	3.2694	34.3046	27.305
1000	3.0402	34.3531	27.365
1200	2.7217	34.4213	27.448
1500	2.3699	34.5045	27.5447

STATION OS16042
LATITUDE 41-00.0 N
LONGITUDE 155-00.0 E
DEPTH (m) 5700

Press.	Temp.	Salinity	Sigma-T
5	14.3595	34.4165	25.6603
10	14.3497	34.4161	25.662
20	12.9512	34.3257	25.8801
30	11.9701	34.2912	26.0442
40	11.714	34.2753	26.0801
50	11.5719	34.3215	26.1425
75	10.9786	34.3051	26.2382
100	10.9235	34.3038	26.2471
125	10.8738	34.2969	26.2507
150	10.698	34.2754	26.2651
175	10.4835	34.2485	26.2819
200	10.3224	34.2244	26.291
250	8.9387	34.0298	26.3681
300	7.6106	33.9027	26.4688
400	6.1017	33.9942	26.745
500	4.9926	34.0479	26.9212
600	4.4707	34.1394	27.0519
700	4.3291	34.2505	27.1554
800	3.7605	34.2882	27.2442
900	3.4402	34.3348	27.3128
1000	3.1986	34.3704	27.3642
1200	2.7964	34.4426	27.4584
1500	2.4114	34.5084	27.5443
2000	1.9773	34.5898	27.6448
2500	1.7153	34.6347	27.701
3000	1.5712	34.66	27.7321

STATION OS16044
LATITUDE 38-00.2 N
LONGITUDE 154-59.9 E
DEPTH (m) 6000

Press.	Temp.	Salinity	Sigma-T
5	17.2854	34.6727	25.195
10	17.287	34.673	25.1948
20	17.2714	34.6733	25.1988
30	17.094	34.6745	25.2421
40	16.1323	34.6483	25.4468
50	15.6026	34.6263	25.5501
75	14.5492	34.5597	25.7302
100	13.5773	34.485	25.8768
125	12.8829	34.4405	25.9827
150	12.1796	34.3721	26.0671
175	11.4927	34.3055	26.1447
200	10.7224	34.2326	26.2274
250	8.2378	33.9298	26.3979
300	8.0757	34.0643	26.5277
400	6.6687	34.0617	26.7245
500	4.7566	34.0122	26.9196
600	4.5228	34.1522	27.0564
700	4.0984	34.2244	27.159
800	3.6858	34.2962	27.2581
900	3.4111	34.3416	27.321
1000	3.1753	34.393	27.3844
1200	2.7362	34.4507	27.4703
1500	2.3531	34.5178	27.5567

STATION OS16045
LATITUDE 37-15.0 N
LONGITUDE 155-00.0 E
DEPTH (m) 5700

Press.	Temp.	Salinity	Sigma-T
5	18.0883	34.7379	25.0495
10	18.0828	34.738	25.051
20	16.5684	34.6838	25.3731
30	16.3045	34.6818	25.4329
40	15.9618	34.6587	25.4938
50	15.3546	34.6299	25.6083
75	14.6204	34.5798	25.7304
100	13.4374	34.4798	25.9014
125	12.5517	34.3892	26.0083
150	11.7568	34.3302	26.1148
175	10.7226	34.2153	26.2139
200	9.9747	34.1304	26.2772
250	8.2699	33.9198	26.3852
300	5.1116	33.542	26.5067
400	6.652	34.079	26.7403
500	5.0828	34.0556	26.917
600	4.8613	34.202	27.0584
700	4.0325	34.2359	27.175
800	3.7638	34.2948	27.2492
900	3.4318	34.345	27.3218
1000	3.164	34.3803	27.3753
1200	2.7793	34.4464	27.463
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

4

THE "OSHORO 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

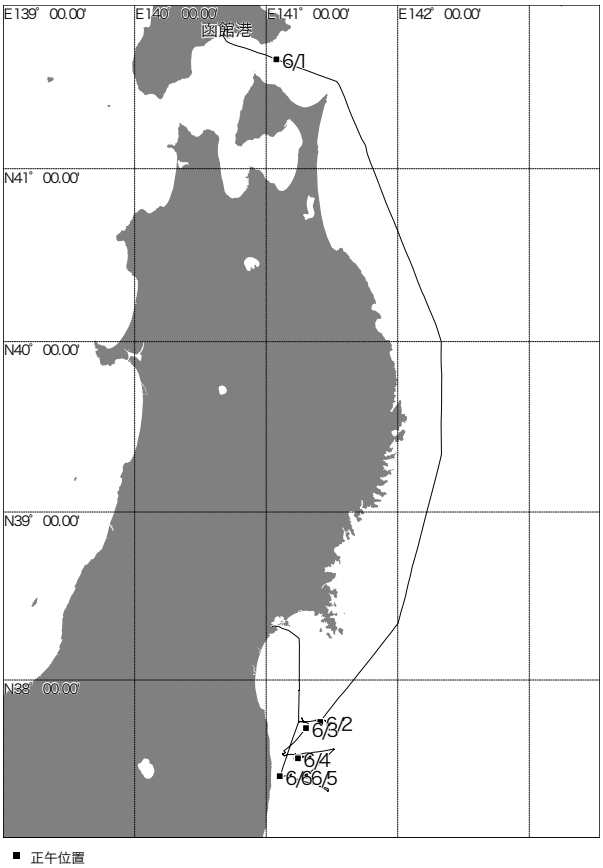


Fig.1.1: Noon Position (Leg1)

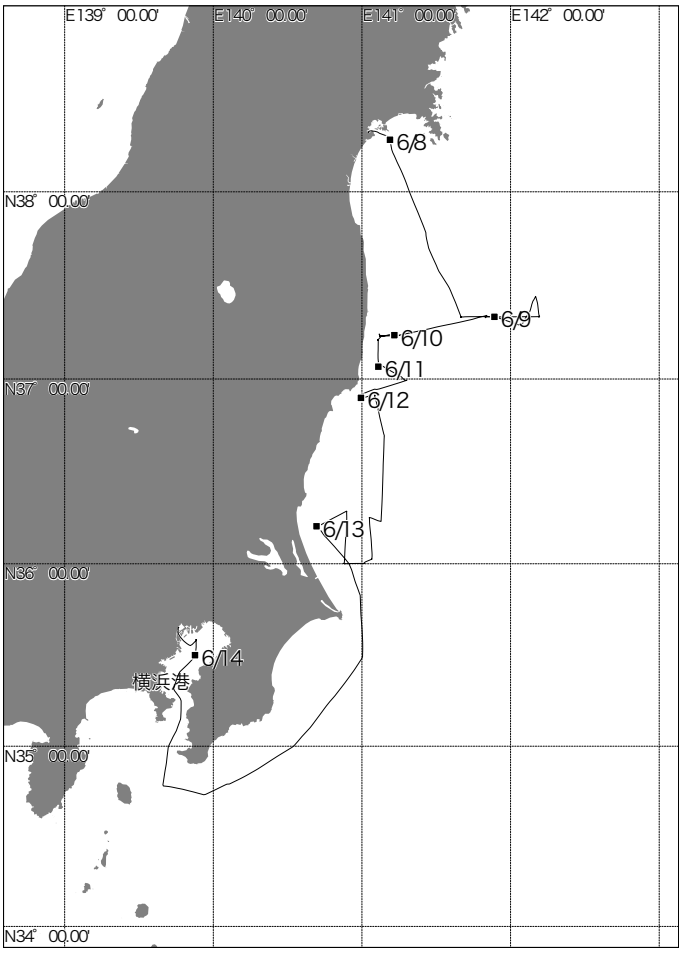


Fig.1.2: Noon Position (Leg2)

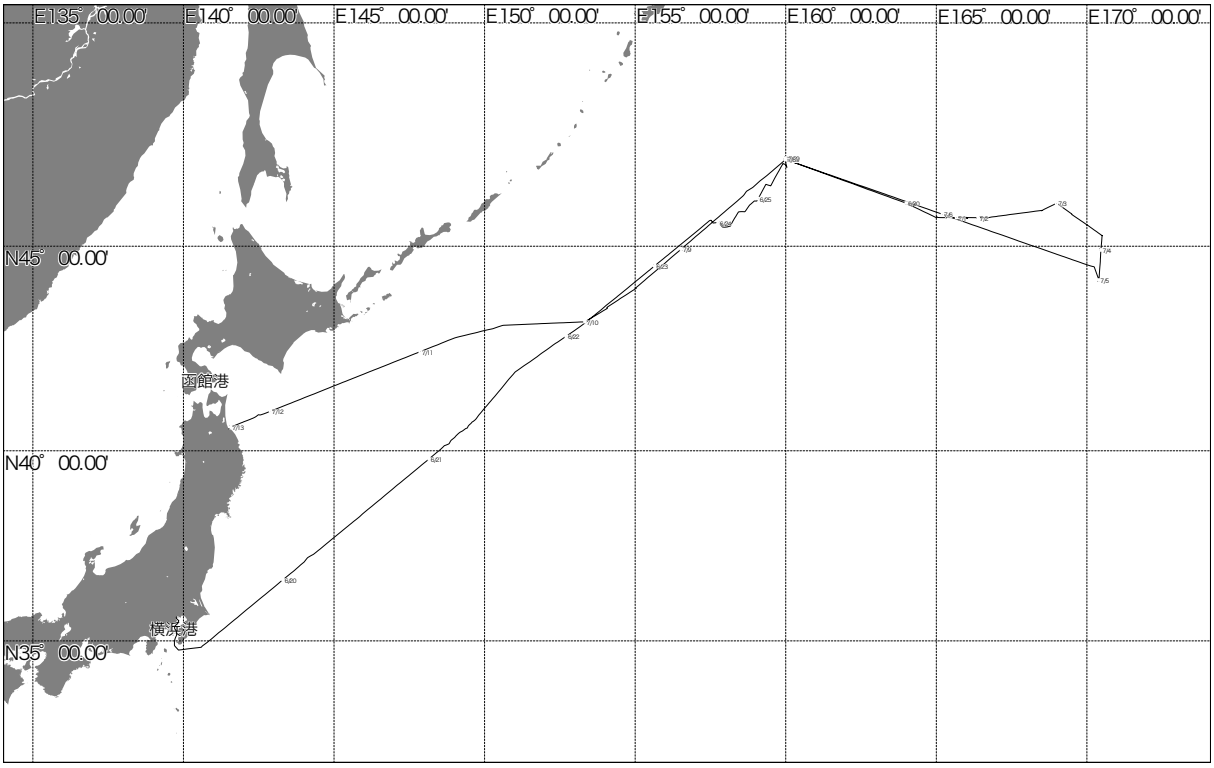
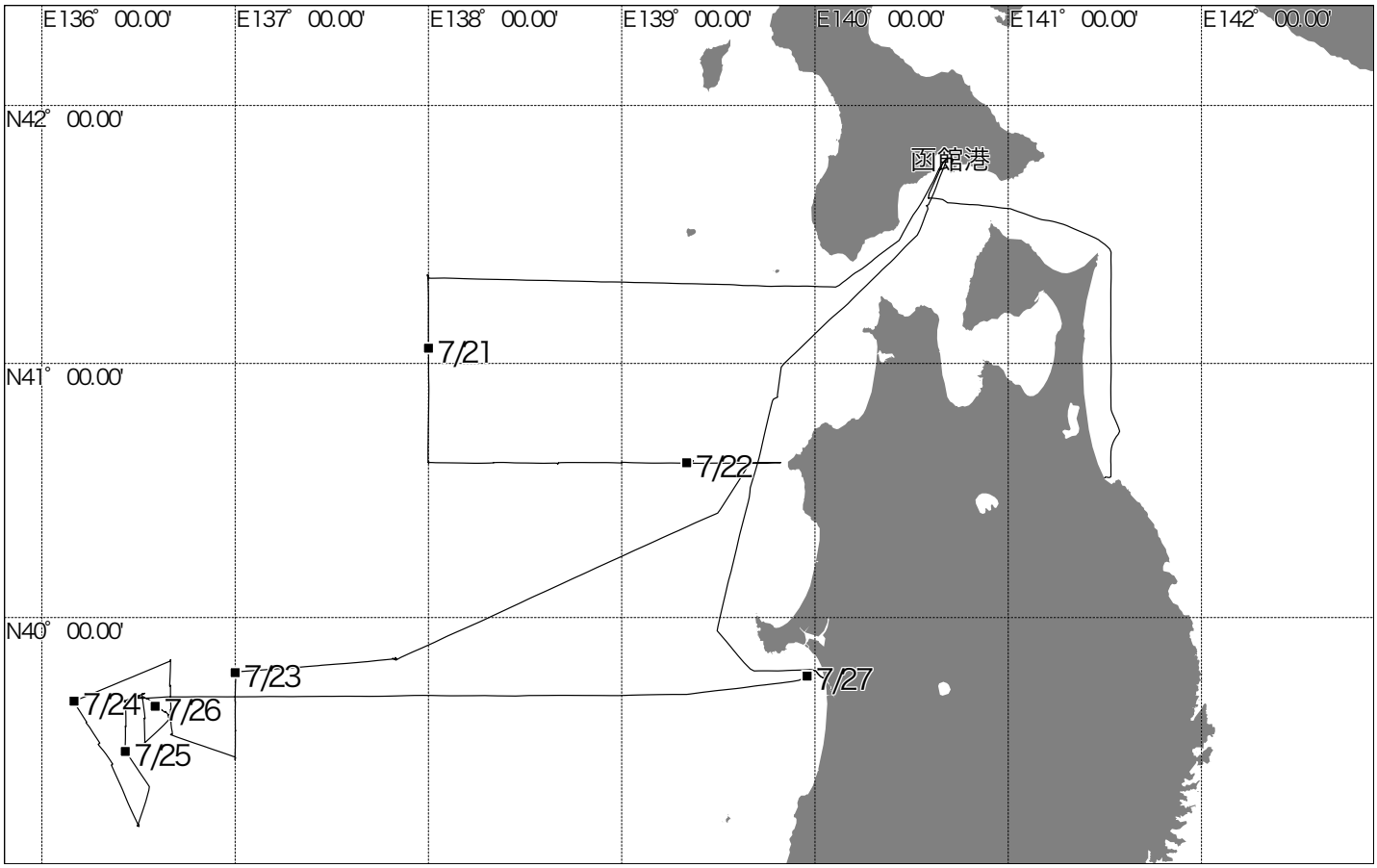


Fig.1.3: Noon Position (Leg3)



■ 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

5

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

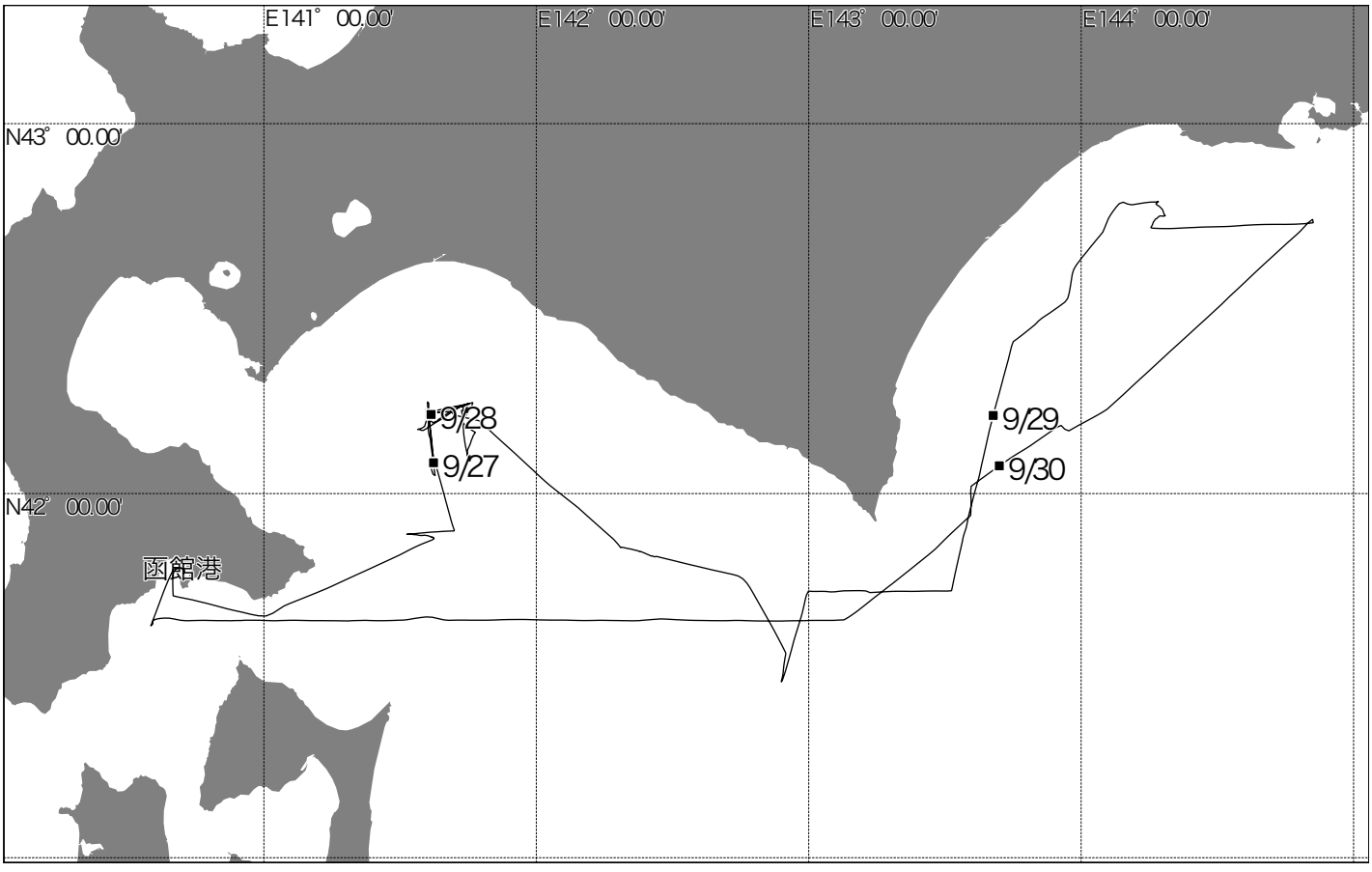


Fig.1 Noon Position

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.

Fig.2 Table.1,2

4. Result of Bottom Trawl Research

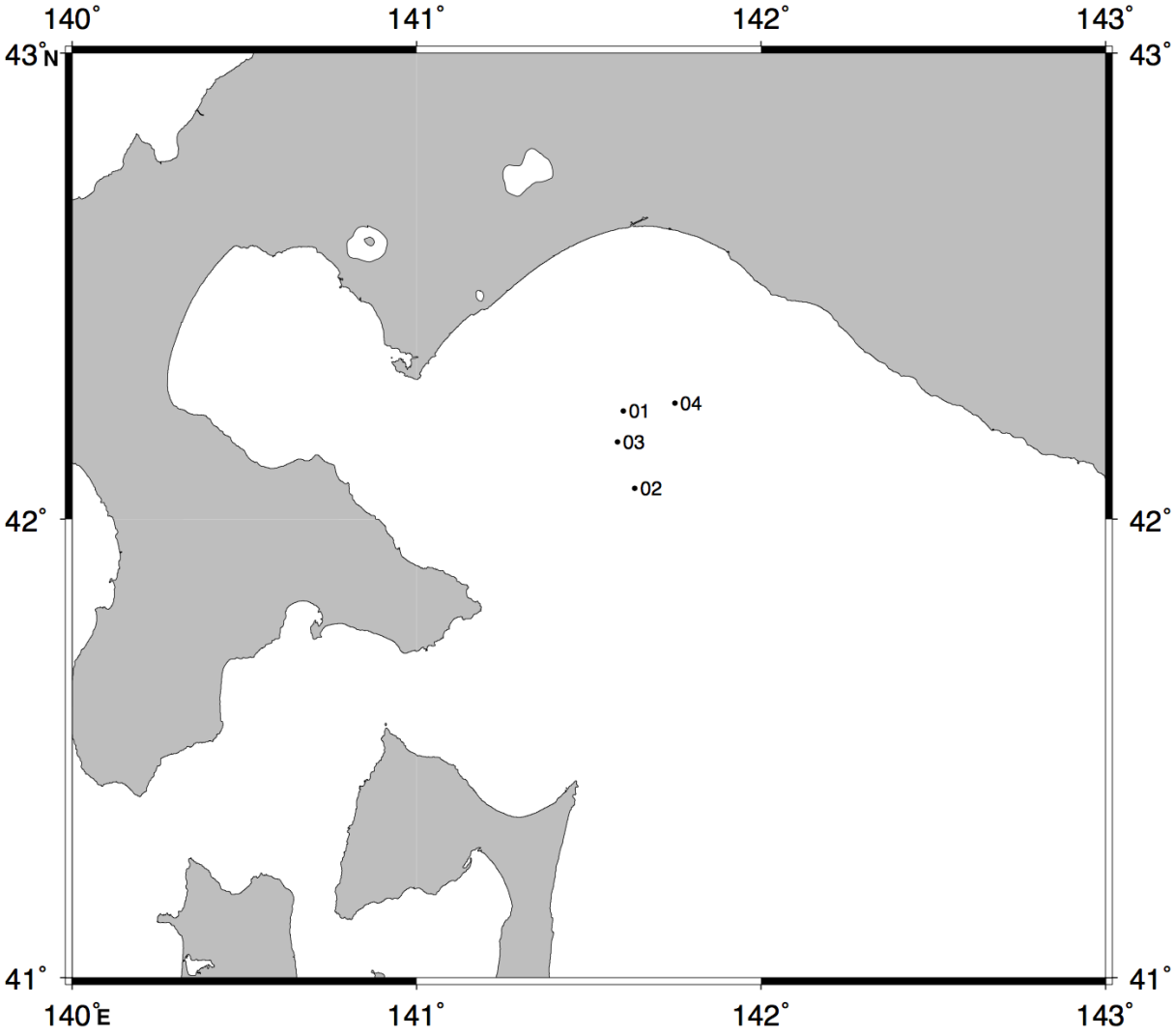


Fig.2 Trawl Research Positions

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

6

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

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

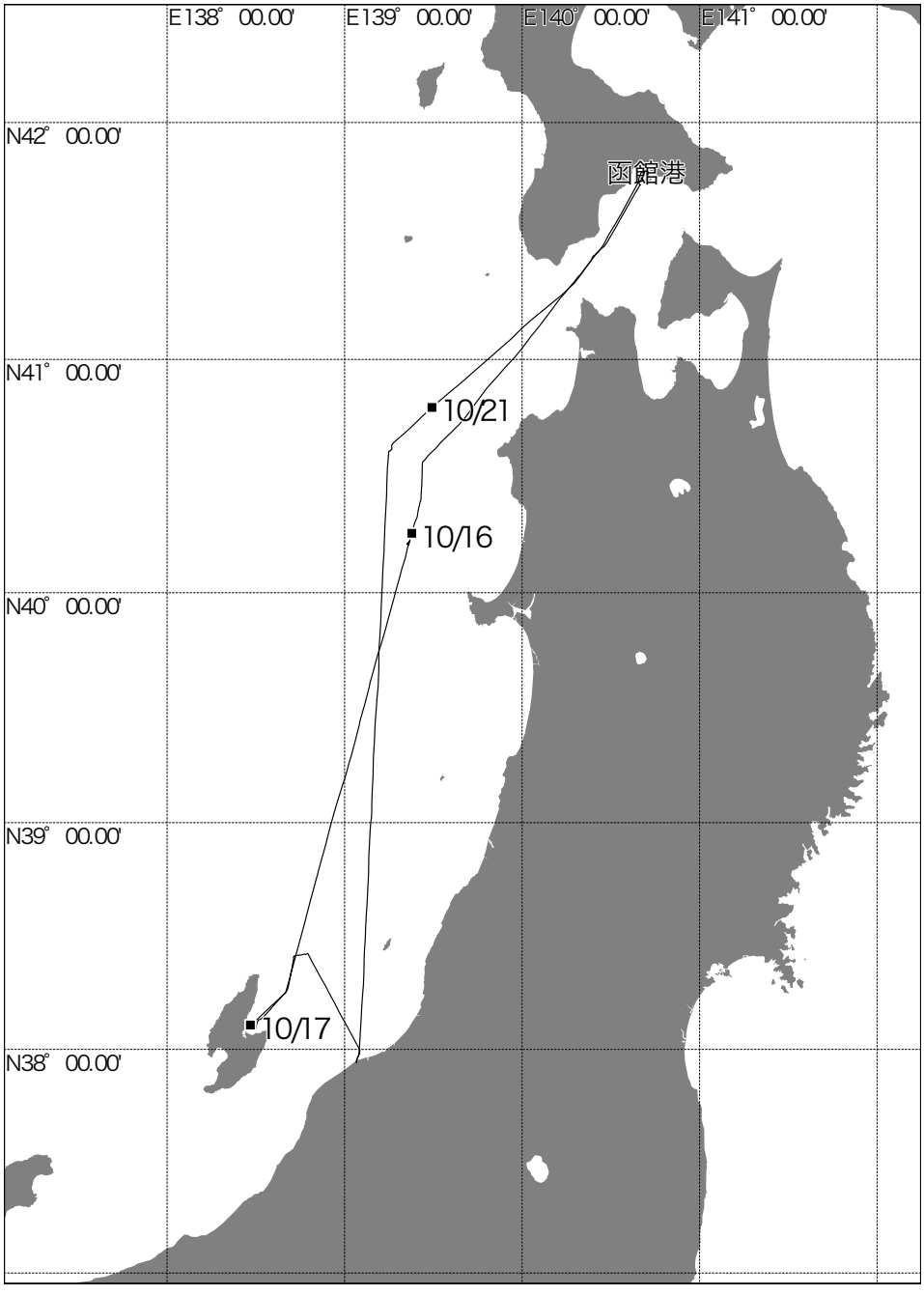


Fig.1: Noon Position

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.

7

THE "OSHORO 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

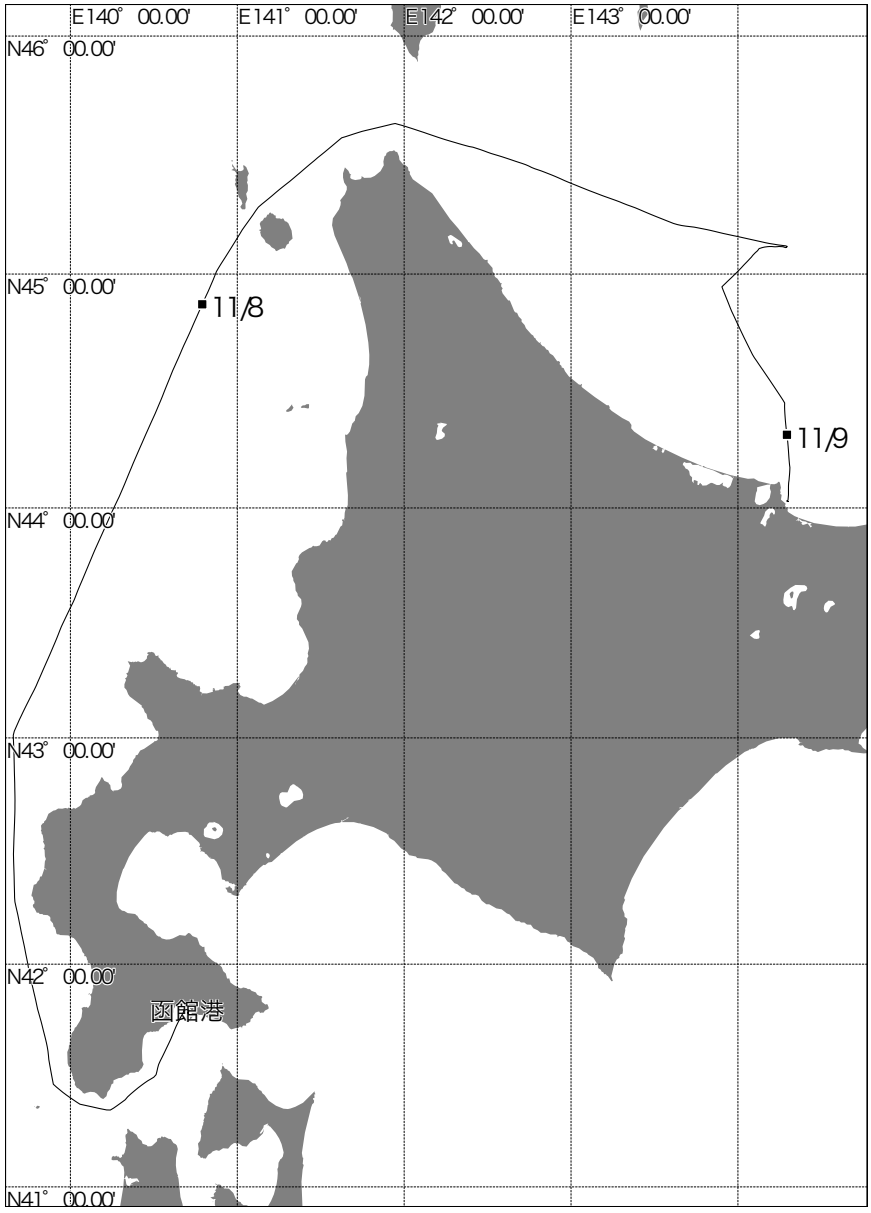
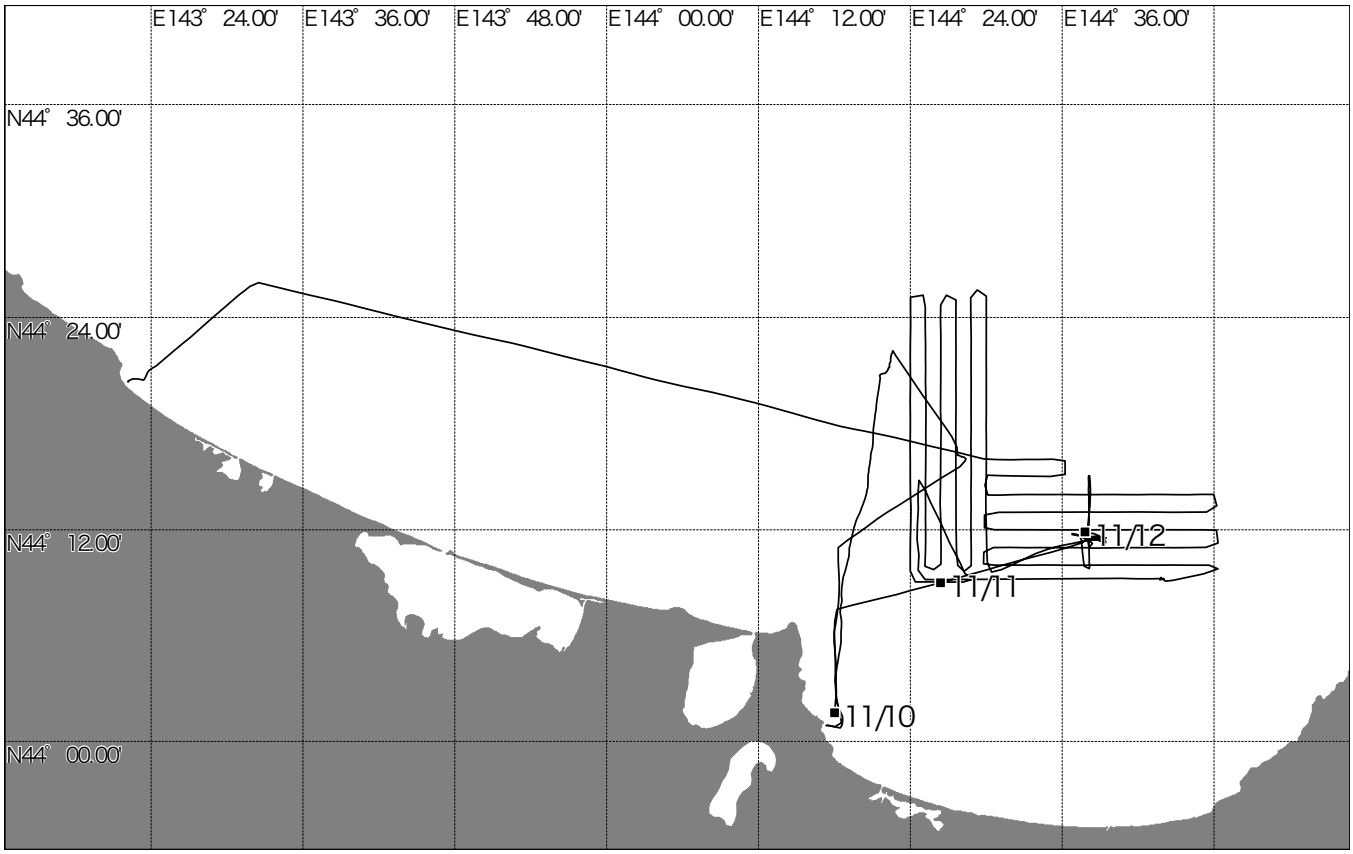
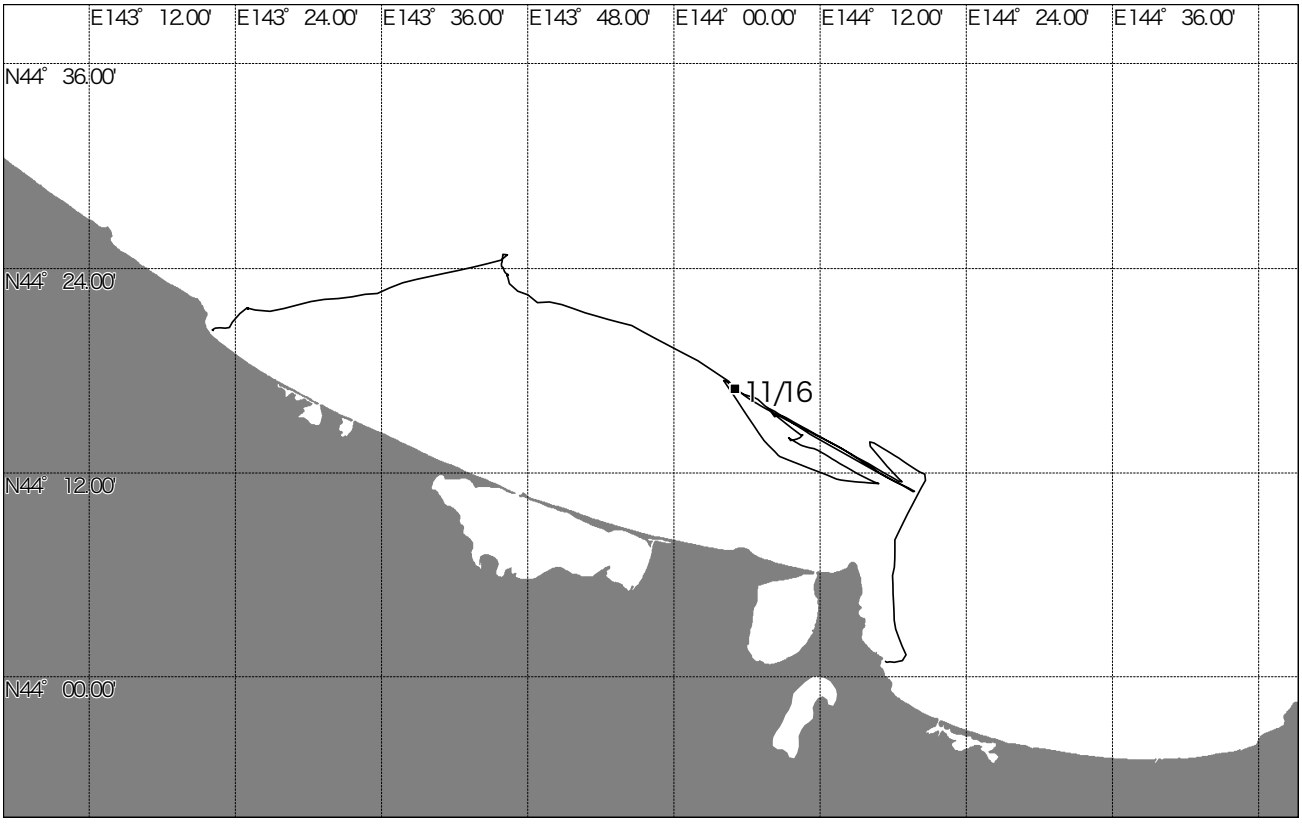


Fig.1.1: Noon Position (Leg1)



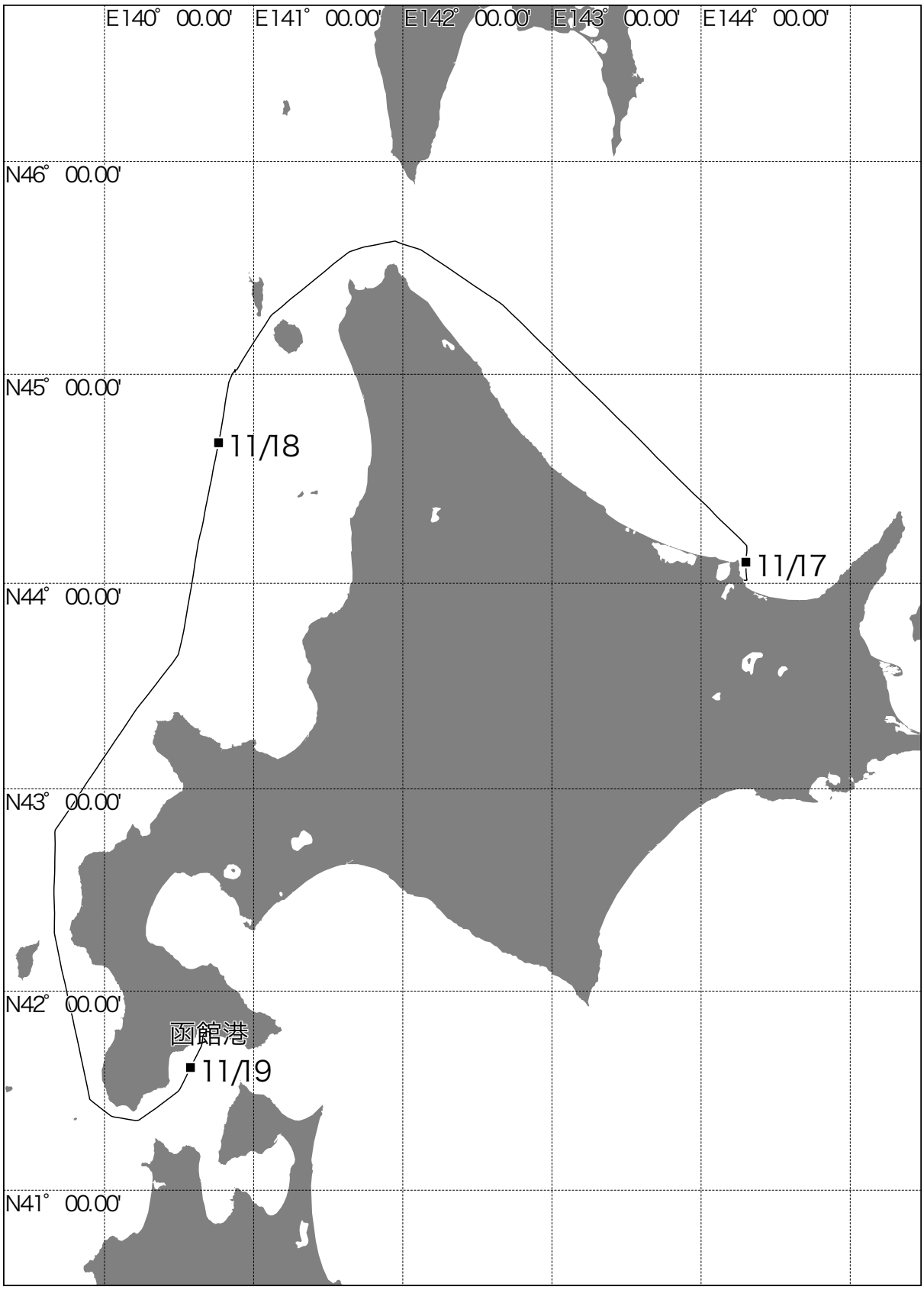
■ 正午位置

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 Shiomoto

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

8

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

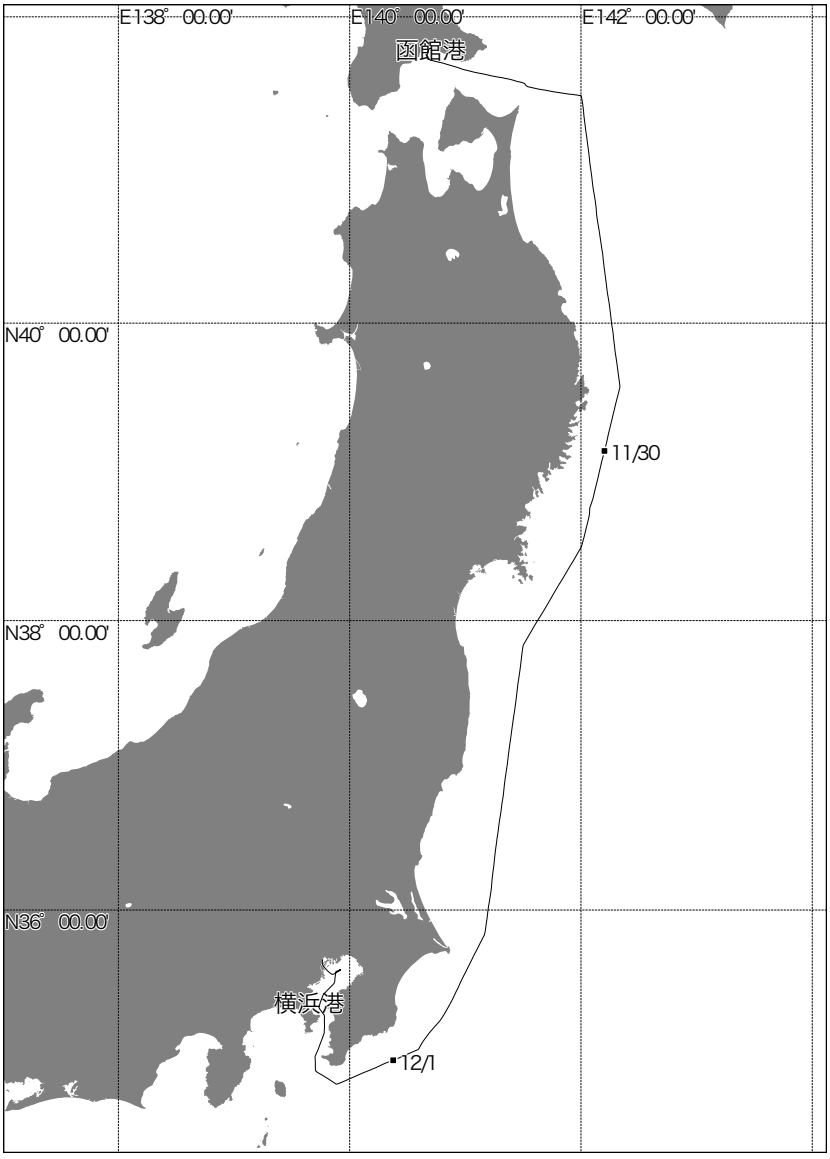
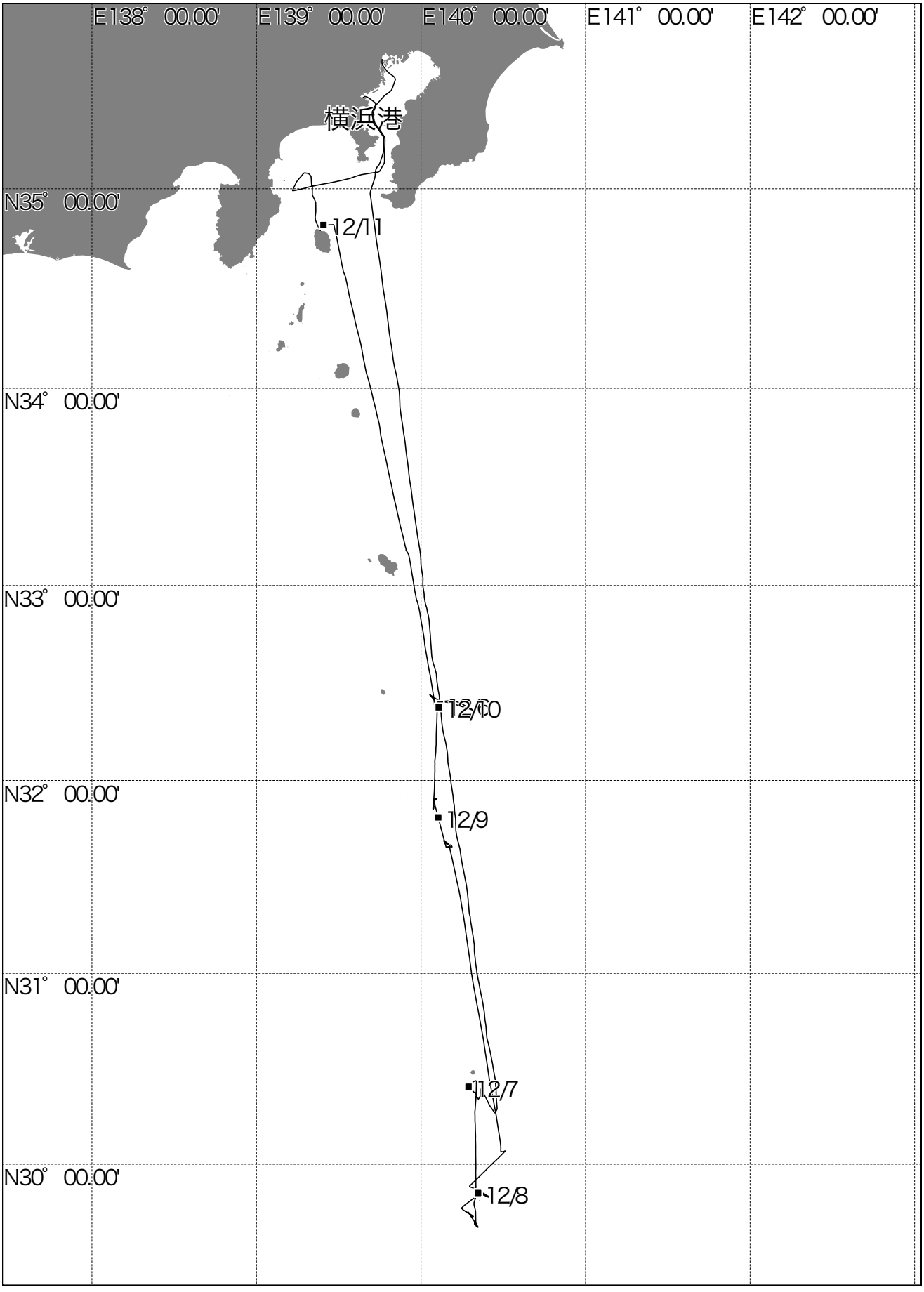


Fig.1.1: Noon Position (Leg1)



■ 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 (Depertment of Marine Science and Resources, Nihon University)

Leg2,3 Takahito Kojima

Assistant Professor (Depertment 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

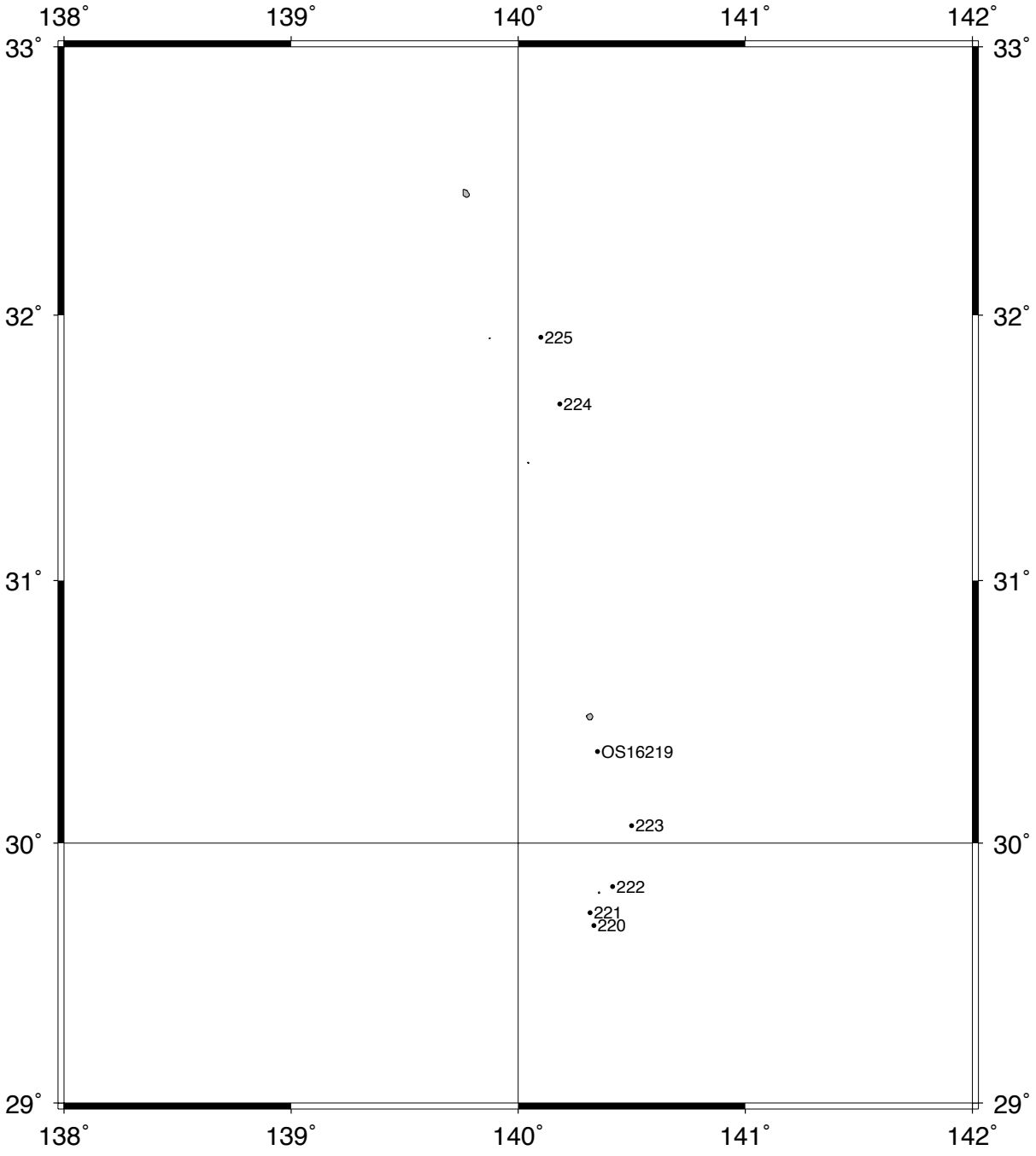


Fig.2: Research stations

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 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 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 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 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 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

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

9

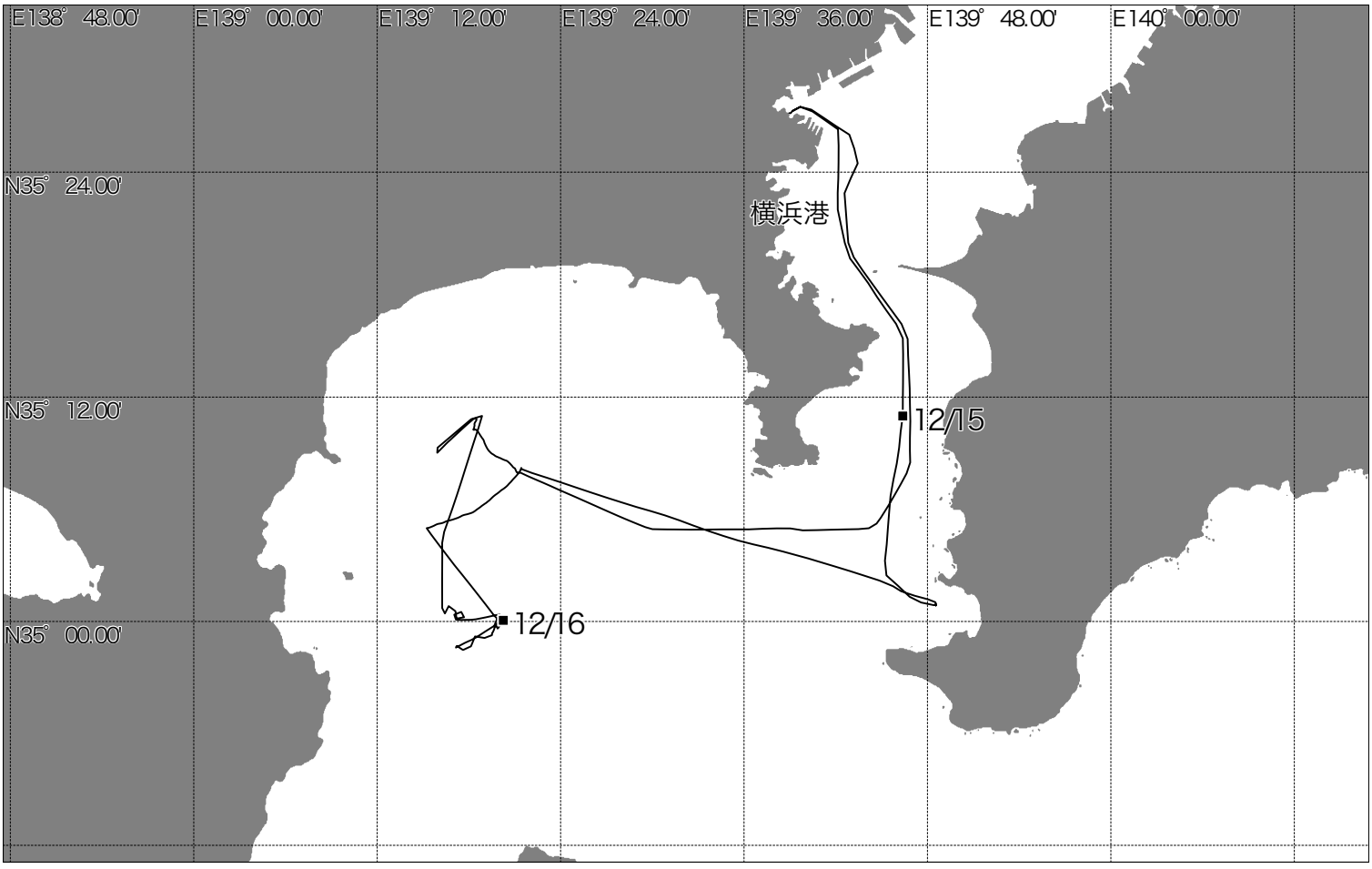
THE "OSHORO MARU" CRUISE 034
TO TATEYAMA-BAY and SAGAMI-NADA
IN DECEMBER 2016

1. Cruise Itinerary

Cruise 034

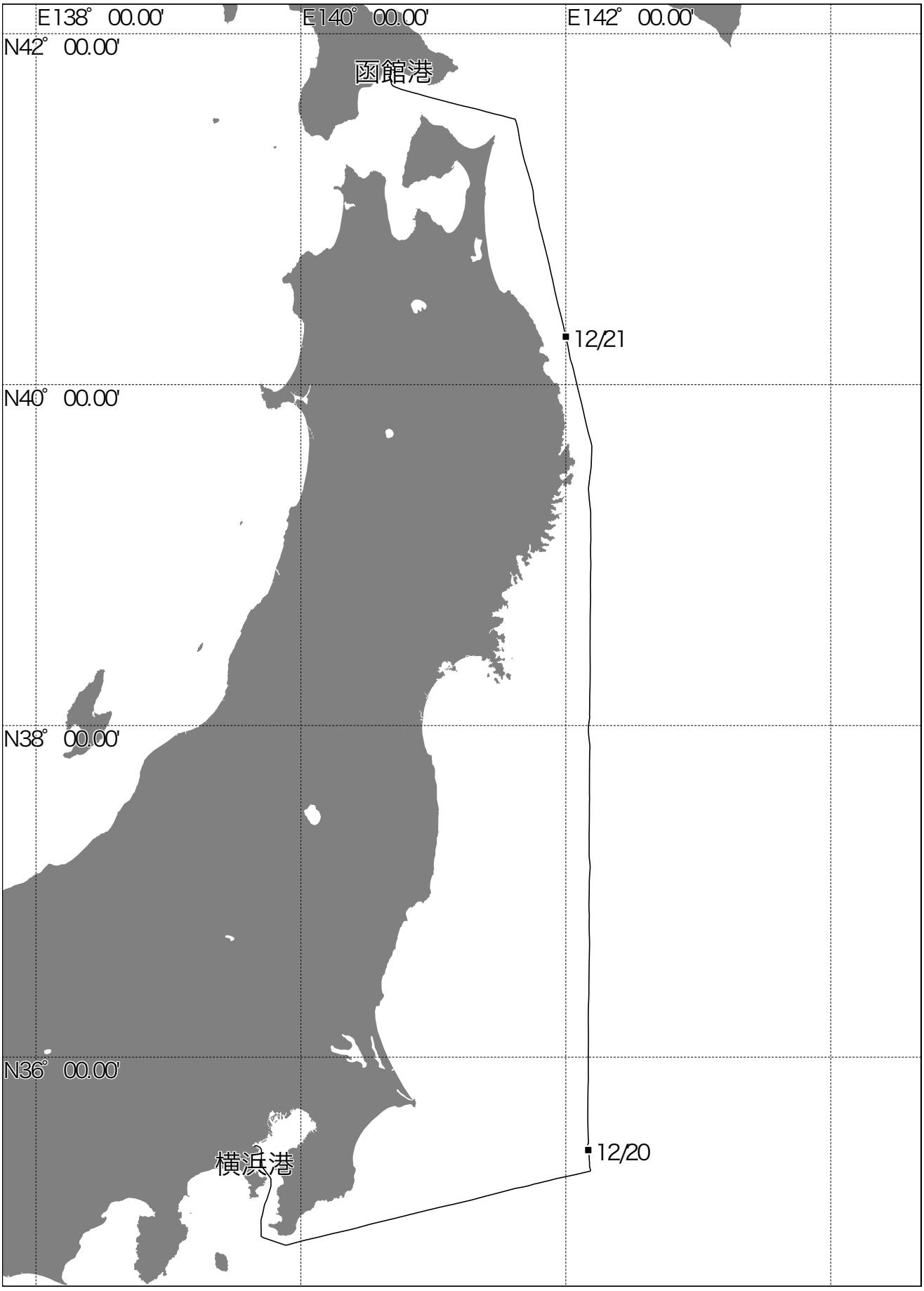
Departure from Yokohama (Leg1)	Dec. 15, 2016
Start and end of oceanographic research	16
Arrival at Yokohama	17
Departure from Yokohama (Leg2)	19
Return to Hakodate	22

Total coverage 721.2 miles



■ 正午位置

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