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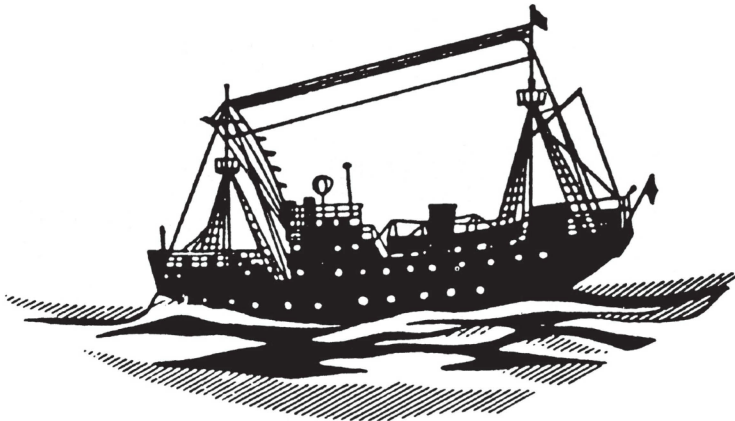
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DATA RECORD
OF
OCEANOGRAPHIC OBSERVATIONS AND
EXPLORATORY FISHING

No. 57

海 洋 調 査 漁 業 試 験 要 報

第 57 号



FACULTY OF FISHERIES SCIENCES,
GRADUATE SCHOOL OF FISHERIES SCIENCES,
SCHOOL OF FISHERIES SCIENCES, HOKKAIDO UNIVERSITY

Hakodate, Japan
March 2016

北海道大学大学院水産科学研究院・大学院水産科学院・水産学部

函 館 市

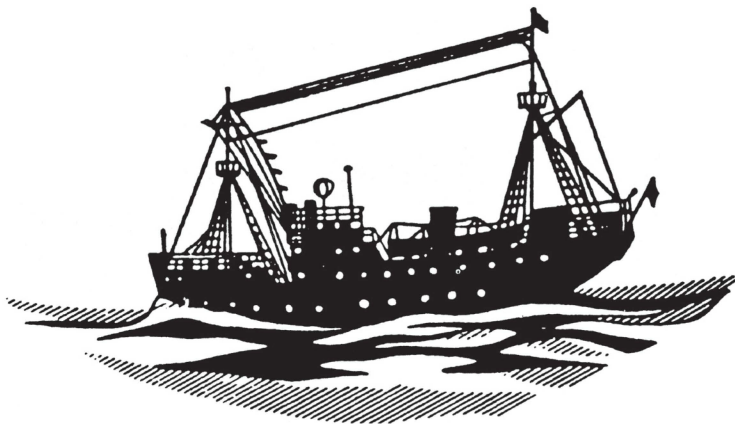
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NOTICE

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 researchers carried out on the regular or occasional cruises of the training ships of the Faculty of Fisheries, 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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EXPLANATION OF HEADINGS

1. Oceanographic data

The Practical Salinity scale, 1978 and the new International Equation of State of Seawater, 1980 have been used in oceanographic data processing.

DATA	Year shown in tens and units only, month and day in numerals by G.M.T
TIME	Hour and tens of hour in G.M.T
S.M.T	Ship's mean time
DEPTH	Depth to the bottom by echosounder but reading only without correction
COL.	Water color in Forel-Ule scale
TR.	Transparency in meters with Secchi disc
S.T.	Surface temperature
T.D.	Time Difference between Greenwich Mean Time (G.M.T.) and S.M.T.
SEA	Wave direction in a scale of 36 points and sea state in WMO Code 3700
SWELL	Direction in 36 points and amount in JMA Code for swell (Douglas scale)
WIND	Direction in 36 points and wind force in Beaufort scale
AIR TEMP.	Air temperatures recorded from dry and wet bulb thermometers in °C
BAR.	Barometric pressure in hectopascal to the tenth of degree
WEATHER	Weather in WMO Code 4501 r: rain d: drizzling rain f: fog o: 100% clouded c: 75-99% clouded bc: 25-75% clouded b: 0-25% clouded
SIG-T	Sigma-t is defined as $\sigma_t = \rho_{s,t,0} - 1,000$ [kg/m ³]

2. Biological Characteristics of Fishes

No	Number of research operation
Mesh	Mesh size of net used in stretched mesh
B	Research remarks for surface long-line fishing
SPECIES	Fish species
F.L.	Fork length
B.L.	Body length
M.L.	Mantle length
B.W.	Body weight
SEX	1:Female, 2:Male, B:Bisexual
G.W.	Gonad weight
AGE	Designation according to Gilbert - Rich's formula (Koo, 1962)

SCIENTIFIC NAME AND COMMON NAME

1. Drift gillnet research

Scientific name	English name	Japanese name
Mollusca		
COLEOIDEA		(Ika)
<i>Todarodes pacificus</i> Steenstrup	Japanese common squid	Surumeika
<i>Onychoteuthis borealijaponica</i> Okada	Boreal clubhook squid	Tsumeika
<i>Gonatopsis borealis</i> Sasaki	Eight-armed squid	Takoika
<i>Ommastrephes bartrami</i> (Lesueur)	Flying squid	Akaika
<i>Symplectoteuthis luminosa</i> Sasaki	Luminous flying squid	Sujiika
Pisces		
<i>Prionace glauca</i> (Linnaeus)	Blue shark	Yoshikirizame
<i>Isurus oxyrinchus</i> Rafinesque	Atlantic mako shark	Aozame
<i>Lamna ditropis</i> Hubbs et Follett	Salmon shark	Nezumizame
<i>Squalus acanthias</i> Linnaeus	Spiny dogfish	Aburatsunozame
<i>Isistius brasiliensis</i> (Quoy et Gaimard)	Cigar shark	Darumazame
<i>Echeneis naucrates</i> Linnaeus	Sharksucker	Kobanzame
<i>Sardinops melanostictus</i> (Temminck et Schlegel)	Japanese scaled sardine	Maiwashi
<i>Engraulis japonica</i> (Houttuyn)	Japanese anchovy	Katakutiiwashi
<i>Oncorhynchus gorbuscha</i> (Walbaum)	Pink salmon	Karafutomasu
<i>Oncorhynchus kisutch</i> (Walbaum)	Coho salmon	Ginzake
<i>Oncorhynchus keta</i> (Walbaum)	Chum salmon	Shirozake
<i>Oncorhynchus tshawytscha</i> (Walbaum)	Chinook salmon	Masunosuke
<i>Diaphus watasei</i> Jordan et Starks	Lantern fishes	Hadakaiwashi
<i>Anoptopterus pharao</i> Zugmayer	Daggertooth	Mizuoodamashi
<i>Alepisaurus ferox</i> Lowe	Pacific lancetfish	Mizuuo
<i>Cololabis saira</i> (Brevoort)	Pacific saury	Sanma
Exocoetidae	Flyingfishes	(Tobiuo)
<i>Pleurogrammus monopterygius</i> (Pallas)	Atka mackerel	Kitanohokke
Caranginae	Carangidae	(Aji)
<i>Naucrates ductor</i> (Linnaeus)	Pilotfish	Burimodoki
<i>Seriola lalandi</i> Valenciennes	Yellowtail	Hiramasa
<i>Seriola dumerili</i> (RissO)	Amberjack	Kanpati
<i>Pseudocaranx dentex</i> (Bloch et Schneider)	Striped jack	Shimaaji
<i>Coryphaena equiselis</i> Linnaeus	Pompano dolphin	Ebisusiira
<i>Coryphaena hippurus</i> Linnaeus	Dolphinfish	Siira
<i>Brama japonica</i> Hilgendorf	Pacific pomfret	Shimagatsuo
Taractes	Taractes sp.	(Manzaio)
<i>Tetrapturus audax</i> (Philippi)	Striped marlin	Makajiki
<i>Tetrapturus angustirostris</i> Tanaka	Shortbill spearfish	Fuuraikajiki
<i>Xiphias gladius</i> Linnaeus	Swordfish	Mekajiki
<i>Scomber japonicus</i> Houttuyn	Chub mackerel	Masaba
<i>Scomber australasicus</i> Cuvier	Slimy mackerel	Gomasaba
Auxis	Auxis sp.	(Soudagatsuo)
<i>Katsuwonus pelamis</i> (Linnaeus)	Skipjack tuna	Katsuo
<i>Thunnus alalunga</i> (Bonnaterre)	Albacore	Bintyou
<i>Gempylus serpens</i> Cuvier	Snake mackerel	Kurotatikamasu
<i>Tetragonurus cuvieri</i> Risso	Smalleye squaretail	Dokuuroko
<i>Icichthys lockingtoni</i> Jordan et Gilbert	Black ruffe	Kuromedai
<i>Hyperoglyphe japonica</i> (Doderlein)	Japanese butterfish	Medai
<i>Icosteus aenigmaticus</i> Lockington	Ragfish	Irezumikonnyakuaji
<i>Aluterus monoceros</i> (Linnaeus)	Unicorn filefish	Usubahagi
<i>Aluterus scriptus</i> Osbeck	Figured scriptus	Soushihagi
<i>Gasterosteus aculeatus</i> Linnaeus	Three-spined stickleback	Itoyo
<i>Mola mola</i> (Linnaeus)	Southern sunfish	Manbou
Aves		
<i>Oceanodroma leucorhoa</i>	Leach's Fork-tailed Petrel	Shijiroumitsubame
<i>Brachyramphus brevirostris</i>	Kittlitz's Murrelet	Kobashiumisuzume
<i>Puffinus tenuirostris</i>	Short-tailed shearwater	Hashibosomizunagi
<i>Puffinus griseus</i>	Grey Fork-tailed Petrel	Haiiromizunagidori
<i>Fratercula corniculata</i>	Horned puffin	Tsunomedori
<i>Lunda cirrhata</i>	Tufted puffin	Etopirika
Mammalia		
<i>Delphinus delphis</i> Linnaeus	Common dolophin	Mairuka
<i>Phocoenoides dalli</i> True	Dall's porpoise	Ishiiruka

2. Longline research

Scientific name	English name	Japanese name
Mollusca		
Octopoda	Octopus	(Tako)
Pisces		
Lamniiformes	Sharks	(Same)
Alepisaurus ferox Lowe	Longnose lancetfish	Mizuuo
Rajiformes	Rays	(Ei)
Coryphaenidae	Dolphins	(Shiira)
Taractichthys steindachneri (Döderlein)	Sickle pomfret	Hirejiromanzaiuo
Tetrapturus audax (Philippi)	Striped marlin	Makajiki
Makaira mazara (Jordan et Snyder)	Black marlin	Kurokajiki
Xiphias gladius Linnaeus	Swordfish	Mekajiki
Acanthocybium solandri (Cuvier)	Wahoo	Kamasusawara
Euthynnus pelamis (Linnaeus)	Skipjack tuna	Katsuo
Thunnus albacares (Bonnaterre)	Yellowfin tuna	Kihada
Thunnus obesus (Lowe)	Bigeye tuna	Mebachi
Gempylus serpens Cuvier	Snake mackerel	Kurotachikamasu
Reptilia		
Cheloniidae	Turtles	(Umigame)

PART. I

OSHORO MARU FROM JANUARY TO DECEMBER IN 2013

I. Particulars

Length (o.a.)	72.85m
Length (p.p.)	66.00m
Breadth (mid)	12.60m
Depth (mid) Upper DK	5.70m
Gross Tonnage (Domestic)	1,396 tons
International Gross Tonnage	1,792 tons
Main Engine	2,353 kW
Call Sign	JDVA

THE "OSHO RO MARU" CRUISE 252 TO WEST OF THE TSUGARU STRAIT and IWATE OFF

IN MARCH 2013

1. Cruise Itinerary

Cruise 252

Departure from Hakodate	Mar.	7	2013
Start hydrographic research (OS13001)		8	
Deploy mooring system		9	
Finish hydrographic research (OS13013)		12	
Return to Hakodate		13	
Total coverage 795.0 miles			

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 29 men
Research Staff:	Associate Professor	(Laboratory of Marine Biodiversity, Hokkaido University)	Atsushi Yamaguchi
	Assistant Professor	(Field Science Center for Northern Biosphere, Hokkaido University)	Yoko Mitani
	Research scientist	(Mutsu Institute, JAMSTEC)	Hajime Kawakami
	Technical scientist	(Mutsu Institute, JAMSTEC)	Masahide Wakita
	Graduate Students		5 persons
	Under Graduate Students		5 persons
			Total 15 persons

3. Items of Research

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

Hydrographic work on deck and the data processing were made by Science officer, deck officers, crews, research staff and cadets of the “Oshoro maru”. Temperature and salinity were measured by CTD (Seabird SBE-19Plus). Sea water samplings by Niskin bottles. Plankton sampling by NORPAC-net and VMPS-net at almost hydrographic stations.

Fig.1 table-1, 2

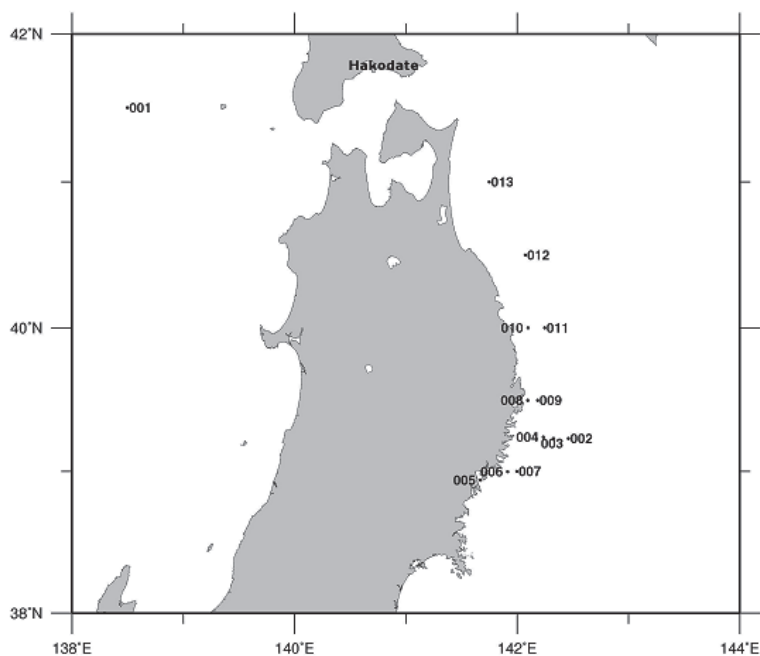


Fig. 1 Oceanographic Stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z	Depth	Col.	Tr.	SST	Wr.	Gear
OS13001	41-30.22N	138-29.94E	3/7	17:31	9	3710	-	-	8.6	bc	9plus-0769
OS13002	39-13.78N	142-27.61E	3/9	15:44	9	1040	-	-	0.7	bc	9plus-0769
OS13003	39-13.85N	142-19.65E	3/9	18:33	9	842	-	-	0.9	bc	9plus-0769
OS13004	39-14.46N	142-14.07E	3/9	20:59	9	536	-	-	3.6	o	9plus-0769
OS13005	38-56.33N	141-40.26E	3/10	6:07	9	52	-	-	6.7	bc	9plus-0769
OS13006	38-59-89N	141-54.82E	3/11	7:47	9	141	-	-	5.0	bc	9plus-0769
OS13007	39-00.03N	141-59.93E	3/11	9:01	9	204	-	-	4.4	bc	9plus-0769
OS13008	39-29.78N	142-05.79E	3/11	12:33	9	144	-	-	5.6	bc	9plus-0769
OS13009	39-29.87N	142-11.02E	3/11	13:28	9	241	-	-	0.7	bc	9plus-0769
OS13010	40-00.00N	142-06.01E	3/11	17:22	9	130	-	-	6.3	bc	9plus-0769
OS13011	39-59.93N	142-14.89E	3/11	18:55	9	229	-	-	2.2	bc	9plus-0769
OS13012	40-30.02N	142-04.41E	3/12	7:38	9	274	-	-	6.1	bc	9plus-0769
OS13013	40-59.95N	141-44.89E	3/12	11:37	9	497	-	-	6.2	o	9plus-0769

Table 2. Oceanographic data

Station OS13001				Station OS13002				Station OS13003			
Latitude 41-30.22N				Latitude 39-13.78N				Latitude 39-13.85N			
Longitude 138-29.94E				Longitude 142-27.61E				Longitude 142-19.65E			
Depth(m) 3710				Depth(m) 1040				Depth(m) 842			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	7.688	33.968	26.509	5	0.673	32.873	26.354	5	0.968	32.823	26.297
10	7.681	33.968	26.510	10	0.669	32.872	26.354	10	0.924	32.820	26.298
20	7.683	33.969	26.510	20	0.716	32.878	26.356	20	0.948	32.822	26.297
30	7.672	33.969	26.512	30	0.924	32.918	26.376	30	0.754	32.814	26.302
40	7.632	33.970	26.519	40	1.056	32.948	26.392	40	0.660	32.836	26.325
50	7.546	33.971	26.532	50	0.956	33.011	26.449	50	0.657	32.864	26.348
75	6.703	34.042	26.704	75	1.093	33.076	26.493	75	0.601	32.944	26.415
100	5.979	34.051	26.806	100	0.807	33.069	26.504	100	0.815	32.997	26.446
125	4.564	34.066	26.984	125	0.739	33.078	26.515	125	1.085	33.063	26.483
150	3.230	34.054	27.109	150	0.854	33.095	26.522	150	1.335	33.127	26.518
175	2.395	34.057	27.185	175	1.504	33.183	26.551	175	1.836	33.195	26.538
200	1.824	34.047	27.222	200	2.446	33.312	26.584	200	1.812	33.222	26.561
250	1.422	34.059	27.260	250	2.115	33.347	26.639	250	3.512	33.493	26.635
300	1.039	34.054	27.282	300	2.270	33.515	26.761	300	3.458	33.557	26.691
400	0.854	34.066	27.304	400	2.852	33.760	26.908	400	2.429	33.551	26.777
500	0.716	34.071	27.316	500	3.102	33.920	27.014	500	3.030	33.797	26.922
600	0.613	34.073	27.324	600	3.336	34.026	27.077	600	3.176	33.964	27.042
700	0.533	34.074	27.330	700	3.339	34.159	27.182	700	3.342	34.078	27.118
800	0.454	34.074	27.334	800	3.353	34.222	27.231	800	3.279	34.241	27.253
900	0.384	34.073	27.337	900	3.057	34.325	27.341				
1000	0.344	34.072	27.339	1000	2.843	34.390	27.412				
1200	0.281	34.071	27.342								
1500	0.242	34.070	27.343								
2000	0.225	34.070	27.344								
2500	0.242	34.071	27.343								
3000	0.274	34.071	27.342								

Station OS13004				Station OS13005				Station OS13006			
Latitude 39-14.46N				Latitude 38-56.33N				Latitude 38-59.91N			
Longitude 142-14.07E				Longitude 141-40.24E				Longitude 141-54.84E			
Depth(m) 536				Depth(m) 52.000				Depth(m) 141.000			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	3.638	33.215	26.402	5	6.668	33.602	26.362	5	4.962	33.470	26.467
10	3.638	33.216	26.402	10	6.667	33.605	26.365	10	4.969	33.470	26.466
20	3.666	33.221	26.404	20	6.663	33.699	26.439	20	4.969	33.470	26.466
30	3.726	33.231	26.406	30	6.613	33.727	26.468	30	4.971	33.470	26.466
40	3.841	33.253	26.412	40	6.576	33.735	26.479	40	4.972	33.470	26.465
50	3.822	33.254	26.415					50	5.049	33.495	26.477
75	3.905	33.269	26.418					75	5.129	33.515	26.483
100	4.142	33.310	26.427					100	5.183	33.526	26.486
125	4.719	33.418	26.452					125	5.2	33.539	26.494
150	4.783	33.470	26.486								
175	4.251	33.488	26.557								
200	5.270	33.644	26.569								
250	5.367	33.662	26.572								
300	4.746	33.594	26.589								
400	2.861	33.483	26.686								
500	2.500	33.552	26.772								

Station OS13007				Station OS13008				Station OS13009			
Latitude 39-0.02N				Latitude 39-29.76N				Latitude 39-29.84N			
Longitude 141-59.97E				Longitude 142-05.80E				Longitude 142-11.03E			
Depth(m) 204				Depth(m) 144				Depth(m) 241			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	4.362	33.362	26.446	5	5.635	33.594	26.486	5	0.662	32.812	26.305
10	4.353	33.359	26.445	10	5.639	33.594	26.486	10	0.666	32.812	26.306
20	4.362	33.361	26.445	20	5.653	33.595	26.485	20	0.717	32.816	26.306
30	4.609	33.402	26.452	30	5.664	33.597	26.485	30	0.69	32.815	26.306
40	4.742	33.422	26.453	40	5.669	33.598	26.486	40	0.738	32.822	26.31
50	4.869	33.444	26.456	50	5.668	33.598	26.485	50	0.712	32.823	26.312
75	5.088	33.49	26.468	75	5.673	33.598	26.485	75	1.389	32.96	26.38
100	5.558	33.574	26.48	100	5.76	33.621	26.492	100	4.033	33.393	26.505
125	5.677	33.596	26.483	125	5.819	33.632	26.494	125	4.742	33.489	26.506
150	5.933	33.662	26.504					150	5.152	33.553	26.511
175	6.004	33.683	26.512					175	5.108	33.56	26.521
								200	4.184	33.456	26.54
Station OS13010				Station OS13011				Station OS13012			
Latitude 39-59.99N				Latitude 39-59.92N				Latitude 40-30.03N			
Longitude 142-06.0E				Longitude 142-14.89E				Longitude 142-04.38E			
Depth(m) 130				Depth(m) 229				Depth(m) 274			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	6.288	33.742	26.522	5	2.1	33.002	26.364	5	6.064	33.719	26.532
10	6.288	33.741	26.522	10	2.065	32.997	26.362	10	6.058	33.719	26.533
20	6.287	33.742	26.522	20	2.136	33.008	26.365	20	6.077	33.725	26.536
30	6.294	33.742	26.521	30	2.365	33.044	26.377	30	6.125	33.736	26.538
40	6.302	33.743	26.521	40	2.905	33.135	26.404	40	6.129	33.737	26.538
50	6.313	33.744	26.52	50	4.708	33.446	26.475	50	6.198	33.752	26.541
75	6.327	33.745	26.52	75	5.562	33.597	26.497	75	6.221	33.755	26.541
100	6.337	33.748	26.521	100	5.906	33.658	26.504	100	6.24	33.759	26.542
				125	6.075	33.686	26.505	125	6.248	33.762	26.543
				150	6.073	33.685	26.505	150	6.207	33.756	26.544
				175	6.092	33.689	26.505	175	6.167	33.75	26.544
				200	6.008	33.7	26.525	200	6.135	33.746	26.545
								250	6.168	33.754	26.547
Station OS13013											
Latitude 40-59.94N											
Longitude 141-44.86E											
Depth(m) 497											
Press.	Temp.	Sal.	SIG-T								
5	6.192	33.697	26.499								
10	6.197	33.697	26.498								
20	6.195	33.697	26.499								
30	6.201	33.698	26.498								
40	6.176	33.7	26.503								
50	6.159	33.699	26.505								
75	6.163	33.701	26.506								
100	6.165	33.701	26.506								
125	6.171	33.702	26.506								
150	6.168	33.701	26.505								
175	6.177	33.703	26.506								
200	6.207	33.71	26.507								
250	6.29	33.743	26.523								
300	6.313	33.778	26.547								
400	5.769	33.856	26.677								

THE "OSHO RO MARU" CRUISE 253 TO TSURUGA-WAN

IN APRIL 2013

1. Cruise Itinerary

Departure from Hakodate	Apr.	15	2013
Start hydrographic research (OS13014)		16	
Arrival at Tsuruga		19	
Departure from Tsuruga		20	
Return to Tsuruga		21	
Departure from Tsuruga		22	
Finish hydrographic research (OS13026)		24	
Return to Hakodate		25	
Total coverage 1158.7 miles			

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 28 men
Research Staff:	Professor	(Laboratory of Marine Environmental Science, Hokkaido University)	Kenshi Kuma
		Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)	Yutaka Isoda
Under Graduate instructor:			
	Professor • Vice-President	(Faculty of Marine Bioscience, Fukui Prefectural University)	Tadahisa Seikai
	Professor	(Faculty of Marine Bioscience, Fukui Prefectural University)	Ryuji Kondo
	Associate Professor	(Faculty of Marine Bioscience, Fukui Prefectural University)	Atsushi Kaneda
	Associate Professor	(Faculty of Marine Bioscience, Fukui Prefectural University)	Takao Yoshitake
	Teaching assistant:		4 persons
	Graduate Students:		4 persons
	Under Graduate Students:		56 persons
Total 99 persons			

3. Items of Research

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

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoro maru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus). Water and Plankton sampling were also carried out at almost hydrographic stations.

Fig.-1 Table-1, 2

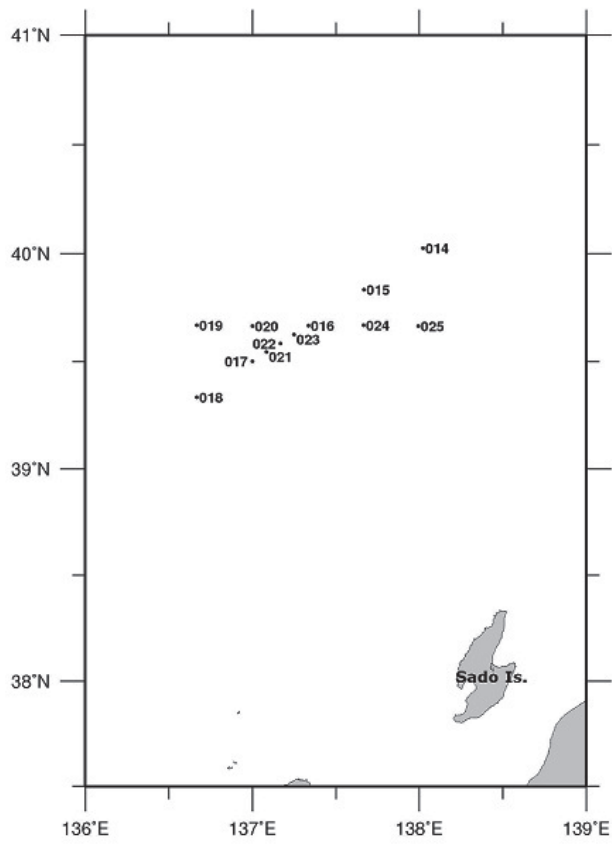


Fig. 1. Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z	Depth	Col.	Tr.	SST	Wr.	Gear
OS13014	40-01.50N	138-01.30E	4/16	1:04	9	2561	-	-	8.4	o	9plus-0769
OS13015	39-50.03N	137-40.12E	4/16	5:35	9	2757	-	-	9.1	o	9plus-0769
OS13016	39-40.00N	137-20.09E	4/16	10:07	9	2580	-	-	9.6	o	9plus-0769
OS13017	39-30.07N	137-00.01E	4/16	14:23	9	2562	-	-	7.5	o	9plus-0769
OS13018	39-20.06N	136-40.08E	4/16	18:29	9	2640	-	-	6.9	o	9plus-0769
OS13019	39-40.08N	136-40.05E	4/16	23:00	9	2415	-	-	6.3	o	9plus-0769
OS13020	39-39.90N	136-59.97E	4/17	3:00	9	2600	-	-	7.8	bc	9plus-0769
OS13021	39-32.66N	137-05.07E	4/17	6:03	9	2557	-	-	8.1	o	9plus-0769
OS13022	39-35.02N	137-10.06E	4/17	8:19	9	2595	-	-	9.6	o	9plus-0769
OS13023	39-37.50N	137-15.04E	4/17	10:40	9	2536	-	-	10.3	o	9plus-0769
OS13024	39-40.14N	137-39.96E	4/17	14:32	9	2599	-	-	9.8	o	9plus-0769
OS13025	39-39.93N	137-59.56E	4/17	18:10	9	2580	-	-	10.0	o	9plus-0769
OS13026	39-37.32N	132-15.10E	4/23	4:00	9	2530	-	-	10.5	o	9plus-0769

Table 2. Oceanographic data

Station OS13014				Station OS13015				Station OS13016			
Latitude 40-01.83N				Latitude 39-50.05N				Latitude 39-39.99N			
Longitude 138-01.58E				Longitude 137-40.14E				Longitude 137-20.08E			
Depth(m) 2561				Depth(m) 2757				Depth(m) 2580			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	8.222	34.067	26.508	5	9.007	34.078	26.395	5	9.569	34.043	26.277
10	8.152	34.066	26.518	10	9.002	34.078	26.396	10	9.560	34.042	26.278
20	6.836	34.049	26.692	20	8.698	34.071	26.438	20	9.562	34.044	26.278
30	6.286	34.049	26.765	30	8.276	34.066	26.499	30	9.558	34.050	26.284
40	5.758	34.042	26.826	40	8.234	34.068	26.507	40	9.026	34.089	26.401
50	5.213	34.041	26.891	50	7.262	34.067	26.648	50	8.744	34.108	26.460
75	4.957	34.046	26.924	75	4.885	34.071	26.951	75	7.265	34.074	26.652
100	4.049	34.041	27.018	100	3.384	34.041	27.084	100	5.641	34.074	26.865
125	2.737	34.045	27.146	125	2.742	34.037	27.139	125	4.187	34.064	27.022
150	2.355	34.043	27.176	150	1.948	34.045	27.210	150	3.221	34.057	27.112
175	1.933	34.050	27.216	175	1.592	34.045	27.237	175	2.456	34.048	27.172
200	1.724	34.049	27.231	200	1.352	34.044	27.253	200	1.964	34.051	27.214
250	1.227	34.063	27.277	250	1.055	34.046	27.275	250	1.284	34.051	27.263
300	0.943	34.068	27.300	300	0.944	34.047	27.283	300	1.105	34.056	27.279
400	0.732	34.071	27.315	400	0.800	34.068	27.309	400	0.816	34.068	27.307
500	0.564	34.072	27.326	500	0.645	34.072	27.321	500	0.664	34.072	27.320
600	0.468	34.073	27.332	600	0.546	34.073	27.328	600	0.569	34.073	27.327
700	0.387	34.072	27.336	700	0.462	34.073	27.333	700	0.469	34.073	27.332
800	0.348	34.072	27.338	800	0.399	34.073	27.336	800	0.400	34.073	27.336
900	0.310	34.071	27.340	900	0.355	34.072	27.338	900	0.354	34.072	27.338
1000	0.277	34.071	27.341	1000	0.324	34.072	27.340	1000	0.316	34.072	27.34
1200	0.239	34.070	27.343	1200	0.271	34.071	27.342	1200	0.265	34.071	27.342
1500	0.213	34.070	27.344	1500	0.235	34.071	27.343	1500	0.227	34.07	27.344
2000	0.211	34.070	27.344	2000	0.221	34.07	27.344	2000	0.221	34.071	27.344
2500	0.238	34.071	27.343	2500	0.238	34.071	27.343	2500	0.240	34.071	27.343

Station OS13017				Station OS13018				Station OS13019			
Latitude 39-30.07N				Latitude 39-20.06N				Latitude 39-40.09N			
Longitude 137-00.19E				Longitude 136-40.12E				Longitude 136-40.06E			
Depth(m) 2562				Depth(m) 2640.000				Depth(m) 2415.000			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	6.764	34.064	26.713	10	6.583	34.061	26.735	10	6.127	34.052	26.787
10	6.765	34.064	26.713	20	6.564	34.060	26.737	20	6.119	34.051	26.788
20	6.627	34.064	26.732	30	6.357	34.058	26.762	30	5.230	34.049	26.894
30	6.451	34.065	26.756	40	6.206	34.063	26.786	40	4.623	34.055	26.968
40	6.333	34.063	26.770	50	5.878	34.061	26.826	50	4.215	34.056	27.013
50	5.735	34.054	26.838	75	3.943	34.042	27.030	75	3.274	34.053	27.104
75	3.445	34.056	27.091	100	3.281	34.050	27.101	100	2.448	34.048	27.173
100	2.508	34.041	27.162	125	2.710	34.043	27.147	125	1.986	34.046	27.209
125	2.008	34.048	27.208	150	2.198	34.041	27.188	150	1.620	34.048	27.238
150	1.631	34.050	27.238	175	1.773	34.044	27.223	175	1.431	34.055	27.256
175	1.488	34.052	27.250	200	1.494	34.048	27.247	200	1.215	34.061	27.277
200	1.253	34.056	27.270	250	1.101	34.06	27.283	250	0.988	34.067	27.296
250	0.988	34.062	27.292	300	0.911	34.067	27.301	300	0.838	34.07	27.308
300	0.866	34.068	27.305	400	0.719	34.072	27.317	400	0.647	34.072	27.321
400	0.673	34.072	27.320	500	0.574	34.073	27.326	500	0.524	34.073	27.329
500	0.544	34.073	27.328	600	0.487	34.073	27.331	600	0.449	34.073	27.334
600	0.439	34.072	27.334	700	0.417	34.072	27.335	700	0.386	34.072	27.337
700	0.377	34.072	27.337	800	0.360	34.072	27.338	800	0.335	34.072	27.339
800	0.332	34.072	27.339	900	0.318	34.072	27.340	900	0.312	34.072	27.34
900	0.297	34.071	27.341	1000	0.288	34.071	27.341	1000	0.285	34.071	27.341
1000	0.273	34.071	27.342	1200	0.252	34.071	27.343	1200	0.242	34.071	27.343
1200	0.238	34.071	27.343	1500	0.218	34.071	27.344	1500	0.217	34.07	27.344
1500	0.217	34.070	27.344	2000	0.221	34.070	27.344	2000	0.216	34.07	27.345
2000	0.219	34.070	27.344	2500	0.249	34.071	27.343				
2500	0.251	34.071	27.343								

Station	OS13020			
Latitude	39-39.89N			
Longitude	136-59.97E			
Depth(m)	2600			
Press.	Temp.	Sal.	SIG-T	
5	7.735	34.051	26.568	
10	7.546	34.049	26.593	
20	7.398	34.052	26.616	
30	6.021	34.053	26.801	
40	5.456	34.062	26.878	
50	4.948	34.066	26.941	
75	3.897	34.061	27.050	
100	3.094	34.058	27.125	
125	2.424	34.048	27.175	
150	1.742	34.050	27.230	
175	1.464	34.053	27.253	
200	1.302	34.057	27.267	
250	1.071	34.063	27.288	
300	0.921	34.067	27.300	
400	0.733	34.071	27.315	
500	0.598	34.072	27.324	
600	0.491	34.072	27.330	
700	0.400	34.072	27.336	
800	0.360	34.072	27.338	
900	0.327	34.072	27.340	
1000	0.301	34.071	27.341	
1200	0.252	34.071	27.343	
1500	0.223	34.071	27.344	
2000	0.219	34.070	27.344	
2500	0.245	34.071	27.343	

Station	OS13021			
Latitude	39-32.68N			
Longitude	137-05.08E			
Depth(m)	2557			
Press.	Temp.	Sal.	SIG-T	
5	7.129	34.065	26.664	
10	7.106	34.064	26.667	
20	6.943	34.062	26.687	
30	6.861	34.060	26.697	
40	6.780	34.059	26.707	
50	6.082	34.048	26.790	
75	3.339	34.043	27.090	
100	2.742	34.052	27.151	
125	1.958	34.048	27.212	
150	1.650	34.051	27.237	
175	1.408	34.056	27.259	
200	1.279	34.059	27.270	
250	1.051	34.065	27.290	
300	0.874	34.069	27.305	
400	0.684	34.072	27.319	
500	0.524	34.072	27.329	
600	0.456	34.073	27.333	
700	0.401	34.072	27.336	
800	0.351	34.072	27.338	
900	0.309	34.072	27.340	
1000	0.280	34.071	27.342	
1200	0.249	34.071	27.343	
1500	0.222	34.070	27.344	
2000	0.224	34.071	27.344	
2500	0.252	34.071	27.343	

Station	OS13022			
Latitude	39-35.12N			
Longitude	137-10.09E			
Depth(m)	2595			
Press.	Temp.	Sal.	SIG-T	
5	9.216	34.082	26.365	
10	9.181	34.078	26.367	
20	7.371	34.062	26.629	
30	7.130	34.064	26.664	
40	6.814	34.055	26.700	
50	6.419	34.052	26.750	
75	5.502	34.056	26.868	
100	3.789	34.061	27.061	
125	2.883	34.053	27.139	
150	2.236	34.054	27.195	
175	1.828	34.054	27.227	
200	1.545	34.055	27.248	
250	1.186	34.061	27.278	
300	1.003	34.067	27.295	
400	0.748	34.071	27.314	
500	0.597	34.072	27.324	
600	0.498	34.072	27.330	
700	0.411	34.072	27.335	
800	0.369	34.072	27.337	
900	0.322	34.072	27.340	
1000	0.289	34.071	27.341	
1200	0.246	34.071	27.343	
1500	0.215	34.070	27.344	
2000	0.219	34.070	27.344	
2500	0.251	34.071	27.343	

Station	OS13023			
Latitude	39-37.52N			
Longitude	137-15.05E			
Depth(m)	2536			
Press.	Temp.	Sal.	SIG-T	
5	9.513	34.073	26.309	
10	9.516	34.073	26.309	
20	9.516	34.073	26.309	
30	9.512	34.073	26.309	
40	8.878	34.073	26.411	
50	8.219	34.086	26.523	
75	6.377	34.066	26.766	
100	4.952	34.060	26.936	
125	3.628	34.059	27.075	
150	2.882	34.054	27.140	
175	2.135	34.054	27.203	
200	1.783	34.055	27.231	
250	1.253	34.061	27.274	
300	1.051	34.065	27.290	
400	0.780	34.071	27.312	
500	0.603	34.072	27.324	
600	0.494	34.073	27.331	
700	0.425	34.073	27.335	
800	0.360	34.072	27.338	
900	0.327	34.072	27.340	
1000	0.293	34.071	27.341	
1200	0.255	34.071	27.343	
1500	0.221	34.070	27.344	
2000	0.218	34.070	27.344	
2500	0.239	34.071	27.343	

Station	OS13024			
Latitude	39-40.12N			
Longitude	137-39.98E			
Depth(m)	2599			
Press.	Temp.	Sal.	SIG-T	
5	9.758	34.031	26.236	
10	9.671	34.039	26.257	
20	9.415	34.053	26.310	
30	9.272	34.068	26.345	
40	8.982	34.076	26.398	
50	8.814	34.081	26.428	
75	7.649	34.070	26.595	
100	6.187	34.066	26.791	
125	5.389	34.058	26.883	
150	4.445	34.061	26.992	
175	3.598	34.062	27.080	
200	2.472	34.053	27.175	
250	1.705	34.057	27.238	
300	1.288	34.064	27.273	
400	0.865	34.070	27.306	
500	0.681	34.072	27.319	
600	0.548	34.073	27.328	
700	0.456	34.073	27.333	
800	0.394	34.072	27.336	
900	0.341	34.072	27.339	
1000	0.306	34.071	27.340	
1200	0.264	34.071	27.342	
1500	0.223	34.070	27.344	
2000	0.216	34.070	27.344	
2500	0.237	34.071	27.343	

Station	OS13025			
Latitude	39-40.10N			
Longitude	137-59.69E			
Depth(m)	2580			
Press.	Temp.	Sal.	SIG-T	
5	9.907	34.025	26.206	
10	9.903	34.025	26.207	
20	9.905	34.025	26.207	
30	9.910	34.026	26.207	
40	9.887	34.033	26.216	
50	9.848	34.058	26.242	
75	9.645	34.055	26.273	
100	9.325	34.085	26.350	
125	8.480	34.081	26.480	
150	7.429	34.073	26.629	
175	6.208	34.068	26.790	
200	5.363	34.073	26.898	
250	3.554	34.059	27.082	
300	1.872	34.051	27.221	
400	1.021	34.067	27.294	
500	0.773	34.071	27.313	
600	0.602	34.072	27.324	
700	0.503	34.072	27.330	
800	0.415	34.072	27.335	
900	0.369	34.072	27.337	
1000	0.338	34.072	27.339	
1200	0.276	34.071	27.342	
1500	0.233	34.070	27.344	
2000	0.224	34.070	27.344	
2500	0.238	34.071	27.343	

Station OS13026
Latitude 39-37.43N
Longitude 137-14.98E
Depth(m) 2530

Press.	Temp.	Sal.	SIG-T
5	9.881	33.988	26.182
10	9.872	33.987	26.183
20	8.95	34.065	26.394
30	8.461	34.073	26.476
40	8.062	34.061	26.527
50	6.923	34.062	26.69
75	5.652	34.064	26.856
100	4.708	34.061	26.964
125	3.8	34.057	27.056
150	2.91	34.055	27.139
175	2.226	34.055	27.197
200	1.736	34.051	27.231
250	1.314	34.058	27.267
300	1.072	34.066	27.29
400	0.761	34.071	27.314
500	0.61	34.072	27.324
600	0.518	34.073	27.33
700	0.447	34.073	27.334
800	0.383	34.072	27.337
900	0.341	34.072	27.339
1000	0.3	34.071	27.34
1200	0.26	34.071	27.342
1500	0.226	34.07	27.344
2000	0.218	34.07	27.344
2500	0.237	34.07	27.343

THE "OSHO RO MARU" CRUISE 254 TO THE WESTERN NORTH PACIFIC OCEAN

IN MAY 2013

1. Cruise Itinerary

Departure from Hakodate	May	9, 2013
Start hydrographic research (OS13027) and longline research (OSS1301)		12
Finish longline research (OSS1302) and start gillnet research (OSG1301)		14
Finish hydrographic research (OS13033)		16
Finish gillnet (OSG1303)		17
Return to Hakodate		20
Total coverage 1803.6 miles		

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 28 men
Research Staff:	(Laboratory of Strategic Studies on Marine Bioresource Conservation and Management)		
			Hideaki Kudo
		Graduate Students	3 persons
		Under Graduate Students	48 persons
			Total 81 persons

3. Items of Research

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

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoro maru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus and SBE-19Plus).

Water and Plankton sampling were also carried out at almost hydrographic stations. Water samplings by Niskin bottles Plankton sampling by NORPAC-net, lava-net and ring-net

Fig. 1 Table 1, 2

Biological research for fishes caught by non-selective drift gillnets:

Three gillnet researches were performed during this cruise. The operations were supervised by the captain, and were conducted by deck officers, crews, research staff and cadets.

Table.3, 4, 5, 6, 7, 8

One set of drift gillnet was used to collect salmonids and other epipelagic fishes [Figs.1-(1),(2) and Table 1].

Details about each operation are shown in Table 2. The gillnet configuration is as follows:

Stations	net	A-Gear		C-gear										Total
	Mesh size(mm)	112	115	48	55	63	72	82	93	106	121	138	157	
OSG1301-03	Number of tan	6	6	3	3	3	5	6	5	3	3	3	3	49

The net comprised of total 49 tans of C-Gear gillnet (non-selective varied research mesh, Takagi, 1975), and A-Gear gillnet (commercial mesh). Each tan was 50m long. Gillnet gear was set in the evening, allowed to soak overnight, and retrieved in the following morning. The number of organisms caught was counted by species for mesh size. Catch per unit effort (CPUE) values were calculated as the number of fish caught by C-gear gillnet per tan.

Salmon Hook-and-Line and surface longline Research:

To collect salmon, hook-and-line gears and surface longline were used in Cruise #254.

Five to ten anglers were engaged in the work. These samplings were mainly conducted with observations when ship was under drifting.

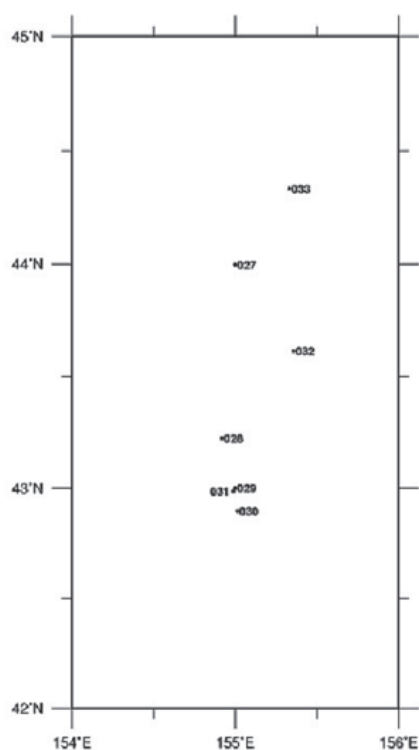


Fig. 1. Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13027	43-59.87N	154-59.95E	5/11	21:36	10	5305	-	-	4.3	o	9plus-0769
OS13027	43-58.87N	155-00.83E	5/12	2:12	10	5313	-	-	4.4	o	9plus-0769
OS13028	43-13.45N	154-55.07E	5/12	7:12	10	5421	-	-	5.1	o	9plus-0769
OS13029	43-00.03N	154-59.98E	5/14	2:08	10	5393	-	-	7.7	o	9plus-0769
OS13030	42-53.80N	155-00.65E	5/15	4:00	10	5300	-	-	6.8	c	9plus-0769
OS13031	42-59.08N	154-59.22E	5/15	9:00	10	5362	-	-	6.2	o	9plus-0769
OS13032	43-36.91N	155-21.45E	5/16	0:17	10	5491	-	-	4.6	bc	9plus-0769
OS13033	44-20.01N	155-19.85E	5/16	6:31	10	5326	-	-	4.7	o	9plus-0769

Table 2. Oceanographic data

Station OS13027				Station OS13028				Station OS13029			
Latitude 43-59.83N				Latitude 43-13.43N				Latitude 43-00.07N			
Longitude 154-59.97E				Longitude 154-55.11E				Longitude 155-00.03E			
Depth(m) 5305				Depth(m) 5421				Depth(m) 5393			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
10	3.287	32.883	26.170	5	4.038	33.012	26.201	20	7.037	33.631	26.336
20	3.285	32.883	26.170	10	4.037	33.018	26.206	30	7.530	33.734	26.348
30	3.283	32.883	26.171	20	4.059	33.030	26.213	40	7.670	33.760	26.348
40	3.272	32.889	26.176	30	4.044	33.032	26.216	50	6.513	33.617	26.395
50	3.137	33.045	26.313	40	4.149	33.076	26.241	75	5.672	33.649	26.525
75	1.654	33.061	26.443	50	4.167	33.104	26.261	100	4.514	33.537	26.569
100	1.892	33.176	26.518	75	4.375	33.430	26.498	125	5.133	33.687	26.619
125	2.271	33.394	26.664	100	1.740	33.209	26.556	150	5.442	33.778	26.655
150	2.528	33.556	26.773	125	1.766	33.257	26.593	175	5.010	33.757	26.689
175	2.617	33.613	26.811	150	1.801	33.351	26.665	200	4.920	33.817	26.746
200	2.907	33.700	26.856	175	2.202	33.489	26.745	250	4.389	33.834	26.819
250	3.286	33.847	26.938	200	2.431	33.561	26.785	300	4.308	33.915	26.891
300	3.362	33.931	26.999	250	3.016	33.712	26.855	400	3.482	33.968	27.016
400	3.383	34.065	27.103	300	3.117	33.795	26.913	500	3.908	34.174	27.138
500	3.259	34.166	27.196	400	4.100	34.065	27.032	600	3.590	34.247	27.229
600	3.126	34.243	27.269	500	3.967	34.173	27.131	700	3.159	34.287	27.302
700	2.965	34.297	27.327	600	3.644	34.240	27.217	800	2.777	34.328	27.369
800	2.825	34.341	27.375	700	3.429	34.311	27.295	900	2.670	34.375	27.416
900	2.680	34.391	27.427	800	3.119	34.350	27.355	1000	2.587	34.401	27.444
1000	2.517	34.430	27.473	900	2.944	34.386	27.400	1200	2.481	34.435	27.480
1200	2.397	34.486	27.528	1000	2.714	34.412	27.441	1500	2.332	34.482	27.530
1500	2.164	34.540	27.590	1200	2.549	34.465	27.498				
2000	1.855	34.608	27.669	1500	2.217	34.526	27.575				
2500	1.633	34.646	27.717								
3000	1.521	34.667	27.742								
3500	1.463	34.679	27.756								
4000	1.454	34.686	27.761								
4500	1.470	34.690	27.764								
5000	1.516	34.691	27.761								

Station	OS13030		
Latitude	42-53.76N		
Longitude	155-00.69E		
Depth(m)	5300		
Press.	Temp.	Sal.	SIG-T
5	5.820	33.357	26.277
10	7.089	33.646	26.340
20	7.799	33.814	26.372
30	7.951	33.850	26.378
40	7.952	33.853	26.380
50	7.940	33.856	26.384
75	6.879	33.859	26.537
100	6.517	33.844	26.573
125	5.936	33.793	26.607
150	5.907	33.821	26.633
175	5.421	33.789	26.666
200	5.286	33.834	26.718
250	4.591	33.851	26.810
300	4.246	33.884	26.873
400	3.718	33.946	26.976
500	3.996	34.125	27.091
600	3.821	34.195	27.164
700	3.533	34.265	27.248
800	3.278	34.322	27.318
900	2.920	34.336	27.362
1000	2.819	34.388	27.413
1200	2.505	34.438	27.480
1500	2.326	34.509	27.552

Station	OS13031		
Latitude	42-59.07N		
Longitude	154-59.24E		
Depth(m)	5362		
Press.	Temp.	Sal.	SIG-T
5	5.212	33.164	26.196
10	4.918	33.155	26.222
20	4.828	33.152	26.229
30	4.833	33.157	26.233
40	4.910	33.183	26.245
50	4.906	33.415	26.429
75	5.073	33.593	26.552
100	4.568	33.577	26.595
125	4.627	33.634	26.634
150	4.249	33.615	26.659
175	3.157	33.536	26.703
200	3.346	33.619	26.751
250	4.584	33.866	26.822
300	4.142	33.896	26.893
400	3.222	33.936	27.016
500	3.873	34.145	27.119
600	3.633	34.240	27.218
700	3.381	34.297	27.288
800	3.225	34.347	27.343
900	2.909	34.361	27.384
1000	2.715	34.380	27.416
1200	2.525	34.433	27.475
1500	2.290	34.497	27.545

Station	OS13032		
Latitude	43-36.91N		
Longitude	155-21.44E		
Depth(m)	5491		
Press.	Temp.	Sal.	SIG-T
5	3.485	32.900	26.165
10	3.395	32.898	26.172
20	3.312	32.897	26.179
30	3.291	32.896	26.180
40	3.185	32.890	26.185
50	2.487	32.944	26.287
75	1.447	33.026	26.430
100	1.391	33.120	26.509
125	2.133	33.437	26.710
150	2.512	33.566	26.782
175	2.698	33.650	26.833
200	2.911	33.720	26.872
250	3.204	33.836	26.937
300	3.356	33.920	26.991
400	3.356	34.059	27.101
500	3.280	34.163	27.191
600	3.146	34.244	27.268
700	2.991	34.296	27.324
800	2.842	34.349	27.380
900	2.707	34.387	27.422
1000	2.583	34.422	27.460
1200	2.383	34.471	27.516
1500	2.193	34.532	27.581

Station	OS13033		
Latitude	44-20.01N		
Longitude	155-19.84E		
Depth(m)	5326		
Press.	Temp.	Sal.	SIG-T
5	3.609	32.919	26.169
10	3.272	32.916	26.197
20	3.191	32.918	26.207
30	3.163	32.919	26.209
40	3.152	32.918	26.21
50	3.142	32.919	26.211
75	2.029	32.996	26.364
100	1.612	33.037	26.427
125	1.622	33.105	26.481
150	2.091	33.347	26.641
175	2.543	33.572	26.785
200	2.823	33.671	26.839
250	3.077	33.781	26.905
300	3.25	33.881	26.969
400	3.326	34.031	27.081
500	3.31	34.138	27.168
600	3.183	34.222	27.247
700	3.027	34.28	27.308
800	2.86	34.335	27.367
900	2.719	34.376	27.412
1000	2.586	34.416	27.455
1200	2.406	34.48	27.522
1500	2.164	34.539	27.589

Table 3. List of salmon research stations, positions and date during the Oshoro maru Cruise #254 and #255, 2013. Oceanographic stations are adopted as the positons.

Oceanographic stations are adopted as the positions.

Station Name				Position		Date	
Oceano-graphic	Gillnet	Hook-and-Line	Surface longline	Latitude	Longitude	S.M.T.*1	T.D.*2
C254							
OS13028	OSG1301	OSHL1301	OSSL1301	43-13.5N	155-00.0E	May 12,14-15	+10h
OS13029			OSSL1302	43-00.0N	155-00.0E	May 14	
OS13030	OSG1302	OSHL1302		42-53.8N	155-00.7E	May 15	
OS13031				42-59.1N	154-59.2E	May 15-16	
OS13032		OSHL1303		43-36.9N	155-21.5E	May 16	
OS13033	OSG1303	OSHL1304		44-20.0N	155-19.9E	May 16	
C255							
OS13038		OSHL1305		56-00.4N	170-21.4W	Jun 22	-10h
OS13046		OSHL1306		55-36.2N	169-03.6W	Jun 24	
OS13060		OSHL1307		54-25.3N	166-20.6W	Jun 26	

*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.).

Table 4. Position and research conditions of surface drift gillnet sampling at each station during the Oshoro maru Cruise #254, 2013.

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 1301	May 14 1755-1820	May 15 0525-0620	+10h	43-14.4N	154-55.4 E	150	5445	o	NW-4	4.6
OSG 1302	May 15 1800-1825	May 16 0525-0625	+10h	42-56.1N	154-58.6 E	30	5340	o	NNE-3	5.4
OSG 1303	May 16 1800-1825	May 17 0425-0525	+10h	44-20.1N	155-19.2 E	135	5316	o	SE-4	4.1

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

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

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

*4 Wr : Weather (o: 100% clouded).

*5 S.T. : Surface temperature

Table 5. The number of organisms caught by drift gillnet during the Oshoro maru Cruise # 254 in May, 2013. CPUE and (%) indicate numerical catch per tan and percentage of total catch by C-gear gillnet at the station, respectively.

Station		OSG 1301					OSG 1302					OSG 1303				
Common name	Scientific name	C		A	Total		C		A	Total		C		A	Total	
		CPUE	(%)				CPUE	(%)				CPUE	(%)			
Sockeye salmon	<i>Oncorhynchus nerka</i>	0	0.0	(0.0)	0	0	0	0.0	(0.0)	0	0	0	0.0	(0.0)	4	4
Chum salmon	<i>Oncorhynchus keta</i>	12	0.3	(4.5)	9	21	6	0.2	(1.8)	11	17	29	0.8	(85.3)	28	57
Pink salmon	<i>Oncorhynchus gorbuscha</i>	251	6.8	(94.7)	8	259	310	8.4	(95.4)	4	314	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	1	0.0	(0.3)	0	1	0	0.0	(0.0)	0	0
																0
Spiny dogfish	<i>Squalus acanthias</i>	0	0.0	(0.0)	0	0	2	0.1	(0.6)	0	2	0	0.0	(0.0)	0	0
Grey Fork-tailed Petrel	<i>Puffinus griseus</i>	0	0.0	(0.0)	0	0	2	0.1	(0.6)	0	2	0	0.0	(0.0)	0	0
Boreal clubhook squid	<i>Onychoteuthis borealijaponica</i>	0	0.0	(0.0)	0	0	3	0.1	(0.9)	0	3	0	0.0	(0.0)	0	0
Eight-armed squid	<i>Gonatopsis borealis</i>	2	0.1	(0.8)	0	2	1	0.0	(0.3)	0	1	5	0.1	(14.7)	0	5

Table 6 . Biological characteristics of salmonids caught by drift gillnet research

Sockeye Salmon											
St.	Gear	F.L.	B.W.	Sex	G.W.	St.	Gear	F.L.	B.W.	Sex	G.W.
G03	A115	580	2415	2	2	G03	A115	548	2000	1	31
G03	A115	608	2980	2	24						
G03	A112	570	1943	1	22						
Chum Salmon											
St.	Gear	F.L.	B.W.	Sex	G.W.	St.	Gear	F.L.	B.W.	Sex	G.W.
G01	A112	506	1530	2	5	G01	A112	492	1207	1	17
G01	A115	556	2092	1	41	G01	A112	484	1381	1	26
G01	A115	530	1684	2	6	G01	A115	498	1496	1	11
G01	A115	490	1430	1	33	G01	A115	486	1496	1	15
G01	C106	520	1708	2	3	G01	A115	530	1725	1	20
G01	C106	528	1713	2	3	G01	C106	534	1811	1	46
G01	C106	510	1829	1	29	G01	C106	550	1750	2	4
G01	C106	542	1657	1	18	G01	C106	504	1613	2	4
G01	C106	504	1582	2	6	G01	C106	500	1526	1	24
G01	C121	590	2439	1	20	G01	C138	484	1279	1	13
G01	C138	550	1783	2	2						
G02	C093	551	1915	2	6	G02	C106	528	1780	1	41
G02	C138	608	2365	2	4	G02	C093	486	1429	1	20
G02	A112	458	1199	–	–	G02	C106	549	1856	2	3
G02	A112	520	1705	–	–						
G02	A112	553	1825	2	4	G02	A112	528	1648	1	18
G02	A112	590	2238	2	4	G02	A112	526	1741	1	17
G02	A112	510	1678	2	4	G02	A112	558	1839	2	7
G02	A112	537	1760	1	18	G02	A112	444	1071	2	6
G02	A112	528	1565	1	19	G02	A112	438	944	2	13
G02	A115	540	1522	2	2	G02	A112	396	697	1	8
G03	C082	510	1502	1	56						
G03	C093	558	1972	2	23	G03	C093	550	2005	1	38
G03	C093	536	1654	2	7						
G03	C106	566	1806	1	36	G03	C106	530	1621	1	47
G03	C106	524	1530	1	28	G03	C106	540	1741	1	42
G03	C106	557	1922	1	40	G03	C106	578	2340	2	14
G03	C106	565	1963	1	46	G03	C106	545	1777	2	9
G03	C106	555	1967	2	8	G03	C106	557	2100	1	56
G03	C106	572	2172	2	10	G03	C106	543	1655	1	22
G03	C106	526	1735	2	10						
G03	C121	582	2181	1	39	G03	C121	538	1801	2	7
G03	C121	562	1840	2	5	G03	C121	550	2036	2	5
G03	C121	555	1830	1	23	G03	C121	552	1930	1	33
G03	C121	545	1931	2	5	G03	C121	540	1645	1	18
G03	C138	546	1870	2	6						
G03	A112	512	1618	2	5	G03	A112	535	1673	1	35
G03	A112	540	1770	1	48	G03	A112	519	1796	2	7
G03	A112	530	1874	1	29	G03	A112	492	1443	1	25
G03	A112	502	1565	2	4	G03	A112	546	1796	1	24
G03	A112	550	2100	2	13	G03	A112	546	1723	2	4
G03	A112	517	1603	1	36	G03	A112	546	2164	1	42
G03	A112	565	2040	2	4						
G03	A115	560	1972	1	23	G03	A115	581	2220	0	10
G03	A115	539	2084	1	46	G03	A115	502	1720	0	15
G03	A115	540	1935	1	42	G03	A115	552	1943	1	48
G03	A115	508	1581	1	34	G03	A115	511	1589	2	35
G03	A115	535	1893	1	93	G03	A115	514	1550	1	44
G03	A115	576	2165	0	15	G03	A115	502	1314	2	16
G03	A115	553	1992	0	11	G03	A115	507	1600	1	43

Table 6. Biological characteristics of salmonids caught by drift gillnet research (continued)

Pink Salmon											
St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)	St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)
G01	A115	460	1098	2	8	G01	A115	460	1167	2	5
G01	A115	450	1080	2	2	G01	A115	462	1103	2	3
G01	C093	422	—	—	—	G01	C093	436	950	2	3
G01	C093	454	995	1	8	G01	C093	400	757	2	3
G01	C093	444	975	2	2	G01	C093	426	780	1	9
G01	C093	406	701	2	5	G01	C093	414	826	2	3
G01	C093	432	864	2	1	G01	C093	394	716	2	1
G01	C093	412	771	2	3	G01	C093	400	729	1	30
G01	C093	414	910	2	3	G01	C093	440	1061	1	30
G01	C093	426	846	2	3	G01	C093	418	873	2	3
G01	C093	394	771	2	2	G01	C093	414	804	2	2
G01	C093	418	854	1	13	G01	C093	432	924	2	2
G01	C093	400	726	2	2	G01	C093	436	823	2	3
G01	C093	420	840	1	8	G01	C093	410	832	2	1
G01	C093	390	760	1	9	G01	C093	438	915	2	3
G01	C093	384	712	2	2	G01	C093	412	835	1	32
G01	C093	424	820	1	25	G01	C093	418	873	2	1
G01	C093	420	800	1	16	G01	C093	524	1696	2	2
G01	C093	428	772	2	2	G01	C093	414	784	2	4
G01	C093	410	870	2	2	G01	C093	410	792	2	2
G01	C093	422	787	1	12	G01	C093	428	868	1	19
G01	C093	424	870	2	2	G01	C093	412	790	2	2
G01	A115	458	991	2	5	G01	C093	404	764	2	4
G01	A115	462	1237	2	6	G01	C093	412	90	2	1
G01	C093	398	731	2	1	G01	C093	412	774	2	6
G01	C093	420	866	1	14	G01	C093	422	817	1	16
G01	C093	400	737	1	6	G01	C093	412	786	2	6
G01	C093	436	937	2	3	G01	C093	434	904	2	5
G01	C093	394	752	1	16	G01	C093	426	905	2	2
G01	C093	462	1153	2	3	G01	C093	424	915	1	15
G01	C093	390	663	2	2	G01	C093	436	876	2	2
G01	C093	456	1096	2	4	G01	C093	422	793	2	3
G01	C093	410	772	1	12	G01	C093	398	696	2	2
G01	C072	420	857	2	2	G01	C072	422	879	1	19
G01	C072	428	938	1	9	G01	C072	398	700	1	13
G01	C072	384	542	2	1	G01	C072	396	710	2	3
G01	C106	446	1042	2	6	G01	C106	430	834	2	4
G01	C106	442	960	2	3	G01	C106	426	929	2	5
G01	C106	452	1111	2	4	G01	C106	424	945	2	4
G01	C106	468	1092	2	2	G01	C106	418	855	2	2
G01	C106	396	757	1	8	G01	C106	452	1029	2	4
G01	C106	422	843	1	6						
G01	C082	422	800	1	9	G01	C082	422	868	2	2
G01	C082	410	822	1	9	G01	C082	428	745	1	11
G01	C082	414	886	2	4	G01	C082	416	804	1	9
G01	C082	424	914	2	4	G01	C082	380	665	1	3
G01	C082	398	720	2	2	G01	C082	400	742	2	1
G01	C082	418	859	2	3	G01	C082	378	680	2	2
G01	C082	400	736	2	2	G01	C082	406	825	1	11
G01	C082	402	700	2	2	G01	C082	422	855	2	2
G01	C082	416	772	2	4	G01	C082	394	764	2	2
G01	C082	402	746	1	15	G01	C082	422	867	2	6
G01	C082	426	799	2	8	G01	C082	400	712	2	2
G01	C082	400	698	1	8	G01	C082	422	884	1	44
G01	C082	426	792	2	2	G01	C082	420	791	2	2
G01	C082	396	682	2	1	G01	C082	420	795	2	2
G01	C082	398	801	1	18	G01	C082	414	891	2	2
G01	C082	420	862	2	7	G01	C082	414	745	1	6
G01	C082	434	881	2	4	G01	C082	410	784	2	12
G01	C082	400	785	1	13	G01	C082	388	762	2	2
G01	C082	436	995	1	12	G01	C082	426	826	2	2
G01	C082	420	869	2	4	G01	C082	416	893	2	5

Table 6. Biological characteristics of salmonids caught by drift gillnet research (continued)

Pink Salmon											
St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)	St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)
G01	C082	402	711	1	7	G01	C082	396	690	1	8
G01	C082	404	792	1	14	G01	C082	416	818	1	7
G01	C082	400	759	2	3	G01	C082	424	845	2	3
G01	C082	436	863	2	3	G01	C082	402	703	1	8
G01	C082	416	806	2	1	G01	C082	394	724	1	9
G01	C082	408	729	2	2	G01	C082	408	765	1	16
G01	C082	402	718	1	18	G01	C082	432	830	2	3
G01	C082	408	743	2	4	G01	C082	406	772	2	4
G01	C082	394	648	1	8	G01	C082	418	833	2	2
G01	C082	426	826	2	4	G01	C082	404	722	2	2
G01	A112	404	649	2	1	G01	A112	434	953	2	4
G02	C063	401	761	1	11	G02	C063	421	841	2	7
G02	C063	405	796	2	3						
G02	C072	400	687	1	13	G02	C072	396	670	1	20
G02	C072	396	708	1	14	G02	C072	408	683	1	10
G02	C072	415	790	2	2						
G02	C082	394	705	2	4	G02	C082	414	833	1	11
G02	C082	426	889	2	3	G02	C082	393	704	1	16
G02	C082	450	1004	2	4	G02	C082	400	737	2	6
G02	C082	412	773	2	2	G02	C082	416	742	2	4
G02	C082	420	817	2	2	G02	C082	431	796	2	4
G02	C082	420	816	2	6	G02	C082	438	894	1	16
G02	C082	430	876	2	3	G02	C082	415	794	1	9
G02	C082	415	775	2	5	G02	C082	417	763	2	1
G02	C082	410	725	2	8	G02	C082	411	751	1	15
G02	C082	430	858	2	3	G02	C082	396	692	2	6
G02	C082	408	717	2	3	G02	C082	396	716	2	3
G02	C082	390	746	2	3	G02	C082	404	725	2	4
G02	C082	406	732	1	15	G02	C082	438	898	2	3
G02	C082	411	777	2	4	G02	C082	427	824	1	27
G02	C082	412	830	1	30	G02	C082	410	748	2	3
G02	C082	400	748	1	12	G02	C082	427	835	2	3
G02	C082	410	719	2	4	G02	C082	426	859	2	3
G02	C082	393	688	2	5	G02	C082	390	705	2	3
G02	C082	394	688	1	13	G02	C082	396	664	2	2
G02	C082	398	731	1	12	G02	C082	416	803	1	17
G02	C082	429	878	2	3	G02	C082	407	685	2	1
G02	C082	397	706	2	3	G02	C082	404	727	2	1
G02	C082	390	674	2	4	G02	C082	423	741	1	7
G02	C082	447	846	1	11	G02	C082	396	714	2	2
G02	C082	398	715	2	3	G02	C082	402	694	1	22
G02	C082	408	793	1	16	G02	C082	410	782	2	3
G02	C082	414	849	2	3	G02	C082	405	788	2	2
G02	C082	399	682	1	15	G02	C082	410	776	1	17
G02	C082	395	724	1	14	G02	C082	413	839	2	3
G02	C082	412	775	1	12	G02	C082	398	665	1	3
G02	C093	418	768	1	10	G02	C093	414	760	2	4
G02	C093	417	774	2	8	G02	C093	405	792	2	2
G02	C093	420	808	2	3	G02	C093	402	726	1	13
G02	C093	406	767	1	10	G02	C093	409	702	2	8
G02	C093	409	740	2	2	G02	C093	421	934	2	2
G02	C093	410	733	1	8	G02	C093	400	692	1	5
G02	C093	429	807	1	12	G02	C093	431	940	1	32
G02	C093	399	730	2	3	G02	C093	396	691	2	2
G02	C093	403	760	1	13	G02	C093	433	843	2	3
G02	C093	409	806	1	14	G02	C093	431	882	1	18
G02	C093	405	795	1	23	G02	C093	414	820	1	10
G02	C093	419	783	1	14	G02	C093	408	770	1	9
G02	C093	415	772	1	27	G02	C093	397	708	2	2
G02	C093	393	754	2	10	G02	C093	408	812	2	2
G02	C093	402	672	2	2	G02	C093	404	813	1	15

Table 6. Biological characteristics of salmonids caught by drift gillnet research (continued)

Pink Salmon											
St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)	St.	Gear	F.L. (mm)	B.W. (gr)	Sex	G.W. (gr)
G02	C093	390	756	2	3	G02	C093	418	764	2	5
G02	C093	400	719	2	2	G02	C093	405	753	1	22
G02	C093	422	854	2	4	G02	C093	419	763	2	3
G02	C093	408	758	1	9	G02	C093	418	771	1	14
G02	C093	400	724	2	3	G02	C093	399	680	1	7
G02	C093	392	724	1	8	G02	C093	410	763	2	2
G02	C093	440	873	2	3	G02	C093	399	693	1	8
G02	C093	409	739	1	16	G02	C093	418	701	2	2
G02	C093	425	879	1	19	G02	C093	375	623	2	3
G02	C093	411	749	2	2	G02	C093	420	850	2	3
G02	C093	417	824	2	3	G02	C093	414	750	2	3
G02	C093	435	968	1	15	G02	C093	406	758	1	4
G02	C093	424	798	2	1	G02	C093	385	709	2	1
G02	C093	402	720	2	10	G02	C093	407	813	1	32
G02	C093	425	835	2	4	G02	C093	393	725	1	10
G02	C106	437	933	1	20	G02	C106	454	1039	2	3
G02	C106	458	987	2	3	G02	C106	445	1026	1	32
G02	A115	458	1123	2	4						

Steel head											
St.	Gear	F.L.	B.W.	Sex	G.W.	St.	Gear	F.L.	B.W.	Sex	G.W.
G02	C072	673	3130	1	25						

Table 7. Position and research conditions of surface longline and hook-and-line sampling at each station during the *Oshoro maru* Cruise #254 and #255, 2013.

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 (Force)	S.T.*5 (°C)
	Line set		Line haul			Lat.	Long.						
C254													
OSSL1301	May 12	1635-1705	May 12	1915-2020	+10h	43-14.8N	154-56.5E	230	20	5463	o	East-3	4.4
OSSL 1302	May 14	0400-0430	May 14	0820-1015	+10h	42-59.7N	155-00.0E	160	30	5388	o	NNW-6	6.8
OSHL1301	May 14	2030	May 15	0400	+10h	43-11.3N	154-57.8E	-	-	5495	o	NNW-3	4.7
OSHL1302	May 15	2130	May16	0340	+10h	42-53.8N	155-00.1E	-	-	-	o	calm	6.9
OSHL1303	May 16	1000	May 16	1130	+10h	43-36.9N	155-21.6E	-	-	-	o	SSE-2	4.2
OSHL1304	May 17	2020	May 17	0230	+10h	44-19.1N	155-17.4E	-	-	5250	o	SE-4	4.1
C255													
OSHL1305	Jun 22	2035	Jun 22	2140	-10h	56-00.4N	170-21.4W	-	-	800	o	NNE-4	6.4
OSHL1306	Jun 24	0130	Jun 24	0220	-10h	55-36.2N	169-03.6W	-	-	1712	f	NW-3	6.7
OSHL1307	Jun 26	2110	Jun 27	0300	-10h	54-25.3N	166-20.6W	-	-	575	o	NNW-2	6.8

*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 line set.

*4 Wr. : Weather (o: 100% clouded, f: fog).

*5 S.T. : Surface temperature

Table 8. 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 # 254 and # 255, 2013.

Station Name	Sampling gear	Species name						Total
		Sockeye	Chum	Pink	Coho	Chinook	Stellhead	
C254								
OSSL 1301	Surface longline	0	1	88	0	0	0	89
OSSL 1302	Surface longline	0	0	100	0	0	0	100
OSHL 1301	Hook-and-line	0	1	18	0	0	0	19
OSHL 1302	Hook-and-line	0	0	90	0	0	0	90
OSHL 1303	Hook-and-line	0	0	1	0	0	0	1
OSHL 1304	Hook-and-line	1	3	0	0	0	0	4
C255								
OSHL 1305	Hook-and-line	0	2	0	0	0	0	2
OSHL 1306	Hook-and-line	5	2	0	0	0	0	7
OSHL 1307	Hook-and-line	4	7	0	0	0	0	11
Total		10	16	297	0	0	0	323

**THE "OSHO RO MARU" CRUISE 255 THE NORTHWEST PACIFIC OCEAN,
THE BERING SEA AND THE CHUKOTCH SEA**

IN JUNE - AUGUST 2013

1. Cruise Itinerary

Departure from Hakodate	June	14, 2013
Date change, repeat June 19 th		
Start hydrographic research (OS13034)		22
Arrival at Dutch Harbor and change research staff		27
Departure from Dutch Harbor	Jul.	1
Start bottom trawl research (OST1301)		4
Finish bottom trawl research (OST1315)		17
Arrival at Dutch Harbor and change research staff		23
Departure from Dutch Harbor		26
Finish hydrographic research (OS13132)		28
Date change, skip July 29 th		
Return to Hakodate	Aug.	6

Total coverage 8951.7 miles

2. Vessel Personnel

Crew:	Captain	Associate Professor	Shogo Takagi
			And 29 crew

Research Staff:	Associate Professor (Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	
	Hakodate - Hakodate	Toru Hirawake
	Associate Professor (Laboratory of Marine Biodiversity, Hokkaido University)	
	Hakodate - Dutch Harbor2	Atsushi Yamaguchi
	Associate Professor (Laboratory of Marine Ecology, Hokkaido University)	
	Hakodate - Dutch Harbor2	Yutaka Watanuki
	Associate Professor (Laboratory of Marine Environmental Science, Hokkaido University)	
	Hakodate - Hakodate	Atsushi Ooki
	Associate Professor (Institute of Low Temperature Science, Hokkaido University)	
	Dutch Harbor1 - Hakodate	Jun Nishioka
	Associate Professor (Institute of Low Temperature Science, Hokkaido University)	
	Dutch Harbor1 - Hakodate	Youhei Yamasita
	Associate Professor (Institute of Low Temperature Science, Hokkaido University)	
	Dutch Harbor1 - Dutch Harbor2	Kouji Suzuki
	Associate Professor (Faculty of Marine Science, Tokyo University of Marine Science and Technology)	
	Dutch Harbor1 - Dutch Harbor2	Michiyo Kawai
	Assistant Professor (Field Science Center for Northern Biosphere, Hokkaido University)	
	Hakodate - Dutch Harbor2	Yoko Mitani
	Assistant Professor (Field Science Center for Northern Biosphere, Hokkaido University)	
	Dutch Harbor1 - Dutch Harbor2	Jun Yamanoto

Assistant Professor (Laboratory of Marine Environmental Science, Hokkaido University)	
Dutch Harbor2 - Hakodate	Hiroji Onishi
Assistant Professor (Laboratory of Marine Environmental Science, Hokkaido University)	
Dutch Harbor1 - Dutch Harbor2	Hiromichi Ueno
Assistant Professor (Museum education and Media studies, Hokkaido University)	
Dutch Harbor1 - Dutch Harbor2	Yoshiharu Fujita
Assistant Professor (National Institute of Polar Research)	
Hakodate - Dutch Harbor1	Takahiro Iida
Researcher (International Christian University)	
Hakodate - Hakodate	Keiko Sekiguchi
Project Researcher (National Institute of Polar Research)	
Hakodate - Dutch Harbor2	Amane Fujiwara
Project Researcher (National Institute of Polar Research)	
Hakodate - Dutch Harbor2	Kohhei Matsuno
Postdoctoral researcher (National Institute of Polar Research)	
Hakodate – Hakodate	Yoshiko J. Kondoh
Chief Researcher (NASA)	
Dutch Harbor1 - Dutch Harbor2	Stanford B. Hooker
Researcher (US Fish and Wildlife Service, Anchorage)	
Dutch Harbor1 - Dutch Harbor2	Elizabeth Labunski
Writer (Hokkaido Shimbun Press)	
Dutch Harbor1 - Dutch Harbor2	Shinya Hosokawa
Japan Marine Science and Technology Center	3 persons
Graduate Students	17 persons
Under Graduate Students	8 persons

Total 49 persons

3. Items of Research

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

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoromaru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus, SBE-19Plus and XCTD).

Water and Plankton sampling were also carried out at almost hydrographic stations. Water samplings by Niskin bottles and underwater tug plane.

Fig. 1 Table 1, 2

Biological research by Bottom trawl, ROV, Frame trawl and Larva-net. Plankton sampling by NORPAC-net, Bongo-net, Closing-net and Ring-net. Dredge, Smith McIntyre Grab and Bottom corer.

Bottom Trawl Research

15 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.

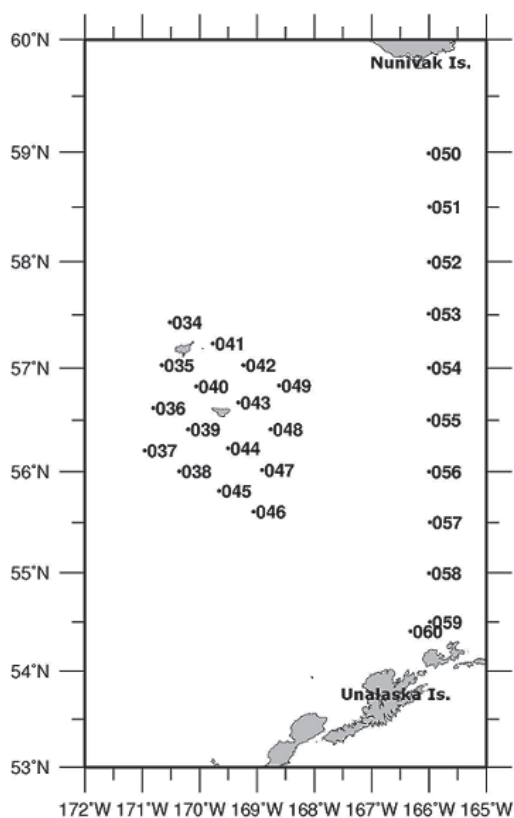


Fig. 1-1. Oceanographic stations

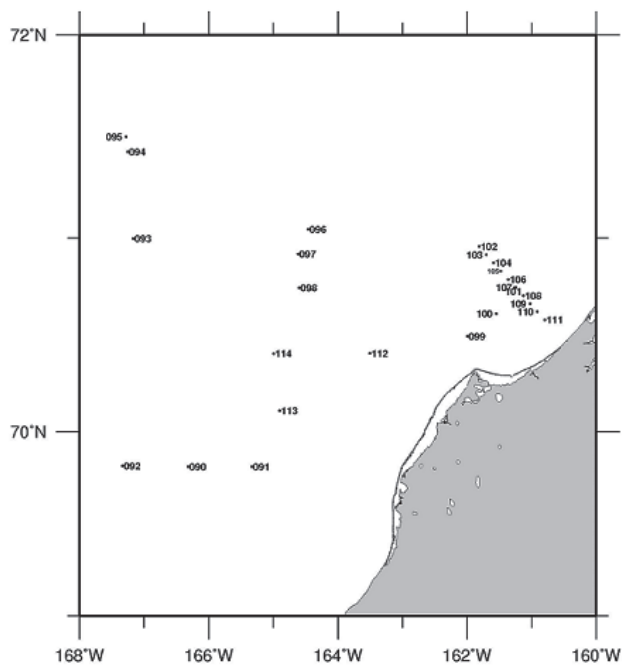
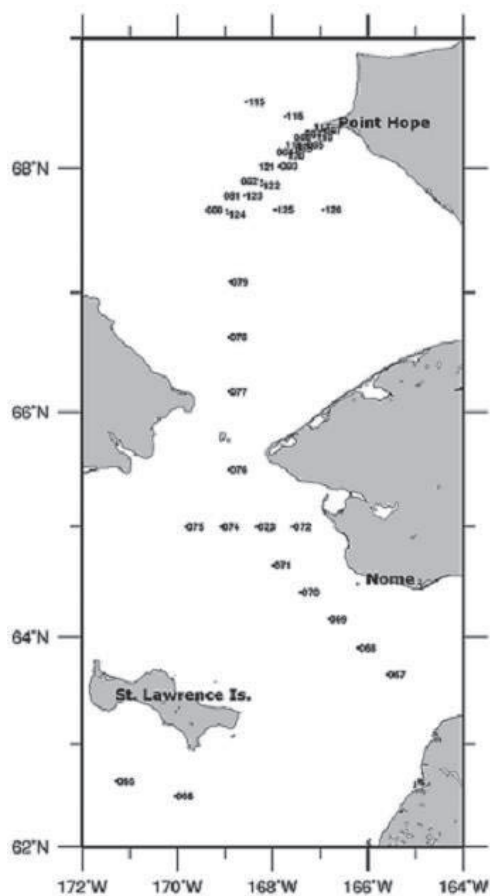


Fig. 1-2. Oceanographic stations

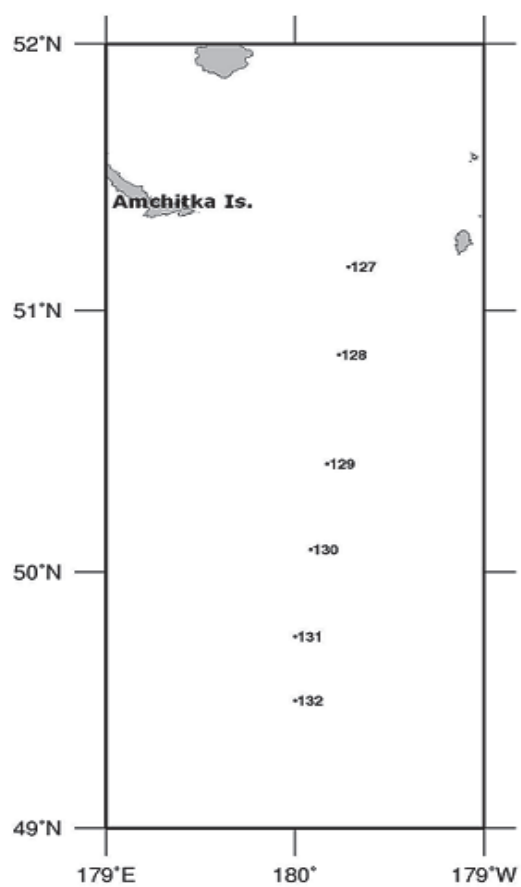


Fig. 1-3. Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13034	57-26.02N	170-30.94W	6/22	18:06	-10	71	-	-	4.6	o	19plus-4636
OS13035	57-01.67N	170-39.57W	6/22	21:09	-10	85	-	-	5.8	o	9plus-0769
OS13036	56-37.14N	170-48.25W	6/23	0:28	-10	118	-	-	5.9	o	9plus-0769
OS13037	56-12.47N	170-57.18W	6/23	3:44	-10	210	-	-	6.8	o	9plus-0769
OS13038	56-00.17N	170-21.20W	6/23	6:52	-10	820	-	-	6.5	o	9plus-0769
OS13039	56-24.67N	170-11.98W	6/23	11:00	-10	113	-	-	5.7	o	9plus-0769
OS13040	56-49.52N	170-03.53W	6/23	14:21	-10	79	-	-	5.8	c	9plus-0769
OS13041	57-13.88N	169-46.06W	6/23	17:28	-10	48	-	-	0.8	o	9plus-0769
OS13042	57-01.64N	169-14.06W	6/23	21:40	-10	77	-	-	4.6	o	9plus-0769
OS13043	56-40.13N	169-19.35W	6/24	0:11	-10	72	-	-	4.4	o	9plus-0769
OS13044	56-13.69N	169-30.41W	6/24	3:55	-10	480	-	-	6.2	o	9plus-0769
OS13045	55-48.70N	169-39.54W	6/24	7:26	-10	1938	-	-	6.5	o	9plus-0769
OS13046	55-36.32N	169-03.65W	6/24	11:29	-10	1712	-	-	6.8	o	9plus-0769
OS13047	56-01.08N	168-54.54W	6/24	15:13	-10	1182	-	-	6.4	o	9plus-0769
OS13048	56-24.71N	168-45.68W	6/24	19:54	-10	120	-	-	6.3	o	9plus-0769
OS13049	56-49.92N	168-36.78W	6/24	22:43	-10	98	-	-	6.2	o	9plus-0769
OS13050	58-59.29N	166-00.32W	6/25	12:47	-10	29	-	-	4.4	o	9plus-0769
OS13051	58-30.30N	165-59.37W	6/25	17:10	-10	46	-	-	3.4	o	9plus-0769
OS13052	57-59.84N	166-00.00W	6/25	21:25	-10	57	-	-	4.4	o	9plus-0769
OS13053	57-30.69N	166-00.36W	6/26	1:10	-10	66	-	-	3.3	o	9plus-0769
OS13054	57-00.16N	165-59.81W	6/26	5:41	-10	74	-	-	4.2	o	9plus-0769
OS13055	56-30.11N	166-00.18W	6/26	9:45	-10	88	-	-	6.7	o	9plus-0769
OS13056	55-59.99N	165-59.84W	6/26	14:18	-10	115	-	-	6.9	o	9plus-0769
OS13057	55-30.11N	165-59.27W	6/26	19:17	-10	123	-	-	6.5	o	9plus-0769
OS13058	54-59.72N	165-59.82W	6/26	23:23	-10	137	-	-	6.6	o	9plus-0769
OS13059	54-30.17N	165-59.24W	6/27	4:19	-10	511	-	-	6.6	o	9plus-0769
OS13060	54-24.33N	166-19.54W	6/27	10:12	-10	581	-	-	7.5	o	19plus-4636
OS13061	62-02.98N	175-12.77W	7/4	7:18	-10	81	-	-	6.5	o	9plus-0769
OS13062	62-31.90N	174-28.98W	7/4	11:16	-10	71	-	-	6.5	o	9plus-0769
OS13063	62-54.51N	173-16.52W	7/4	15:39	-10	68	-	-	6.3	o	9plus-0769
OS13064	62-53.33N	172-02.25W	7/4	23:32	-10	54	-	-	6.7	c	9plus-0769
OS13065	62-38.62N	171-17.30W	7/5	5:50	-10	45	-	-	6.0	o	9plus-0769
OS13066	62-29.90N	170-03.01W	7/5	10:38	-10	37	-	-	6.3	c	9plus-0769
OS13067	63-39.25N	165-36.12W	7/6	14:57	-10	21	-	-	5.8	o	9plus-0769
OS13068	63-54.01N	166-12.40W	7/7	0:29	-10	27	-	-	7.3	bc	9plus-0769
OS13069	64-09.98N	166-49.65W	7/7	3:11	-10	30	-	-	7.3	bc	9plus-0769
OS13070	64-24.59N	167-24.71W	7/7	5:24	-10	30	-	-	6.1	bc	9plus-0769
OS13071	64-39.32N	167-59.57W	7/7	7:40	-10	35	-	-	3.1	bc	9plus-0769
OS13072	65-00.11N	167-35.06W	7/7	10:30	-10	32	-	-	6.2	bc	9plus-0769
OS13073	65-00.05N	168-19.93W	7/7	13:42	-10	43	-	-	6.2	bc	9plus-0769
OS13074	65-00.06N	169-04.91W	7/7	16:12	-10	49	-	-	3.8	bc	9plus-0769
OS13075	65-00.06N	169-49.58W	7/7	21:30	-10	50	-	-	4.6	bc	9plus-0769
OS13076	65-29.99N	168-55.06W	7/8	6:28	-10	56	-	-	4.8	o	9plus-0769
OS13077	66-10.45N	168-54.88W	7/8	11:56	-10	55	-	-	4.4	o	9plus-0769
OS13078	66-37.92N	168-54.99W	7/8	15:44	-10	47	-	-	5.7	o	9plus-0769
OS13079	67-05.32N	168-53.33W	7/9	2:11	-10	47	-	-	4.6	f	9plus-0769
OS13080	67-40.15N	168-57.68W	7/9	6:24	-10	49.8	-	-	5.6	b	XCTD-1

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13081	67-47.00N	168-35.91W	7/9	7:37	-10	50	-	-	5.4	b	XCTD-1
OS13082	67-53.90N	168-14.07W	7/9	8:59	-10	58	-	-	7.1	b	XCTD-1
OS13083	68-01.02N	167-51.82W	7/9	10:23	-10	51	-	-	7.1	b	XCTD-1
OS13084	68-07.70N	167-29.46W	7/9	11:46	-10	51	-	-	6.6	b	XCTD-1
OS13085	68-11.00N	167-18.50W	7/9	12:26	-10	47	-	-	9.0	b	XCTD-1
OS13086	68-14.56N	167-07.30W	7/9	13:08	-10	42	-	-	8.9	bc	XCTD-1
OS13087	68-17.91N	166-56.41W	7/9	14:19	-10	34	-	-	9.4	b	XCTD-1
OS13088	68-14.58N	167-07.16W	7/9	15:14	-10	42	-	-	7.2	b	9plus-0769
OS13089	68-11.30N	167-18.89W	7/9	16:28	-10	47	-	-	7.8	b	19plus-4636
OS13090	69-48.79N	166-19.11W	7/10	20:39	-10	44	-	-	2.9	o	9plus-0769
OS13091	69-48.76N	165-20.02W	7/11	5:29	-10	38	-	-	2.7	b	9plus-0769
OS13092	69-48.99N	167-19.97W	7/11	10:18	-10	47	-	-	4.3	b	9plus-0769
OS13093	70-59.93N	167-10.03W	7/11	18:06	-10	45	-	-	5.5	b	9plus-0769
OS13094	71-25.84N	167-15.31W	7/12	0:40	-10	47	-	-	4.3	b	9plus-0769
OS13095	71-30.34N	167-16.89W	7/12	2:30	-10	48	-	-	4.4	b	9plus-0769
OS13096	71-02.74N	164-27.41W	7/12	17:58	-10	41	-	-	2.9	b	9plus-0769
OS13097	70-55.20N	164-37.34W	7/12	21:23	-10	33	-	-	2.8	b	9plus-0769
OS13098	70-44.85N	164-36.02W	7/12	23:24	-10	46	-	-	1.9	b	9plus-0769
OS13099	70-29.97N	161-59.72W	7/13	17:56	-10	20	-	-	0.7	b	9plus-0769
OS13100	70-37.00N	161-32.83W	7/13	21:12	-10	36	-	-	0.7	b	9plus-0769
OS13101	70-44.93N	161-16.10W	7/14	3:07	-10	42	-	-	0.5	b	9plus-0769
OS13102	70-57.50N	161-48.81W	7/14	6:45	-10	45	-	-	2.2	b	XCTD-1
OS13103	70-55.00N	161-42.15W	7/14	7:06	-10	45	-	-	2.4	b	XCTD-1
OS13104	70-52.50N	161-35.42W	7/14	7:27	-10	44	-	-	2.4	b	XCTD-1
OS13105	70-50.05N	161-28.83W	7/14	7:47	-10	44	-	-	2.7	b	XCTD-1
OS13106	70-47.42N	161-21.60W	7/14	8:08	-10	43	-	-	1.9	b	XCTD-1
OS13107	70-45.07N	161-14.54W	7/14	8:29	-10	42	-	-	1.5	b	XCTD-1
OS13108	70-42.50N	161-07.68W	7/14	8:49	-10	42	-	-	1.1	b	XCTD-1
OS13109	70-40.00N	161-01.39W	7/14	9:10	-10	37	-	-	1.2	b	XCTD-1
OS13110	70-37.50N	160-54.70W	7/14	9:29	-10	36	-	-	1.8	b	XCTD-1
OS13111	70-35.00N	160-47.78W	7/14	9:49	-10	27	-	-	1.8	b	XCTD-1
OS13112	70-24.67N	163-30.14W	7/14	15:56	-10	35	-	-	3.7	c	9plus-0769
OS13113	70-06.68N	164-54.14W	7/15	4:37	-10	40	-	-	5.2	c	9plus-0769
OS13114	70-24.54N	164-59.76W	7/15	7:17	-10	44	-	-	5.2	d	9plus-0769
OS13115	68-31.03N	168-32.68W	7/15	21:14	-10	52	-	-	4.5	o	9plus-0769
OS13116	68-24.45N	167-44.44W	7/16	4:09	-10	53	-	-	3.9	c	9plus-0769
OS13117	68-17.84N	166-56.69W	7/16	6:22	-10	34	-	-	6.8	d	9plus-0769
OS13118	68-14.57N	167-07.33W	7/16	7:14	-10	42	-	-	6.2	d	9plus-0769
OS13119	68-11.13N	167-18.51W	7/16	8:19	-10	47	-	-	2.9	r	9plus-0769
OS13120	68-07.70N	167-29.79W	7/16	9:09	-10	49	-	-	6.1	r	9plus-0769
OS13121	68-00.82N	167-51.92W	7/16	11:17	-10	52	-	-	5.0	o	9plus-0769
OS13122	67-51.93N	168-14.01W	7/16	12:44	-10	56	-	-	5.1	r	9plus-0769
OS13123	67-47.00N	168-35.95W	7/16	14:39	-10	50	-	-	3.4	r	9plus-0769
OS13124	67-38.23N	168-57.36W	7/16	16:08	-10	50	-	-	2.9	f	9plus-0769
OS13125	67-40.27N	167-56.83W	7/17	2:14	-10	48	-	-	3.9	f	9plus-0769
OS13126	67-40.32N	166-55.98W	7/17	17:57	-10	48	-	-	6.4	o	9plus-0769
OS13127	51-10.00N	179-42.97W	7/28	16:06	-11	3685	-	-	8.9	c	XCTD-4
OS13128	50-50.00N	179-46.00W	7/28	18:01	-11	5470	-	-	10.6	c	XCTD-4
OS13129	50-24.96N	179-49.81W	7/28	20:19	-11	6720	-	-	10.6	c	XCTD-4
OS13130	50-05.23N	179-54.96W	7/28	22:13	-11	6034	-	-	10.7	c	XCTD-4
OS13131	49-44.99N	179-59.83W	7/29	0:09	-11	5160	-	-	10.8	o	XCTD-4
OS13132	49-30.00N	179-59.84W	7/29	1:39	-11	4956	-	-	10.8	o	XCTD-4

Table 2. Oceanographic data

Station OS13034 Latitude 57-26.02N Longitude 170-30.94W Depth(m) 71				Station OS13035 Latitude 57-01.68N Longitude 170-39.73W Depth(m) 85				Station OS13036 Latitude 56-37.19N Longitude 170-48.34W Depth(m) 118			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	3.657	31.708	25.200	5	5.544	31.987	25.226	20	5.383	31.978	25.238
10	3.655	31.708	25.201	10	5.540	31.987	25.227	30	3.334	32.022	25.480
20	3.792	31.742	25.215	20	5.539	31.987	25.227	40	2.637	32.098	25.599
30	3.029	31.744	25.285	30	5.016	31.989	25.287	50	2.280	32.131	25.653
50	1.638	31.974	25.573	40	2.392	31.972	25.518	75	2.245	32.206	25.716
				50	2.168	32.025	25.577	100	4.561	32.637	25.850
Station OS13037 Latitude 56-12.48N Longitude 170-57.22W Depth(m) 210				Station OS13038 Latitude 56-00.13N Longitude 170-21.19W Depth(m) 820				Station OS13039 Latitude 56-24.61N Longitude 170-12.02W Depth(m) 113			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	6.581	32.786	25.730	10	6.267	32.430	25.490	10	5.143	31.954	25.245
10	6.580	32.786	25.730	20	6.110	32.433	25.511	20	4.922	31.949	25.265
20	6.435	32.787	25.750	30	5.039	32.595	25.764	30	4.716	31.975	25.308
30	4.209	32.940	26.127	40	4.623	32.743	25.927	40	3.475	32.022	25.467
40	3.905	33.002	26.206	50	4.238	32.739	25.964	50	2.587	32.041	25.557
50	3.720	33.034	26.250	75	3.817	32.834	26.081	75	2.199	32.108	25.640
75	3.440	33.074	26.308	100	3.802	32.914	26.147	100	2.640	32.307	25.766
100	3.376	33.168	26.389	125	3.954	33.047	26.237				
125	3.553	33.286	26.467	150	3.862	33.087	26.278				
150	3.666	33.338	26.497	175	3.898	33.154	26.328				
175	3.674	33.341	26.499	200	3.609	33.193	26.387				
				250	3.746	33.326	26.479				
				300	3.791	33.486	26.602				
Station OS13040 Latitude 56-49.49N Longitude 170-03.39W Depth(m) 73				Station OS13041 Latitude 57-13.83N Longitude 169-46.05W Depth(m) 48				Station OS13042 Latitude 57-01.64N Longitude 169-14.09W Depth(m) 77			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	5.453	31.981	25.232	5	0.514	31.667	25.392	5	4.204	31.581	25.048
10	5.454	31.981	25.232	10	0.514	31.666	25.392	10	3.828	31.596	25.095
20	5.401	31.978	25.235	20	0.509	31.670	25.395	20	0.861	31.722	25.418
30	2.411	31.955	25.502	30	0.537	31.675	25.398	30	-0.039	31.812	25.535
40	2.235	32.014	25.562	40	0.549	31.675	25.397	40	0.066	31.831	25.546
50	2.222	32.016	25.565					50	0.112	31.836	25.548
Station OS13043 Latitude 56-40.17N Longitude 169-19.39W Depth(m) 72				Station OS13044 Latitude 56-13.07N Longitude 169-30.36W Depth(m) 480				Station OS13045 Latitude 55-48.67N Longitude 169-39.6W Depth(m) 1938			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	3.268	31.881	25.373	5	6.020	32.278	25.400	5	6.209	32.449	25.511
10	2.890	31.866	25.393	10	5.921	32.314	25.441	10	5.948	32.443	25.539
20	2.060	31.910	25.492	20	5.892	32.318	25.447	20	5.818	32.471	25.576
30	1.743	31.914	25.518	30	5.931	32.352	25.469	30	5.140	32.524	25.697
40	1.676	31.914	25.522	40	5.358	32.364	25.546	40	4.303	32.736	25.955
50	1.669	31.913	25.522	50	3.848	32.489	25.804	50	4.295	32.787	25.996
				75	3.748	32.684	25.969	75	4.151	32.880	26.085
				100	3.741	32.845	26.097	100	3.968	32.995	26.195
				125	3.719	32.902	26.145	125	3.889	33.047	26.244
				150	3.651	32.942	26.183	150	3.934	33.135	26.309
				175	3.624	33.022	26.249	175	3.678	33.180	26.370
				200	3.687	33.082	26.291	200	3.646	33.251	26.430
				250	3.557	33.175	26.378	250	3.757	33.423	26.556
				300	3.638	33.302	26.471	300	3.788	33.555	26.658

Station OS13046			
Latitude 55-36.27N			
Longitude 169-03.66W			
Depth(m) 1712			
Press.	Temp.	Sal.	SIG-T
5	6.601	32.483	25.489
10	6.592	32.485	25.491
20	6.147	32.491	25.553
30	6.011	32.491	25.569
40	5.313	32.602	25.739
50	4.507	32.681	25.890
75	4.130	32.860	26.071
100	4.080	32.959	26.155
125	3.869	33.032	26.233
150	3.888	33.084	26.273
175	3.988	33.151	26.317
200	3.707	33.170	26.359
250	3.704	33.312	26.473
300	3.801	33.477	26.594

Station OS13047			
Latitude 56-01.14N			
Longitude 168-54.60W			
Depth(m) 1182			
Press.	Temp.	Sal.	SIG-T
5	6.189	32.168	25.292
10	6.057	32.168	25.308
20	5.978	32.288	25.412
30	4.385	32.345	25.636
40	4.239	32.488	25.765
50	4.003	32.595	25.873
75	3.881	32.717	25.982
100	3.708	32.925	26.164
125	3.710	33.020	26.240
150	3.673	33.076	26.288
175	3.640	33.132	26.336
200	3.618	33.194	26.387
250	3.676	33.324	26.485
300	3.742	33.452	26.580

Station OS13048			
Latitude 56-24.68N			
Longitude 168-45.71W			
Depth(m) 120			
Press.	Temp.	Sal.	SIG-T
5	5.967	31.908	25.114
10	5.755	31.905	25.137
20	5.462	31.906	25.171
30	3.850	31.948	25.373
40	2.582	31.987	25.514
50	2.402	32.021	25.555
75	2.214	32.229	25.736
100	2.707	32.370	25.810

Station OS13049			
Latitude 56-49.91N			
Longitude 168-36.85W			
Depth(m) 98			
Press.	Temp.	Sal.	SIG-T
5	5.761	31.931	25.156
10	5.601	31.934	25.178
20	5.338	31.934	25.208
30	1.138	31.953	25.588
40	1.020	31.965	25.605
50	1.008	31.963	25.604
75	1.022	31.971	25.609

Station OS13050			
Latitude 58-59.20N			
Longitude 166-00.25W			
Depth(m) 29			
Press.	Temp.	Sal.	SIG-T
5	4.221	31.205	24.747
10	4.217	31.203	24.746
20	4.219	31.203	24.746

Station OS13051			
Latitude 58-30.34N			
Longitude 165-59.31W			
Depth(m) 46			
Press.	Temp.	Sal.	SIG-T
5	3.138	31.168	24.816
10	3.121	31.169	24.818
20	3.114	31.169	24.818
30	3.096	31.169	24.820
40	3.083	31.169	24.821

Station OS13052			
Latitude 57-59.81N			
Longitude 165-59.96W			
Depth(m) 57			
Press.	Temp.	Sal.	SIG-T
5	3.659	31.146	24.753
10	3.661	31.146	24.753
20	2.709	31.147	24.834
30	1.687	31.206	24.954
40	1.514	31.224	24.979
50	1.489	31.227	24.983

Station OS13053			
Latitude 57-30.65N			
Longitude 166-00.36W			
Depth(m) 66			
Press.	Temp.	Sal.	SIG-T
5	2.782	31.373	25.008
10	2.756	31.373	25.011
20	2.633	31.374	25.021
30	0.788	31.400	25.163
40	0.722	31.408	25.173
50	0.702	31.407	25.174

Station OS13054			
Latitude 57-00.15N			
Longitude 165-59.67W			
Depth(m) 74			
Press.	Temp.	Sal.	SIG-T
5	4.043	31.404	24.923
10	4.001	31.405	24.927
20	3.940	31.414	24.941
30	1.436	31.405	25.129
40	0.210	31.488	25.263
50	0.187	31.492	25.267

Station OS13055			
Latitude 56-30.07N			
Longitude 166-00.09W			
Depth(m) 88			
Press.	Temp.	Sal.	SIG-T
5	6.439	31.805	24.975
10	6.438	31.804	24.975
20	6.440	31.805	24.974
30	4.400	31.853	25.243
40	0.924	31.873	25.536
50	0.902	31.880	25.543
75	0.883	31.877	25.541

Station OS13056			
Latitude 55-59.97N			
Longitude 165-59.79W			
Depth(m) 115			
Press.	Temp.	Sal.	SIG-T
5	6.772	31.827	24.950
10	6.769	31.827	24.950
20	6.016	31.874	25.081
30	5.902	31.898	25.114
40	5.090	31.960	25.256
50	4.128	32.136	25.496
75	3.499	32.420	25.781
100	3.396	32.565	25.907

Station OS13057			
Latitude 55-30.15N			
Longitude 165-59.24W			
Depth(m) 123			
Press.	Temp.	Sal.	SIG-T
5	6.309	31.980	25.129
10	6.303	31.980	25.130
20	5.653	32.010	25.232
30	5.533	32.022	25.256
40	4.843	32.243	25.507
50	4.395	32.375	25.659
75	4.201	32.623	25.876
100	3.823	32.703	25.976

Station	OS13058		
Latitude	54-59.70N		
Longitude	165-59.82W		
Depth(m)	137		
Press.	Temp.	Sal.	SIG-T
5	6.355	32.197	25.295
10	6.231	32.201	25.313
20	5.906	32.188	25.342
30	5.450	32.214	25.416
40	4.707	32.431	25.671
50	4.483	32.550	25.789
75	4.327	32.661	25.893
100	3.774	32.946	26.175
125	3.763	33.016	26.232

Station	OS13059		
Latitude	54-30.24N		
Longitude	165-59.25W		
Depth(m)	511		
Press.	Temp.	Sal.	SIG-T
5	6.500	32.545	25.550
10	6.478	32.545	25.554
20	5.777	32.712	25.772
30	5.575	32.703	25.789
40	5.056	32.794	25.920
50	4.095	32.839	26.058
75	3.984	32.973	26.175
100	4.189	33.063	26.227
125	3.859	33.098	26.287
150	3.865	33.168	26.343
175	3.879	33.219	26.382
200	3.670	33.259	26.433
250	3.766	33.415	26.549
300	3.790	33.539	26.645
400	3.797	33.742	26.806

Station	OS13060		
Latitude	54-24.33N		
Longitude	166-19.54W		
Depth(m)	581		
Press.	Temp.	Sal.	SIG-T
5	6.702	32.725	25.666
10	6.68	32.727	25.671
20	6.227	32.747	25.745
30	5.62	32.821	25.877
50	5.085	33.01	26.088
75	4.612	33.087	26.201
100	4.16	33.122	26.276
150	3.969	33.228	26.38
200	3.875	33.329	26.469
300	3.791	33.556	26.658
400	3.774	33.781	26.839
500	3.599	33.97	27.007

Station	OS13061		
Latitude	62-02.98N		
Longitude	175-12.72W		
Depth(m)	81		
Press.	Temp.	Sal.	SIG-T
5	6.442	31.011	24.348
10	5.570	31.074	24.501
20	-1.175	31.578	25.385
30	-1.600	31.753	25.537
40	-1.628	31.826	25.597
50	-1.560	31.866	25.628
75	-1.560	31.867	25.629

Station	OS13062		
Latitude	62-31.91N		
Longitude	174-28.92W		
Depth(m)	71		
Press.	Temp.	Sal.	SIG-T
5	6.126	31.169	24.512
10	5.786	31.149	24.536
20	-0.949	31.722	25.495
30	-1.561	31.870	25.631
40	-1.632	31.979	25.721
50	-1.658	32.118	25.835

Station	OS13063		
Latitude	62-54.51N		
Longitude	173-16.48W		
Depth(m)	68		
Press.	Temp.	Sal.	SIG-T
5	5.929	31.168	24.535
10	5.678	31.284	24.655
20	-1.134	31.843	25.599
30	-1.630	32.217	25.915
40	-1.701	32.286	25.972
50	-1.711	32.405	26.070

Station	OS13064		
Latitude	62-53.36N		
Longitude	172-02.27W		
Depth(m)	54		
Press.	Temp.	Sal.	SIG-T
5	6.041	30.862	24.280
10	5.507	30.885	24.359
20	-1.078	32.122	25.823
30	-1.567	32.353	26.024
40	-1.568	32.351	26.023

Station	OS13065		
Latitude	62-38.64N		
Longitude	171-17.24W		
Depth(m)	45		
Press.	Temp.	Sal.	SIG-T
5	5.764	30.754	24.226
10	5.621	30.742	24.233
20	-1.218	32.378	26.035
30	-1.243	32.385	26.041
40	-1.245	32.381	26.038

Station	OS13066		
Latitude	62-29.87N		
Longitude	170-03.01W		
Depth(m)	37		
Press.	Temp.	Sal.	SIG-T
5	5.687	30.788	24.262
10	4.225	30.922	24.522
20	-0.962	32.479	26.109
30	-0.904	32.523	26.143

Station	OS13067		
Latitude	63-39.25N		
Longitude	165-36.12W		
Depth(m)	21		
Press.	Temp.	Sal.	SIG-T
5	5.068	30.939	24.450
10	3.992	30.887	24.517

Station	OS13068		
Latitude	63-54.01N		
Longitude	166-12.41W		
Depth(m)	27		
Press.	Temp.	Sal.	SIG-T
5	7.035	31.395	24.576
10	6.487	31.450	24.688
20	4.724	31.682	25.075

Station	OS13069		
Latitude	64-10.00N		
Longitude	166-49.70W		
Depth(m)	30		
Press.	Temp.	Sal.	SIG-T
5	6.837	31.236	24.476
10	6.080	31.273	24.599
20	1.524	31.742	25.394

Station	OS13070		
Latitude	64-24.62N		
Longitude	167-24.71W		
Depth(m)	30		
Press.	Temp.	Sal.	SIG-T
5	5.915	30.846	24.282
10	4.153	31.261	24.799
20	0.280	32.163	25.804

Station	OS13071		
Latitude	64-39.37N		
Longitude	167-59.56W		
Depth(m)	35		
Press.	Temp.	Sal.	SIG-T
5	1.661	31.899	25.511
10	0.367	32.190	25.821
20	0.225	32.229	25.859
30	0.223	32.228	25.858

Station	OS13072		
Latitude	65-00.15N		
Longitude	167-35.05W		
Depth(m)	32		
Press.	Temp.	Sal.	SIG-T
5	5.581	31.058	24.487
10	4.169	31.367	24.880
20	0.517	31.775	25.479

Station	OS13073		
Latitude	65-00.07N		
Longitude	168-19.94W		
Depth(m)	43		
Press.	Temp.	Sal.	SIG-T
5	5.799	31.331	24.678
10	5.451	31.632	24.956
20	2.955	31.866	25.388
30	-0.357	32.258	25.908

Station	OS13074		
Latitude	65-00.10N		
Longitude	169-04.94W		
Depth(m)	49		
Press.	Temp.	Sal.	SIG-T
5	2.482	32.393	25.847
10	1.843	32.441	25.933
20	1.378	32.447	25.969
30	1.288	32.446	25.975
40	1.290	32.445	25.973

Station	OS13075		
Latitude	65-00.08N		
Longitude	169-49.54W		
Depth(m)	50		
Press.	Temp.	Sal.	SIG-T
5	2.879	32.542	25.934
10	2.259	32.566	26.002
20	1.445	32.585	26.075
30	1.494	32.605	26.088
40	1.506	32.605	26.088

Station	OS13076		
Latitude	65-30.05N		
Longitude	168-55.06W		
Depth(m)	56		
Press.	Temp.	Sal.	SIG-T
5	2.238	32.161	25.680
10	1.749	32.211	25.755
20	0.759	32.162	25.777
30	0.714	32.174	25.789
40	0.706	32.190	25.803
50	0.724	32.193	25.804

Station	OS13077		
Latitude	66-10.51N		
Longitude	168-54.87W		
Depth(m)	55		
Press.	Temp.	Sal.	SIG-T
5	2.219	32.155	25.676
10	1.140	32.220	25.802
20	1.133	32.222	25.804
30	1.102	32.227	25.810
40	1.104	32.226	25.809
50	1.105	32.226	25.809

Station	OS13078		
Latitude	66-37.93N		
Longitude	168-54.98W		
Depth(m)	47		
Press.	Temp.	Sal.	SIG-T
5	1.718	32.150	25.709
10	1.434	32.142	25.721
20	1.410	32.148	25.728
30	1.360	32.147	25.730
40	1.292	32.153	25.739

Station	OS13079		
Latitude	67-05.35N		
Longitude	168-53.27W		
Depth(m)	47		
Press.	Temp.	Sal.	SIG-T
5	4.124	32.198	25.546
10	2.625	32.193	25.673
20	1.174	32.210	25.792
30	1.034	32.225	25.812
40	0.963	32.233	25.823

Station	OS13080		
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	4.307	32.256	-
10	1.973	32.412	-
20	1.624	32.477	-
30	1.449	32.504	-
40	1.480	32.523	-
50	1.511	12.920	-
75	2.402	12.700	-
100	3.481	12.628	-

Station	OS13081		
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	4.680	32.402	-
10	4.010	32.394	-
20	1.675	32.414	-
30	1.582	32.458	-
40	1.572	32.489	-
50	1.438	14.528	-
75	2.289	14.409	-
100	3.328	14.311	-

Station	OS13082		
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	6.081	32.178	-
10	4.815	32.177	-
20	1.511	32.390	-
30	1.179	32.374	-
40	1.251	32.418	-
50	1.314	32.422	-
75	1.654	13.982	-
100	2.714	13.923	-

Station	OS13083		
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	5.825	31.531	-
10	2.999	32.190	-
20	1.011	32.230	-
30	0.452	32.291	-
40	0.502	32.298	-
50	0.502	32.294	-
75	1.624	9.697	-
100	2.816	9.663	-

Station	OS13084		
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	3.163	31.645	-
10	0.812	31.911	-
20	0.436	31.964	-
30	0.404	31.983	-
40	0.404	31.986	-
50	0.446	16.865	-
75	1.187	16.782	-
100	2.103	16.678	-

Station OS13085			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	7.020	30.499	-
10	3.461	31.584	-
20	1.527	31.763	-
30	0.990	31.836	-
40	0.984	31.842	-
50	1.060	13.380	-
75	2.237	13.276	-
100	3.210	13.226	-
125	3.992	13.192	-

Station OS13086			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	6.589	30.432	-
10	4.427	31.291	-
20	2.245	31.671	-
30	1.373	31.803	-
40	1.362	31.810	-
50	1.472	12.796	-
75	2.541	12.669	-

Station OS13087			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	5.807	30.201	-
10	4.423	31.374	-
20	2.618	31.638	-
30	2.476	31.650	-
40	2.598	31.353	-
50	2.506	31.529	-
75	2.506	31.506	-
100	2.506	31.490	-

Station OS13088			
Latitude 68-14.60N			
Longitude 167-07.26W			
Depth(m) 42			
Press.	Temp.	Sal.	SIG-T
5	5.276	30.948	24.434
10	3.887	31.498	25.012
20	2.211	31.642	25.267
30	1.432	31.769	25.422

Station OS13089			
Latitude 68-11.30N			
Longitude 167-18.89E			
Depth(m) 47			
Press.	Temp.	Sal.	SIG-T
5	2.615	31.585	25.192
10	1.692	31.757	25.395
20	1.040	31.851	25.512
30	0.983	31.868	25.528

Station OS13090			
Latitude 69-48.79N			
Longitude 166-19.17W			
Depth(m) 44			
Press.	Temp.	Sal.	SIG-T
5	2.424	29.436	23.489
10	1.724	31.304	25.030
20	-0.563	32.285	25.938
30	-1.269	32.443	26.089

Station OS13091			
Latitude 69-48.75N			
Longitude 165-20.02W			
Depth(m) 38			
Press.	Temp.	Sal.	SIG-T
5	2.332	29.062	23.196
10	2.377	29.209	23.310
20	-0.370	31.943	25.654
30	-0.940	32.476	26.106

Station OS13092			
Latitude 69-48.99N			
Longitude 167-20.06W			
Depth(m) 47			
Press.	Temp.	Sal.	SIG-T
5	3.599	30.109	23.933
10	1.106	31.681	25.371
20	-0.234	32.282	25.923
30	-1.332	32.447	26.094
40	-1.433	32.496	26.137

Station OS13093			
Latitude 70-59.97N			
Longitude 167-10.10W			
Depth(m) 45			
Press.	Temp.	Sal.	SIG-T
5	4.796	31.225	24.705
10	4.820	31.219	24.698
20	-1.029	32.397	26.045
30	-1.422	32.599	26.220
40	-1.443	32.604	26.224

Station OS13094			
Latitude 71-25.84N			
Longitude 167-15.35W			
Depth(m) 47			
Press.	Temp.	Sal.	SIG-T
5	4.165	30.819	24.446
10	3.738	31.019	24.645
20	-1.616	32.672	26.284
30	-1.700	32.711	26.318
40	-1.703	32.720	26.325

Station OS13095			
Latitude 71-30.36N			
Longitude 16716.95W			
Depth(m) 48			
Press.	Temp.	Sal.	SIG-T
5	4.240	30.914	24.514
10	1.947	31.505	25.175
20	-1.697	32.694	26.304
30	-1.703	32.716	26.322
40	-1.704	32.724	26.329

Station OS13096			
Latitude 71-02.77N			
Longitude 164-27.34W			
Depth(m) 41			
Press.	Temp.	Sal.	SIG-T
5	1.955	29.904	23.894
10	-0.043	30.446	24.432
20	-1.661	32.275	25.962
30	-1.734	32.716	26.322

Station OS13097			
Latitude 70-55.21N			
Longitude 164-37.35W			
Depth(m) 33			
Press.	Temp.	Sal.	SIG-T
5	2.973	29.486	23.489
10	1.247	30.425	24.354
20	-1.691	32.495	26.142

Station OS13098			
Latitude 70-44.85N			
Longitude 164-36.02W			
Depth(m) 46			
Press.	Temp.	Sal.	SIG-T
5	1.294	27.847	22.284
10	1.716	29.292	23.419
20	-1.650	32.392	26.057
30	-1.715	32.714	26.321
40	-1.716	32.714	26.321

Station OS13099			
Latitude 70-29.95N			
Longitude 161-59.65W			
Depth(m) 20			
Press.	Temp.	Sal.	SIG-T
5	0.364	32.130	25.772
10	0.187	32.135	25.785

Station	OS13100		
Latitude	70-36.99N		
Longitude	161-32.75W		
Depth(m)	36		
Press.	Temp.	Sal.	SIG-T
5	0.295	32.307	25.918
10	0.318	32.299	25.911
20	-1.203	32.613	26.225
30	-1.219	32.616	26.228

Station	OS13101		
Latitude	70-44.92N		
Longitude	161-16.17W		
Depth(m)	42		
Press.	Temp.	Sal.	SIG-T
5	-0.023	31.980	25.670
10	-0.372	32.149	25.821
20	-1.687	32.448	26.104
30	-1.709	32.686	26.297

Station	OS13112		
Latitude	70-24.67N		
Longitude	163-30.08W		
Depth(m)	35		
Press.	Temp.	Sal.	SIG-T
5	2.883	30.439	24.255
10	1.192	31.308	25.066
20	-0.772	32.436	26.068
30	-0.824	32.446	26.077

Station	OS13113		
Latitude	70-06.70N		
Longitude	164-54.12W		
Depth(m)	40		
Press.	Temp.	Sal.	SIG-T
5	4.621	29.038	22.990
10	1.543	31.604	25.282
20	-0.904	32.485	26.112
30	-1.176	32.523	26.151

Station	OS13114		
Latitude	70-24.55N		
Longitude	164-59.70W		
Depth(m)	44		
Press.	Temp.	Sal.	SIG-T
5	4.130	30.043	23.833
10	3.339	30.387	24.177
20	-0.749	32.209	25.883
30	-0.795	32.502	26.122

Station	OS13115		
Latitude	68-31.06N		
Longitude	168-32.79W		
Depth(m)	52		
Press.	Temp.	Sal.	SIG-T
10	4.020	32.254	25.601
20	1.359	32.237	25.802
30	1.080	32.295	25.865
40	1.065	32.311	25.880

Station	OS13116		
Latitude	68-24.48N		
Longitude	167-44.42W		
Depth(m)	53		
Press.	Temp.	Sal.	SIG-T
5	3.404	31.927	25.398
10	2.995	31.886	25.401
20	2.833	31.875	25.405
30	2.697	31.861	25.405
40	2.277	31.869	25.444

Station	OS13117		
Latitude	68-17.86N		
Longitude	166-56.80W		
Depth(m)	34		
Press.	Temp.	Sal.	SIG-T
5	6.365	31.291	24.579
10	6.352	31.293	24.582
20	5.794	31.305	24.658

Station	OS13118		
Latitude	68-14.60N		
Longitude	167-07.33W		
Depth(m)	42		
Press.	Temp.	Sal.	SIG-T
5	5.130	31.482	24.873
10	3.390	31.491	25.052
20	3.163	31.510	25.087
30	2.953	31.517	25.110

Station	OS13119		
Latitude	68-11.15N		
Longitude	167-18.65W		
Depth(m)	47		
Press.	Temp.	Sal.	SIG-T
5	2.351	31.550	25.183
10	2.296	31.560	25.195
20	2.184	31.567	25.209
30	1.865	31.679	25.321
40	2.485	31.957	25.498

Station	OS13120		
Latitude	68-07.69N		
Longitude	167-29.92W		
Depth(m)	49		
Press.	Temp.	Sal.	SIG-T
5	5.879	32.162	25.325
10	5.851	32.166	25.331
20	1.882	32.119	25.672
30	1.876	32.119	25.673
40	1.864	32.123	25.677

Station	OS13121		
Latitude	68-00.84N		
Longitude	167-51.95W		
Depth(m)	52		
Press.	Temp.	Sal.	SIG-T
5	4.829	32.323	25.572
10	3.955	32.291	25.636
20	1.342	32.267	25.828
30	1.309	32.272	25.833
40	1.255	32.278	25.842

Station	OS13122		
Latitude	67-51.96N		
Longitude	168-14.02W		
Depth(m)	56		
Press.	Temp.	Sal.	SIG-T
5	4.696	32.123	25.428
10	4.689	32.125	25.430
20	0.908	32.261	25.849
30	0.815	32.285	25.873
40	0.804	32.283	25.872
50	0.791	32.282	25.872

Station	OS13123		
Latitude	67-47.02N		
Longitude	168-35.96W		
Depth(m)	50		
Press.	Temp.	Sal.	SIG-T
5	2.836	32.197	25.662
10	2.835	32.197	25.662
20	1.725	32.209	25.755
30	0.751	32.252	25.850
40	0.684	32.249	25.851

Station	OS13124		
Latitude	67-38.26N		
Longitude	168-57.31W		
Depth(m)	50		
Press.	Temp.	Sal.	SIG-T
5	2.504	32.260	25.739
10	2.414	32.258	25.744
20	1.614	32.241	25.788
30	1.523	32.240	25.794
40	0.813	32.237	25.835

Station OS13125
Latitude 67-40.29N
Longitude 167-56.83W
Depth(m) 48

Press.	Temp.	Sal.	SIG-T
5	4.525	32.025	25.367
10	3.272	32.150	25.587
20	0.848	32.226	25.824
30	0.796	32.231	25.831
40	0.795	32.229	25.829

Station OS13126
Latitude 67-40.35N
Longitude 166-55.98W
Depth(m) 48

Press.	Temp.	Sal.	SIG-T
5	6.021	32.041	25.212
10	6.014	32.042	25.214
20	2.374	32.092	25.611
30	1.345	32.194	25.768
40	1.303	32.204	25.779

Station OS13127			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	7.973	32.731	-
10	7.944	32.743	-
20	7.408	32.811	-
30	6.856	32.876	-
40	6.450	32.923	-
50	6.401	32.928	-
75	5.258	33.067	-
100	4.543	33.189	-
125	4.280	33.274	-
150	4.191	33.370	-
175	4.191	33.442	-
200	4.220	33.512	-
250	4.261	33.604	-
300	4.002	33.748	-
400	3.835	33.904	-
500	3.662	33.999	-
600	3.592	34.125	-
700	3.502	34.178	-
800	3.325	34.248	-
900	3.171	34.300	-
1000	2.959	34.348	-
1200	2.670	34.415	-
1500	2.280	34.508	-

Station OS13128			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	9.782	32.678	-
10	9.782	32.691	-
20	9.791	32.696	-
30	8.985	32.736	-
40	6.378	32.876	-
50	6.136	32.923	-
75	3.287	33.004	-
100	2.772	33.043	-
125	2.519	33.130	-
150	3.180	33.592	-
175	3.488	33.749	-
200	3.538	33.836	-
250	3.639	33.940	-
300	3.649	34.004	-
400	3.568	34.119	-
500	3.438	34.183	-
600	3.287	34.252	-
700	3.126	34.314	-
800	2.965	34.353	-
900	2.833	34.391	-
1000	2.722	34.419	-
1200	2.437	34.485	-
1500	2.182	34.535	-

Station OS13129			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	9.777	32.649	-
10	9.777	32.662	-
20	8.751	32.721	-
30	6.822	32.791	-
40	6.453	32.808	-
50	6.138	32.813	-
75	3.769	32.899	-
100	3.345	32.975	-
125	3.516	33.301	-
150	3.809	33.741	-
175	3.856	33.893	-
200	3.856	33.940	-
250	3.816	34.016	-
300	3.746	34.087	-
400	3.536	34.187	-
500	3.295	34.272	-
600	3.094	34.320	-
700	2.904	34.362	-
800	2.760	34.395	-
900	2.608	34.428	-
1000	2.466	34.461	-
1200	2.273	34.501	-
1500	2.038	34.556	-

Station OS13130			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	9.839	32.661	-
10	9.308	32.690	-
20	7.944	32.765	-
30	6.577	32.808	-
40	6.441	32.818	-
50	5.745	32.822	-
75	3.686	32.904	-
100	3.346	32.966	-
125	3.536	33.338	-
150	3.783	33.709	-
175	3.786	33.861	-
200	3.846	33.928	-
250	3.806	34.015	-
300	3.742	34.078	-
400	3.546	34.171	-
500	3.325	34.255	-
600	3.124	34.310	-
700	2.933	34.349	-
800	2.791	34.388	-
900	2.650	34.415	-
1000	2.505	34.448	-
1200	2.274	34.492	-
1500	2.008	34.550	-

Station OS13131			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	9.700	32.664	-
10	9.568	32.668	-
20	7.065	32.771	-
30	6.549	32.818	-
40	6.384	32.827	-
50	5.276	32.826	-
75	3.466	32.910	-
100	3.315	33.112	-
125	3.573	33.574	-
150	3.716	33.818	-
175	3.756	33.874	-
200	3.766	33.933	-
250	3.756	34.006	-
300	3.696	34.068	-
400	3.502	34.160	-
500	3.345	34.221	-
600	3.185	34.290	-
700	3.023	34.341	-
800	2.872	34.377	-
900	2.730	34.417	-
1000	2.598	34.450	-
1200	2.354	34.502	-
1500	2.079	34.576	-

Station OS13132			
Latitude			
Longitude			
Depth(m)			
Depth	Temp.	Sal.	SIG-T
5	9.793	32.704	-
10	9.614	32.718	-
20	6.628	32.846	-
30	6.093	32.878	-
40	5.750	32.893	-
50	4.203	32.942	-
75	2.852	33.014	-
100	2.503	33.087	-
125	3.114	33.471	-
150	3.526	33.721	-
175	3.636	33.813	-
200	3.676	33.871	-
250	3.656	33.934	-
300	3.659	34.016	-
400	3.556	34.124	-
500	3.406	34.189	-
600	3.235	34.249	-
700	3.044	34.309	-
800	2.902	34.353	-
900	2.741	34.389	-
1000	2.599	34.422	-
1200	2.370	34.472	-
1500	2.110	34.536	-

**THE "OSHO RO MARU" CRUISE 260
TO EAST OF THE TSUGARU STRAIT**

IN SEPTEMBER 2013

1. Cruise Itinerary

Departure from Hakodate and start hydrographic research (OS13144)	Sep. 17, 2013
Bottom trawl research (OST1317-OST1318)	18
Arrival at Muroran	20
Departure from Muroran	21
Saury gillnet (OSSG1301) and finish hydrographic research (OS13152)	22
Return to Hakodate	24
Total coverage 690.7 miles	

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 29 men

Research Staff:	Associate Professor	(Laboratory of Marine Bio-resources Ecology)	
	Hakodate - Hakodate		Takashi Matsuishi
	Professor	(Laboratory of Marine Bio-resources Science)	
	Hakodate - Muroran		Tetsuya Takatsu
	Associate Professor	(Laboratory of Marine Environmental Science)	
	Hakodate - Hakodate		Atsushi Ooki
	Associate Professor	(Laboratory of Marine Biology and Biodiversity)	
	Hakodate - Muroran		Hisashi Imamura
	Associate Professor	(Laboratory of Marine Biodiversity)	
	Hakodate - Muroran		Atsushi Yamaguchi
	Associate Professor	(Laboratory of Marine Ecology)	
	Muroran - Muroran		Yutaka Watanuki
	Mitsui Engineering & Shipbuilding staff		2 persons
	Hakodate - Muroran		
	Teaching Assistant:		11 persons
	Cadets:		50 persons
			Total 69 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 and floating gillnet catch for undergraduate students in the Department of Marine Biological Science.

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

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

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

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

Fig. 1 Table 1, 2

Bottom trawl observations:

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

Table 3, 4

Saury floating gillnet research:

One operation of gillnet Researches were carried out. These operations was supervised by the captain, Deck officer, Science officer, crew, research staff, and cadets were engaged in the work.

Table 5

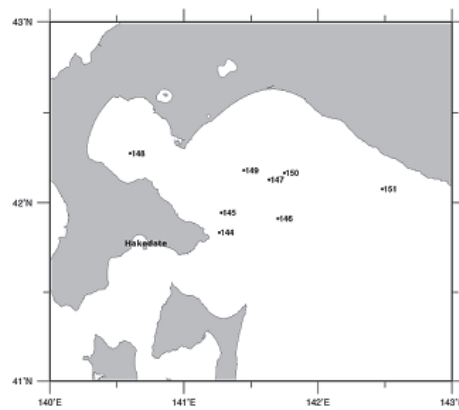


Fig. 1. Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13144	41-50.15N	141-15.95E	9/17	6:40	9	245	-	-	20.5	bc	9plus-0769
OS13145	41-56.74N	141-16.78E	9/17	10:16	9	285	-	-	20.7	bc	9plus-0769
OS13146	41-54.74N	141-42.14E	9/18	9:46	9	893	-	-	19.6	bc	9plus-0769
OS13147	42-07.71N	141-38.20E	9/18	13:35	9	748	-	-	19.5	bc	9plus-0769
OS13148	42-16.48N	140-36.02E	9/18	23:29	9	92	-	-	-	o	9plus-0769
OS13149	42-10.82N	141-26.89E	9/19	3:48	9	507	-	-	21.1	c	9plus-0769
OS13150	42-10.01N	141-45.00E	9/19	7:16	9	795	-	-	19.3	c	9plus-0769
OS13151	42-04.63N	142-28.92E	9/21	9:32	9	568	-	-	20.1	bc	9plus-0769
OS13152	42-38.05N	144-06.57E	9/22	9:33	9	452	-	-	16.5	c	9plus-0769

Table 2. Oceanographic data

Station OS13144 Latitude 41-50.14N Longitude 141-15.96E Depth(m) 245				Station OS13145 Latitude 41-56.74N Longitude 141-16.79E Depth(m) 285				Station OS13146 Latitude 41-54.7N Longitude 141-42.18E Depth(m) 893			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	20.717	32.417	22.604	5	20.743	32.909	22.971	5	19.563	33.320	23.594
10	20.841	32.751	22.826	10	20.932	33.077	23.049	10	19.561	33.320	23.595
20	19.319	33.320	23.657	20	21.095	33.502	23.328	20	19.490	33.339	23.628
30	18.764	33.522	23.951	30	19.023	33.848	24.135	30	15.702	33.914	24.979
40	14.483	34.058	25.358	40	16.307	34.020	24.924	40	13.088	33.947	25.560
50	12.969	34.076	25.683	50	13.300	34.040	25.589	50	12.728	34.073	25.728
75	10.801	33.987	26.022	75	11.108	34.036	26.006	75	11.281	34.009	25.953
100	9.073	33.855	26.210	100	9.804	33.915	26.138	100	10.210	33.936	26.085
125	6.998	33.685	26.383	125	7.301	33.707	26.358	125	9.098	33.849	26.201
150	5.205	33.540	26.494	150	5.363	33.546	26.481	150	7.628	33.714	26.318
175	3.884	33.452	26.566	175	4.098	33.455	26.548	175	5.677	33.551	26.447
200	2.779	33.417	26.640	200	3.287	33.418	26.597	200	3.606	33.391	26.545
				250	2.504	33.431	26.675	250	2.544	33.438	26.678
								300	2.330	33.494	26.740
								400	3.103	33.751	26.879
								500	3.468	33.966	27.016
								600	3.407	34.106	27.133
								700	3.360	34.187	27.202
								800	3.248	34.248	27.262

Station OS13147 Latitude 42-07.76N Longitude 141-38.20E Depth(m) 748				Station OS13148 Latitude 42-16.48N Longitude 140-36.02E Depth(m) 92				Station OS13149 Latitude 42-10.82N Longitude 141-26.85E Depth(m) 507			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	20.017	33.373	23.517	5	20.304	32.087	22.462	5	20.385	33.307	23.370
10	20.021	33.373	23.516	10	20.305	32.087	22.462	10	20.299	33.314	23.398
20	20.001	33.381	23.527	20	19.983	33.294	23.465	20	20.238	33.357	23.447
30	18.051	33.699	24.263	30	17.462	33.339	24.130	30	16.838	33.933	24.734
40	15.623	34.056	25.107	40	14.358	33.713	25.117	40	14.905	34.183	25.362
50	14.403	34.066	25.381	50	11.174	33.521	25.593	50	13.603	34.077	25.556
75	12.575	34.071	25.757	75	3.806	33.194	26.369	75	11.922	34.076	25.886
100	10.586	33.966	26.044					100	10.773	34.007	26.042
125	8.154	33.754	26.273					125	8.803	33.831	26.234
150	5.427	33.540	26.468					150	6.973	33.668	26.373
175	4.816	33.504	26.510					175	5.071	33.499	26.477
200	3.044	33.386	26.593					200	3.691	33.409	26.551
250	2.489	33.451	26.692					250	2.874	33.416	26.632
300	2.554	33.534	26.753					300	2.511	33.462	26.699
400	3.037	33.734	26.871					400	2.867	33.705	26.863
500	3.462	33.966	27.017								
600	3.416	34.067	27.102								
700	3.382	34.157	27.177								

Station OS13150				Station OS13151				Station OS13152			
Latitude 42-10.04N				Latitude 42-04.63N				Latitude 42-38.04N			
Longitude 141-44.96E				Longitude 142-28.92E				Longitude 144-06.56E			
Depth(m) 795				Depth(m) 568				Depth(m) 452			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	20.111	33.560	23.635	5	20.038	33.462	23.579	5	16.38	33.323	24.371
10	20.110	33.560	23.635	10	20.033	33.465	23.583	10	16.129	33.328	24.432
20	20.003	33.563	23.665	20	17.938	33.815	24.380	20	15.555	33.349	24.578
30	19.880	33.575	23.707	30	15.577	33.969	25.050	30	13.05	33.326	25.086
40	16.015	34.071	25.030	40	13.679	34.044	25.515	40	11.383	33.283	25.369
50	15.209	34.130	25.256	50	13.141	34.072	25.646	50	10.439	33.62	25.800
75	11.980	33.904	25.742	75	11.795	34.046	25.887	75	4.759	33.195	26.271
100	9.043	33.832	26.197	100	9.825	33.915	26.134	100	3.877	33.252	26.408
125	7.572	33.709	26.322	125	6.568	33.609	26.381	125	3.075	33.276	26.502
150	5.159	33.492	26.462	150	4.544	33.439	26.488	150	3.099	33.346	26.556
175	3.888	33.412	26.534	175	3.416	33.381	26.555	175	2.775	33.362	26.597
200	3.142	33.389	26.586	200	2.810	33.378	26.607	200	2.771	33.402	26.629
250	2.543	33.440	26.679	250	2.455	33.479	26.717	250	2.183	33.401	26.676
300	2.530	33.538	26.758	300	2.553	33.562	26.775	300	2.158	33.475	26.737
400	2.991	33.745	26.884	400	3.192	33.846	26.946	400	2.482	33.61	26.820
500	3.302	33.911	26.988	500	3.370	33.985	27.040				
600	3.388	34.017	27.065								
700	3.406	34.121	27.146								

Table 3: Data on Bottom trawl research during the Oshoromaru Cruise#260.

No. of research	Date and time		Position		T.D.*2	D.S.*3	Speed of tow (K't)	Bottom depth (m)	Wr.*4	Wind	S.T.*5 (°C)
	of net tow (S.M.T.*1)		Lat. (N)	Long. (E)							
OST1316	Sep. 18	0730-0955	42-09.9	141-38.2	+9h	180	5.5	725	bc	West-5	20.2
OST1317	Sep. 18	1114-1342	41-56.8	141-40.1	+9h	150	4.0-4.5	788	bc	WNW-5	19.8

*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: 25-75% clouded).

*5 S.T. : Surface temperature

Table 4: Data on catches by bottom trawl research during the Oshoromaru Cruise#260

Japanese name	Scientific Name	OST1316		OST1317	
		Number	Weight (kg)	Number	Weight (kg)
Gangiei-rui	<i>Bathyraja</i> spp.	6	2.11	-	-
Irakoanago	<i>Synaphobranchus kaupii</i>	37	7.61	11	8.50
Yukihoraanago	<i>Ilyophis nigeli</i>	3	0.04	3	0.12
Sokoiwashi-rui	Microstomatidae	4	0.17	8	0.43
Yokoeso	<i>Sigmops gracile</i>	-	-	1	0.01
Horaieso	<i>Chauliodus sloani</i>	1	0.03	1	0.08
Hoteieso	<i>Photonectes albipennis</i>	-	-	2	0.32
Hadakaishashi-rui	Myctophidae	5	0.09	-	-
Nagahadaka	<i>Symbolophorus californiensis</i>	-	-	1	0.06
Mamehadaka	<i>Lampanyctus jordani</i>	-	-	6	0.13
Hutasujinamehadaka	<i>Lestrolepis intermedia</i>	1	0.06	-	-
Okuchiishashi	<i>Notoscopelus japonicus</i>	-	-	1	0.07
Karasudara	<i>Halargyreus johnsonii</i>	-	-	2	0.59
Kanadadara	<i>Antimora microlepis</i>	23	6.91	50	20.00
Itohikidara	<i>Laemonema longipes</i>	210	315.25	55	36.94
Munedara	<i>Coryphaenoides pectoralis</i>	1	2.72	2	1.51
Ibarahige	<i>Coryphaenoides acrolepis</i>	-	-	7	0.99
Karafutosokodara	<i>Coryphaenoides cinereus</i>	74	16.75	119	27.50
Nezumiginpo	<i>Lumpenella longirostris</i>	12	0.50	12	0.73
Norogenge	<i>Bothrocara hollandi</i>	-	-	1	0.06
Shirogenge	<i>Bothrocara molle</i>	175	47.30	139	63.35
Kantenngenge	<i>Bothrocara tanakae</i>	6	2.11	2	0.83
Nyuudoukajika	<i>Psychrolutes phrictus</i>	-	-	2	0.92
Kichiji	<i>Sebastolobus macrochir</i>	103	21.13	65	5.71
Ganko	<i>Dasycottus setiger</i>	4	2.34	3	1.17
Kusauo-rui	Liparidae sp.	-	-	1	0.06
Hirainkiuo	<i>Paraliparis grandis</i>	2	2.24	-	-
Tako-rui	Octopuses	54	14.60	60	22.50
Mendako	<i>Opisthoteuthis depressa</i>	10	3.40	-	-
Ika-rui	Squids	-	-	31	6.94
Dosuika	<i>Berryteuthis magister</i>	19	3.57	-	-
Ezobai spp.	Buccinidae spp.	-	-	65	1.97
Benizuwaigani	<i>Chionoecetes japonicus</i>	6	1.72	12	10.00
Hitode-rui	Asteroidea	-	-	434	56.00
Namako-rui	Holothuroidea	-	-	534	54.50

Table 5 Data on floating gill net research during the "Oshoro Maru" Cruise #260

No. of research		OSSG 1301-01	OSSG 1301-02	OSSG 1301-03
Date		22-Sep	22-Sep	22-Sep
position of	Lat. (N)	42-35.6	42-29.7	42-33.8
net set	Long. (E)	144-03.6	144-07.0	144-01.3
Time(S.M.T.*1)	net set	2028	2104	2126
	net houl	2037	2109	2132
Mesh size(mm)		42	42	42
Wr.*2		c	c	c
S.T.*3 (°C)		16.5	16.5	16.5
Wind (force)		NNE-4	NNE-4	NNE-3
Pacific saury		5	5	2
Japanese sardine		1	-	-

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

*2 Wr. : Weather (c: over 75-99% clouded).

*3 S.T. : Surface temperature

**THE "OSHORO MARU" CRUISE 261
TO WEST OF THE TOHOKU OFF**

IN OCTOBER 2013

1. Cruise Itinerary

Departure from Hakodate	Oct.	17, 2013
Start hydrographic research (OS13153) and gill-net research for Saury (OSG1304)		18
Arrival at Tokyo		22
Departure from Tokyo		27
Finish hydrographic research (OS13174)		31
Return to Hakodate	Nov.	25
Total coverage 1522.3 miles		

2. Vessel Personnel

Crew:	Captain: Associate Professor	Shogo Takagi
		And 29 men
Research staff:	Professor	
	(Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	
		Yasuzumi Fujimori
	Associate Professor (Laboratory of Marine Environment and Resource Sensing, Hokkaido University)	
		Tohru Mukai
	Associate Professor (Laboratory of Fishing Production Engineering, Hokkaido University)	
		Hiroki Yasuma
	Assistant Professor (Laboratory of Marine Environmental Science, Hokkaido University)	
		Hiromichi Ueno
	Assistant Professor (Laboratory of Marine Environmental Science, Hokkaido University)	
		Hiroji Oonishi
Teaching Assistant:		3 persons
Graduate Students:		1 person
Under Graduate Students:		41 persons
Total 53 persons		

3. Items of Research

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

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

Fig. 1

Table 1, 2

Saury floating gillnet research:

One operation of gillnet Researches were carried out. These operations were supervised by the captain, Deck officer, Science officer, crew, research staff, and cadets were engaged in the work.

Table 3, 4, 5

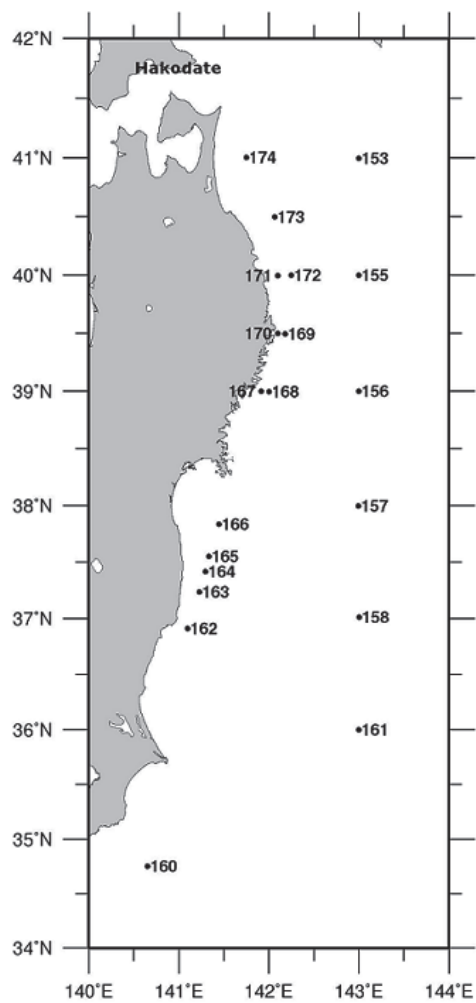


Fig. 1 Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13153	40-59.67N	142-59.90E	10/17	15:02	9	1886	-	-	18.7	bc	19plus-4636
OS13154	40-58.90N	144-30.00E	10/18	7:53	9	5685	-	-	13.8	bc	9plus-0769
OS13155	40-00.11N	142-59.90E	10/19	6:14	9	1290	-	-	20.4	bc	9plus-0769
OS13156	39-00.11N	142-59.98E	10/19	12:52	9	1613	-	-	21.1	bc	9plus-0769
OS13157	37-59.82N	142-59.69E	10/19	19:47	9	1850	-	-	19.9	bc	9plus-0769
OS13158	37-00.53N	143-00.14E	10/20	2:44	9	5101	-	-	-	o	XCTD-2
OS13159	35-00.61N	139-48.74E	10/21	2:18	9	61	-	-	22.1	o	9plus-0769
OS13160	34-45.17N	140-39.14E	10/28	4:20	9	1812	-	-	-	bc	9plus-0769
OS13160	34-44.91N	140-37.06E	10/28	5:46	9	1837	-	-	-	bc	9plus-0769
OS13160	34-46.23N	140-38.69E	10/28	6:56	9	1783	-	-	-	bc	XCTD-2
OS13161	35-59.92N	143-00.06E	10/28	18:32	9	6230	-	-	-	bc	9plus-0769
OS13162	36-54.64N	141-05.90E	10/29	5:29	9	123	-	-	-	o	9plus-0769
OS13163	37-13.98N	141-13.62E	10/29	8:56	9	119	-	-	-	o	9plus-0769
OS13164	37-24.88N	141-17.91E	10/29	11:59	9	117	-	-	-	o	9plus-0769
OS13165	37-32.96N	141-20.25E	10/29	14:30	9	117	-	-	-	o	9plus-0769
OS13166	37-50.05N	141-26.85E	10/29	17:36	9	126	-	-	-	o	9plus-0769
OS13167	39-00.11N	141-54.95E	10/30	3:02	9	134	-	-	-	b	9plus-0769
OS13168	38-59.87N	142-00.06E	10/30	5:16	9	200	-	-	-	bc	9plus-0769
OS13169	39-29.73N	142-11.00E	10/30	8:52	9	231	-	-	-	d	9plus-0769
OS13170	39-29.98N	142-06.01E	10/30	9:53	9	144	-	-	-	r	9plus-0769
OS13171	39-59.92N	142-05.99E	10/30	13:17	9	124	-	-	-	o	9plus-0769
OS13172	40-00.05N	142-15.07E	10/30	14:27	9	235	-	-	-	o	9plus-0769
OS13173	40-29.87N	142-04.08E	10/30	17:37	9	253	-	-	-	o	9plus-0769
OS13174	41-00.04N	141-44.94E	10/30	21:15	9	490	-	-	-	o	9plus-0769

Table 2. Oceanographic data

Station OS13153 Latitude 40-59.67N Longitude 142-59.90E Depth(m) 1886				Station OS13154 Latitude 40-58.88N Longitude 144-30.07E Depth(m) 5685				Station OS13155 Latitude 40-00.12N Longitude 142-59.89E Depth(m) 1290			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
75	14.935	34.039	25.245	5	13.854	33.131	24.773	5	20.639	33.804	23.681
100	12.648	34.043	25.721	10	13.832	33.135	24.781	10	20.562	33.790	23.690
150	10.469	33.948	26.050	20	13.831	33.145	24.789	20	19.733	33.728	23.861
200	7.111	33.668	26.354	30	13.835	33.148	24.791	30	19.022	33.701	24.023
300	2.645	33.406	26.643	40	13.852	33.155	24.792	40	16.787	33.611	24.498
400	2.514	33.531	26.754	50	11.246	33.668	25.694	50	15.280	33.670	24.886
500	3.115	33.754	26.880	75	6.682	33.589	26.350	75	14.198	34.398	25.680
600	3.363	33.923	26.992	100	4.137	33.406	26.504	100	11.133	34.103	26.053
700	3.416	34.096	27.125	125	2.994	33.369	26.584	125	9.054	33.959	26.295
800	3.324	34.217	27.230	150	2.668	33.383	26.623	150	8.539	33.983	26.394
900	3.100	34.286	27.306	175	2.659	33.431	26.662	175	8.006	34.048	26.525
1000	2.871	34.329	27.361	200	2.339	33.439	26.695	200	7.889	34.136	26.612
				250	2.333	33.545	26.780	250	7.200	34.128	26.704
				300	2.803	33.675	26.845	300	6.638	34.161	26.807
				400	3.169	33.863	26.962	400	5.185	34.117	26.954
				500	3.732	34.076	27.078	500	4.717	34.178	27.055
				600	3.555	34.158	27.161	600	4.121	34.209	27.145
				700	3.345	34.236	27.243	700	3.746	34.266	27.228
				800	3.162	34.296	27.309	800	3.403	34.311	27.298
				900	2.933	34.347	27.370	900	3.164	34.364	27.362
				1000	2.780	34.397	27.424	1000	2.923	34.411	27.422

Station OS13156 Latitude 39-00.12N Longitude 142-59.97E Depth(m) 1613				Station OS13157 Latitude 37-59.82N Longitude 142-59.69E Depth(m) 1850				Station OS13158 Latitude 37-00.53N Longitude 143-00.14E Depth(m) 5101			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Depth	Temp.	Sal.	SIG-T
5	21.346	33.918	23.577	5	20.019	33.862	23.889	5	23.037	33.993	-
10	21.352	33.918	23.575	10	20.027	33.862	23.887	10	23.017	34.023	-
20	21.358	33.919	23.574	20	20.035	33.865	23.887	20	22.803	33.977	-
30	21.341	33.914	23.574	30	20.030	33.880	23.900	30	18.254	33.256	-
40	20.379	33.795	23.743	40	19.898	33.867	23.924	40	16.991	33.371	-
50	17.605	33.994	24.598	50	17.922	33.848	24.409	50	16.466	33.389	-
75	13.514	34.326	25.767	75	13.656	34.224	25.659	75	14.324	33.956	-
100	11.446	34.156	26.037	100	10.449	33.943	26.050	100	12.466	34.032	-
125	7.265	33.570	26.256	125	10.002	34.037	26.200	125	12.809	34.319	-
150	5.635	33.500	26.412	150	3.069	33.125	26.382	150	11.884	34.182	-
175	4.354	33.444	26.512	175	5.138	33.552	26.511	175	9.836	33.937	-
200	3.487	33.426	26.584	200	5.060	33.588	26.549	200	8.216	33.815	-
250	3.147	33.515	26.686	250	6.146	33.915	26.677	250	4.584	33.511	-
300	2.982	33.591	26.762	300	3.741	33.680	26.762	300	4.638	33.709	-
400	3.964	33.903	26.917	400	3.346	33.796	26.893	400	2.999	33.668	-
500	4.781	34.160	27.034	500	4.184	34.121	27.068	500	4.182	34.020	-
600	4.304	34.257	27.163	600	3.994	34.225	27.171	600	3.584	34.081	-
700	3.669	34.284	27.250	700	4.005	34.328	27.251	700	3.612	34.233	-
800	3.285	34.318	27.315	800	3.354	34.344	27.329	800	3.442	34.315	-
900	3.142	34.366	27.366	900	3.062	34.385	27.388	900	3.253	34.357	-
1000	2.881	34.406	27.421	1000	2.877	34.421	27.434	1000	2.989	34.404	-
								1200	2.685	34.470	-
								1500	2.309	34.529	-

Station OS13159			
Latitude 3500.61N			
Longitude 139-48.74E			
Depth(m) 61			
Press.	Temp.	Sal.	SIG-T
5	22.074	33.858	23.330
10	22.071	33.862	23.333
20	21.803	33.946	23.472
30	21.650	33.978	23.538
40	21.667	34.011	23.559
50	21.657	34.040	23.583

Station OS13160			
Latitude 34-45.17N			
Longitude 140-39.12E			
Depth(m) 1812			
Press.	Temp.	Sal.	SIG-T
5	25.107	34.327	22.800
10	25.109	34.326	22.799
20	25.102	34.325	22.800
30	25.100	34.325	22.801
40	25.079	34.323	22.805
50	25.066	34.322	22.809
75	23.157	34.402	23.435
100	19.945	34.370	24.295
125	16.760	34.484	25.175
150	14.396	34.432	25.664
175	12.966	34.428	25.956
200	11.859	34.398	26.148
250	10.022	34.331	26.426
300	8.545	34.276	26.622
400	6.427	34.237	26.895
500	5.417	34.258	27.038
600	4.712	34.295	27.149
700	4.220	34.339	27.237
800	3.768	34.380	27.317
900	3.359	34.414	27.383
1000	3.033	34.443	27.437

Station OS13161			
Latitude 35-59.92N			
Longitude 143-00.06E			
Depth(m) 6230			
Press.	Temp.	Sal.	SIG-T
5	25.004	34.419	22.901
10	25.004	34.419	22.901
20	25.012	34.419	22.898
30	25.009	34.419	22.900
40	25.015	34.419	22.898
50	25.015	34.419	22.898
75	24.881	34.443	22.956
100	24.158	34.518	23.229
125	21.586	34.737	24.133
150	19.841	34.743	24.608
175	19.514	34.749	24.697
200	19.003	34.752	24.831
250	18.220	34.756	25.031
300	17.473	34.718	25.184
400	15.273	34.577	25.585
500	12.018	34.385	26.108
600	9.232	34.237	26.484
700	6.927	34.134	26.747
800	5.772	34.253	26.991
900	4.368	34.191	27.104
1000	3.881	34.278	27.224

Station OS13162			
Latitude 36-54.64N			
Longitude 141-05.90E			
Depth(m) 123			
Press.	Temp.	Sal.	SIG-T
5	18.498	33.157	23.739
10	18.611	33.300	23.820
20	18.697	33.385	23.863
30	18.698	33.445	23.909
40	18.621	33.469	23.947
50	18.440	33.455	23.981
75	17.560	33.528	24.252
100	14.298	33.743	25.153

Station OS13163			
Latitude 37-13.98N			
Longitude 141-13.61E			
Depth(m) 119			
Press.	Temp.	Sal.	SIG-T
5	18.331	33.464	24.015
10	18.319	33.464	24.018
20	18.285	33.463	24.026
30	18.280	33.465	24.028
40	18.334	33.490	24.034
50	18.212	33.477	24.054
75	17.617	33.473	24.196
100	15.158	33.773	24.992

Station OS13164			
Latitude 37-24.89N			
Longitude 141-17.91E			
Depth(m) 117			
Press.	Temp.	Sal.	SIG-T
5	18.772	33.533	23.958
10	18.772	33.533	23.958
20	18.736	33.539	23.971
30	18.571	33.521	23.999
40	18.393	33.534	24.053
50	18.127	33.571	24.147
75	15.974	33.685	24.742
100	14.608	33.695	25.050

Station OS13165			
Latitude 37-32.96N			
Longitude 141-20.25E			
Depth(m) 117			
Press.	Temp.	Sal.	SIG-T
5	18.268	33.416	23.993
10	18.267	33.416	23.994
20	18.269	33.418	23.995
30	18.280	33.428	24.000
40	18.288	33.432	24.001
50	18.234	33.433	24.015
75	16.502	33.595	24.552
100	13.786	33.822	25.321

Station OS13166			
Latitude 37-50.06N			
Longitude 141-26.85E			
Depth(m) 126			
Press.	Temp.	Sal.	SIG-T
5	17.770	33.461	24.150
10	17.771	33.462	24.150
20	17.780	33.464	24.149
30	17.783	33.466	24.151
40	17.785	33.471	24.154
50	17.653	33.491	24.201
75	14.636	33.463	24.865
100	13.727	34.024	25.489

Station OS13167			
Latitude 39-00.14N			
Longitude 141-54.98E			
Depth(m) 134			
Press.	Temp.	Sal.	SIG-T
5	17.460	33.474	24.234
10	17.432	33.476	24.243
20	17.416	33.502	24.266
30	17.432	33.511	24.269
40	17.464	33.537	24.281
50	17.060	33.494	24.344
75	16.889	33.478	24.373
100	15.010	33.505	24.818
125	14.517	33.599	24.996

Station OS13168			
Latitude 38-59.86N			
Longitude 142-00.06E			
Depth(m) 200			
Press.	Temp.	Sal.	SIG-T
5	17.632	33.447	24.172
10	17.597	33.447	24.181
20	17.416	33.487	24.254
30	17.270	33.489	24.291
40	17.144	33.484	24.317
50	16.976	33.473	24.348
75	15.698	33.487	24.652
100	13.318	33.645	25.280
125	12.305	33.707	25.527
150	12.078	34.046	25.833
175	10.414	33.974	26.080

Station OS13169			
Latitude 39-29.72N			
Longitude 142-11.00E			
Depth(m) 231			
Press.	Temp.	Sal.	SIG-T
5	17.647	33.463	24.181
10	17.649	33.469	24.185
20	17.320	33.448	24.247
30	17.121	33.455	24.300
40	16.664	33.458	24.409
50	16.491	33.444	24.439
75	14.589	33.671	25.036
100	13.862	33.995	25.440
125	11.885	34.002	25.836
150	8.475	33.798	26.259
175	6.928	33.676	26.386
200	5.694	33.554	26.448

Station OS13170			
Latitude 39-29.96N			
Longitude 142-06.01E			
Depth(m) 144			
Press.	Temp.	Sal.	SIG-T
5	17.421	33.353	24.151
10	17.439	33.368	24.158
20	17.306	33.434	24.241
30	17.242	33.440	24.260
40	17.203	33.445	24.274
50	17.100	33.458	24.308
75	16.338	33.476	24.499
100	15.462	33.608	24.798
125	14.019	33.908	25.339

Station OS13171			
Latitude 39-59.91N			
Longitude 142-06.00E			
Depth(m) 124			
Press.	Temp.	Sal.	SIG-T
5	17.171	33.484	24.311
10	17.145	33.483	24.316
20	16.983	33.476	24.349
30	16.769	33.469	24.394
40	16.700	33.482	24.420
50	16.505	33.509	24.485
75	14.848	33.588	24.916
100	13.385	34.053	25.582

Station OS13172			
Latitude 40-00.04N			
Longitude 142-15.07E			
Depth(m) 235			
Press.	Temp.	Sal.	SIG-T
5	17.495	33.801	24.476
10	17.474	33.795	24.477
20	17.104	33.724	24.511
30	16.791	33.657	24.533
40	16.255	33.548	24.573
50	16.295	33.612	24.613
75	14.420	33.969	25.302
100	13.296	34.055	25.601
125	12.669	34.284	25.904
150	11.297	34.223	26.116
175	9.501	34.025	26.273
200	8.708	34.041	26.413

Station OS13173			
Latitude 40-29.87N			
Longitude 142-04.09E			
Depth(m) 253			
Press.	Temp.	Sal.	SIG-T
5	17.860	33.478	24.141
10	17.872	33.479	24.139
20	17.873	33.478	24.138
30	17.873	33.478	24.138
40	17.857	33.484	24.146
50	17.798	33.484	24.160
75	17.454	33.483	24.242
100	16.941	33.472	24.355
125	16.684	33.610	24.521
150	13.777	33.926	25.403
175	7.842	33.702	26.277
200	5.758	33.716	26.568

Station OS13174			
Latitude 41-00.03N			
Longitude 141-44.93E			
Depth(m) 490			
Press.	Temp.	Sal.	SIG-T
5	17.674	33.460	24.172
10	17.679	33.460	24.170
20	17.667	33.458	24.172
30	17.403	33.479	24.252
40	17.002	33.489	24.354
50	16.578	33.511	24.470
75	15.433	33.696	24.871
100	12.961	33.631	25.340
125	11.406	33.934	25.872
150	8.212	33.785	26.288
175	5.336	33.484	26.435
200	4.319	33.413	26.491
250	3.578	33.437	26.585
300	2.923	33.450	26.655
400	3.005	33.726	26.868

Table 3. Position and research conditions of surface drift gillnet sampling at each station during the *Oshoro maru* Cruise #261, 2013.

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)	Oceano-graphic
	Net set	Net haul		Lat.	Long.						
OSG1304	Oct 18 1617-1622	Oct 19 0629-0635	+9h	40-59.7N	144-30.9 E	286	5623	b	NW-3	13.9	OS13154

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

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

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

*4 Wr : Weather (b: 0-25% clouded).

*5 S.T. : Surface temperature

Table 4. Net information

Stations	Mesh size (mm)	25	33	37	42	48	Total
OSG1304	Number of tan	1	1	1.5	1	0.5	5

Table 5. Data on catches by gill net research

Japanese name	Scientific Name	Number
Sanma	<i>Cololabis saira</i>	2
Masaba	<i>Scomber japonicus</i>	7
Ishigakidai	<i>Oplegnathus punctatus</i>	1

**THE "OSHORO MARU" CRUISE 263
TO SEA OF OKHOTSK**

IN NOVEMBER 2013

1. Cruise Itinerary

Departure from Hakodate	Nov. 21, 2013
Start hydrographic research (OS13177)	22
Entrance and leaving Abashiri	23
Finish hydrographic research (OS13181)	25
Return to Abashiri	26
Departure from Abashiri	27
Return to Hakodate	29
Total coverage 1481.4 miles	

2. Vessel Personnel

Crew:	Captain:	Associate Professor	Shogo Takagi
			And 29 men
Research Staff:	Professor	(Civil and Environmental Engineering, Kitami Institute of Technology)	
		Hakodate - Abashiri	Satoshi Yamashita
	Professor	(Aqua Bioscience and Industry, Tokyo university of agriculture)	
		Abashiri - Abashiri	Akihiro Shiimoto
	Professor	(Materials Science and Engineering, Kitami Institute of Technology)	
		Abashiri - Abashiri	Hirotsugu Minami
	Associate Professor	(Environmental and Energy Engineering, Kitami Institute of Technology)	
		Hakodate - Abashiri	Akihiro Hachikubo
	Assistant Professor	(Materials Science and Engineering, Kitami Institute of Technology)	
		Hakodate - Abashiri	Hirotohi Sakagami
	Assistant Professor	(Civil and Environmental Engineering, Kitami Institute of Technology)	
		Abashiri - Abashiri	Shintaro Yamasaki
	Assistant Professor	(Department of Civil Engineering, Kobe University)	
		Hakodate - Abashiri	Satuki Kataoka
	Associate Professor	(Institute of Low Temperature, Hokkaido university)	
		Hakodate - Abashiri	Jun Nishioka
Technical staff:		(New Energy Resources Research Center, Kitami Institute of Technology)	
		Hakodate - Abashiri	Kinji Hyakutake
		Hakodate - Abashiri	1 person
Guest Scientist:	Specially Appointed Assistant Professor (School of Fisheries Sciences, Hokkaido University)		
		Abashiri - Abashiri	Mitsuhiro Nakaya
	Graduate Students:		8 persons
	Under Graduate Students:		41 persons

Teaching Assistant:

1 person

Total 80 persons

3. Items of Research

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

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoromaru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus). Water and Plankton sampling were also carried out at almost hydrographic stations.

Fig. 1 Table 1, 2



Fig. 1. Oceanographic stations

Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13177	44-50.72N	144-46.70E	11月22日	6:56	9	1965	-	-	9.2	c	9plus-0769
OS13178	44-09.95N	144-43.86E	11月23日	23:29	9	776	-	-	6.4	bc	9plus-0769
OS13179	44-10.02N	144-42.95E	11月24日	0:59	9	745	-	-	6.5	bc	9plus-0769
OS13180	44-09.27N	144-41.79E	11月24日	21:32	9	637	-	-	6.6	b	9plus-0769
OS13181	44-08.60N	144-44.30E	11月24日	23:16	9	661	-	-	6.7	b	9plus-0769

Table 2. Oceanographic data

Station OS13177 Latitude 44-50.73N Longitude 144-46.69E Depth(m) 1965				Station OS13178 Latitude 44-09.95N Longitude 144-43.87E Depth(m) 776				Station OS13179 Latitude 44-10.01N Longitude 144-42.97E Depth(m) 745			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
20	8.310	33.096	25.733	5	5.412	30.589	24.136	5	5.502	30.592	24.128
30	8.313	33.097	25.733	10	5.410	30.589	24.136	10	5.490	30.593	24.130
40	8.309	33.120	25.752	20	6.169	30.861	24.263	20	5.490	30.625	24.156
50	8.277	33.172	25.797	30	5.587	31.350	24.718	30	5.586	31.294	24.674
75	4.075	33.198	26.345	40	5.270	31.671	25.007	40	5.886	31.876	25.098
100	2.560	33.197	26.483	50	6.644	32.190	25.252	50	8.693	32.759	25.411
125	1.932	33.214	26.546	75	4.548	32.303	25.586	75	7.078	32.769	25.651
150	1.464	33.228	26.591	100	7.476	33.098	25.855	100	7.307	33.049	25.840
175	1.065	33.237	26.624	125	3.894	32.935	26.155	125	4.382	32.858	26.043
200	0.995	33.260	26.647	150	0.642	33.014	26.470	150	0.909	33.013	26.453
250	1.110	33.355	26.715	175	1.599	33.212	26.568	175	1.225	33.208	26.591
300	0.854	33.378	26.750	200	1.361	33.244	26.610	200	1.143	33.233	26.616
400	1.296	33.522	26.838					250	0.673	33.268	26.672
500	1.706	33.664	26.923					300	0.742	33.308	26.701
600	1.927	33.816	27.029					400	1.015	33.443	26.792
700	2.099	33.959	27.130					500	1.621	33.629	26.901
800	2.212	34.078	27.216					600	1.880	33.799	27.019
900	2.273	34.177	27.290								
1000	2.314	34.289	27.377								
1200	2.247	34.404	27.474								
1500	2.129	34.487	27.550								

Station OS13180 Latitude 44-09.27N Longitude 144-41.80E Depth(m) 637				Station OS13181 Latitude 44-08.60N Longitude 144-44.30E Depth(m) 661			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	5.662	30.422	23.976	5	5.670	30.455	24.001
10	5.644	30.424	23.980	10	5.662	30.453	24.001
20	5.751	30.471	24.005	20	5.817	30.512	24.030
30	5.760	30.795	24.260	30	5.952	30.648	24.121
40	6.290	31.351	24.636	40	5.889	31.059	24.453
50	8.214	32.494	25.275	50	9.090	32.688	25.294
75	10.046	33.234	25.566	75	10.968	33.363	25.506
100	6.712	32.978	25.865	100	10.086	33.368	25.663
125	2.548	32.934	26.274	125	3.372	32.795	26.092
150	0.679	33.026	26.477	150	1.729	33.000	26.389
175	0.145	33.095	26.561	175	-0.365	33.111	26.598
200	-0.650	33.144	26.636	200	0.533	33.214	26.637
				250	0.462	33.221	26.646
				300	0.844	33.299	26.687
				400	0.967	33.421	26.778
				500	1.641	33.639	26.907
				600	1.923	33.834	27.044

**THE "OSHORO MARU" CRUISE 264
IWATE OFF, TO EAST OF HONSHU AND THE OGASAWARA ISLANDS**

IN DECEMBER 2013

1. Cruise Itinerary

Departure from Hakodate and start hydrographic research (OS13182)	Dec. 6, 2013
Arrival at Tokyo	9
Departure from Tokyo	12
Arrival at Futami	14
Departure from Futami and start vertical long-line research	16
Finish hydrographic research (OS13194) and vertical long-line research (OSVL1304)	18
Return to Tokyo	20
Total coverage 1717.2 miles	

2. Vessel Personnel

Crew: Captain:	Associate Professor	Shogo Takagi
		And 29 men
Under Graduate instructor:	Associate Professor (Department of Marine Science and Resources, Nihon University)	
	Takahito Kojima	
	Associate Professor (Teikyo University of Science and Technology)	
	Kyoichi Mori	
	Research Assistant (Department of Marine Science and Resources, Nihon University)	
	Makiguchi Yuya	
Guest Scientist:	Assistant Professor (The Hokkaido University Museum)	
	Yoshiharu Fujita	
	Teaching Assistant:	2 persons
	Under Graduate Students:	41 persons
	(Department of Marine Science and Resources Nihon University	31 persons)
	(Teikyo University of Science and Technology	10 persons)
	Total 77 persons	

3. Items of research:

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

Hydrographic work on deck and the data processing were made by Science officer, the deck officers, crews, research staff and cadets of the “Oshoromaru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus and XCTD). Water and Plankton sampling were also carried out at almost hydrographic stations.

Vertical long-line Research

Four operations using a vertical long-line were performed.

The gear comprised by three types of main line (400,500,600m) with a weight attached to one end, a buoy attached to the other end, and six branch lines (18m-for tuna and 4m-for squid) attached to the main line.

These operations were supervised by the captain, Deck officers, Science officer, crews, cadets, and under graduate instructor were engaged in the work

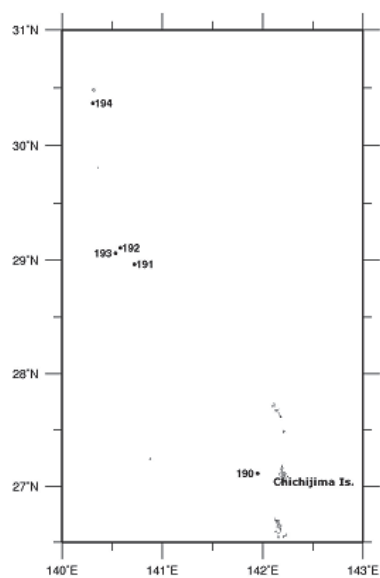
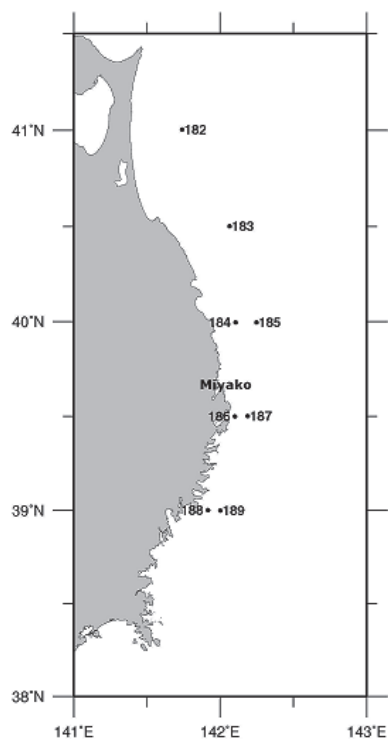


Table 1. List of Oceanographic station

Station	Lat.	Long.	Date (GMT)	Hour (GMT)	T.Z.	Depth	Col.	Tr.	SST	Wr.	Gear
OS13182	41-00.23N	141-44.40E	12月6日	13:01	9	476	-	-	-	bc	9plus-0769
OS13183	40-30.02N	142-03.91E	12月6日	16:54	9	250	-	-	-	bc	9plus-0769
OS13184	39-59.82N	142-06.28E	12月6日	20:01	9	125	-	-	-	bc	9plus-0769
OS13185	39-59.77N	142-14.94E	12月6日	21:30	9	222	-	-	-	bc	9plus-0769
OS13186	39-29.96N	142-06.00E	12月7日	0:27	9	145	-	-	-	b	9plus-0769
OS13187	39-30.07N	142-11.26E	12月7日	1:20	9	237	-	-	-	bc	9plus-0769
OS13188	39-00.08N	141-55.05E	12月7日	4:35	9	136	-	-	-	c	9plus-0769
OS13189	39-00.00N	142-00.04E	12月7日	5:25	9	198	-	-	-	bc	9plus-0769
OS13190	27-06.94N	141-56.94E	12月14日	2:52	9	1338	-	-	-	bc	XCTD-1
OS13191	28-57.94N	140-43.40E	12月16日	22:14	9	3250	-	-	21.9	bc	9plus-0769
OS13192	29-06.60N	140-34.89E	12月17日	3:33	9	2594	-	-	21.9	bc	9plus-0769
OS13193	29-03.77N	140-32.04E	12月17日	9:04	9	654	-	-	21.7	bc	9plus-0769
OS13194	30-22.12N	140-18.48E	12月17日	20:42	9	1520	-	-	21.3	r	9plus-0769

Table 2. Oceanographic data

Station OS13182				Station OS13183				Station OS13184			
Latitude 41-00.23N				Latitude 40-30.04N				Latitude 39-59.78N			
Longitude 141-44.40E				Longitude 142-03.93E				Longitude 142-06.29E			
Depth(m) 476				Depth(m) 250				Depth(m) 125			
Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T	Press.	Temp.	Sal.	SIG-T
5	14.441	33.538	24.965	5	14.618	33.414	24.831	5	13.636	33.590	25.172
10	14.417	33.542	24.973	10	14.625	33.413	24.830	10	13.638	33.591	25.173
20	14.411	33.544	24.976	20	14.627	33.413	24.829	20	13.646	33.598	25.176
30	14.390	33.548	24.984	30	14.629	33.413	24.829	30	14.033	33.852	25.293
40	14.380	33.551	24.988	40	14.627	33.414	24.830	40	14.230	33.979	25.350
50	14.382	33.551	24.988	50	14.629	33.414	24.829	50	14.236	33.986	25.354
75	14.381	33.552	24.988	75	14.623	33.416	24.832	75	14.246	33.995	25.359
100	14.361	33.552	24.993	100	14.600	33.422	24.841	100	14.236	33.998	25.363
125	14.285	33.553	25.009	125	14.499	33.430	24.870				
150	14.062	33.572	25.071	150	14.176	33.543	25.024				
175	11.234	33.699	25.721	175	13.849	33.525	25.079				
200	7.682	33.717	26.312	200	12.247	33.805	25.614				
250	2.625	33.334	26.587	250	3.724	33.599	26.699				
300	2.308	33.446	26.703								
400	3.154	33.774	26.893								

Station OS13185			
Latitude 39-59.76N			
Longitude 142-14.94E			
Depth(m) 222			
Press.	Temp.	Sal.	SIG-T
5	13.582	33.636	25.219
10	13.582	33.636	25.219
20	13.887	33.813	25.293
30	14.233	33.971	25.343
40	14.223	33.971	25.345
50	14.201	33.967	25.347
75	13.035	33.733	25.404
100	11.368	33.827	25.796
125	9.936	33.782	26.012
150	8.317	33.747	26.243
175	7.347	33.715	26.359
200	6.760	33.731	26.451

Station OS13186			
Latitude 39-29.96N			
Longitude 142-06.01E			
Depth(m) 145			
Press.	Temp.	Sal.	SIG-T
5	14.235	33.526	24.999
10	14.240	33.524	24.997
20	14.232	33.528	25.001
30	14.203	33.534	25.012
40	14.070	33.547	25.050
50	13.983	33.551	25.071
75	13.407	33.578	25.210
100	13.511	33.828	25.382
125	12.812	33.705	25.427

Station OS13187			
Latitude 39-30.01N			
Longitude 142-11.34E			
Depth(m) 237			
Press.	Temp.	Sal.	SIG-T
5	14.163	33.535	25.021
10	14.164	33.535	25.021
20	14.177	33.539	25.021
30	14.179	33.539	25.021
40	14.031	33.560	25.068
50	13.863	33.572	25.112
75	13.987	33.823	25.280
100	13.936	33.946	25.386
125	13.834	33.930	25.395
150	13.301	33.829	25.425
175	11.651	33.691	25.638
200	6.670	33.704	26.442

Station OS13188			
Latitude 39-00.09N			
Longitude 141-55.05E			
Depth(m) 136			
Press.	Temp.	Sal.	SIG-T
5	14.155	33.615	25.085
10	14.164	33.616	25.083
20	14.160	33.616	25.084
30	14.141	33.615	25.087
40	14.148	33.615	25.086
50	14.192	33.622	25.083
75	14.135	33.632	25.102
100	14.010	33.727	25.201
125	12.609	33.960	25.664

Station OS13189			
Latitude 38-59.99N			
Longitude 142-00.04E			
Depth(m) 198			
Press.	Temp.	Sal.	SIG-T
5	14.946	33.833	25.084
10	14.954	33.835	25.084
20	14.948	33.833	25.084
30	15.014	33.851	25.083
40	15.020	33.852	25.083
50	15.093	33.876	25.085
75	15.199	33.908	25.087
100	15.277	33.932	25.088
125	15.289	33.935	25.088
150	13.700	33.816	25.335
175	12.372	34.201	25.898

Station OS13190			
Latitude 27-06.94N			
Longitude 141-56.94E			
Depth(m) 1338			
Depth	Temp.	Sal.	SIG-T
5	23.166	34.611	-
10	23.156	34.616	-
20	23.137	34.626	-
30	23.127	34.630	-
40	23.137	34.634	-
50	23.127	34.635	-
75	23.127	34.637	-
100	22.271	34.654	-
125	19.953	34.686	-
150	18.528	34.671	-
175	18.059	34.674	-
200	17.693	34.689	-
250	17.090	34.662	-
300	16.239	34.607	-
400	13.650	34.434	-
500	10.145	34.213	-
600	7.830	34.109	-
700	5.966	34.078	-
800	4.916	34.168	-
900	4.114	34.268	-
1000	3.735	34.320	-

Station OS13191			
Latitude 28-57.93N			
Longitude 140-43.40E			
Depth(m) 3250			
Press.	Temp.	Sal.	SIG-T
10	21.174	34.701	24.219
20	21.186	34.700	24.215
30	21.186	34.701	24.215
40	21.185	34.701	24.216
50	21.188	34.701	24.215
75	21.195	34.702	24.214
100	21.169	34.710	24.227
125	19.645	34.756	24.668
150	18.903	34.772	24.871
175	18.463	34.768	24.980
200	18.178	34.755	25.040
250	17.507	34.724	25.181
300	16.722	34.676	25.331
400	15.061	34.565	25.623
500	12.275	34.404	26.073
600	8.126	34.212	26.636
700	6.352	34.204	26.879
800	5.162	34.204	27.026
900	4.365	34.253	27.153
1000	3.694	34.332	27.285

Station OS13192			
Latitude 29-06.58N			
Longitude 140-34.90E			
Depth(m) 2594			
Press.	Temp.	Sal.	SIG-T
20	21.143	34.683	24.214
30	21.071	34.701	24.247
40	20.987	34.712	24.278
50	20.940	34.714	24.292
75	20.922	34.718	24.300
100	20.911	34.721	24.306
125	19.921	34.760	24.600
150	19.022	34.761	24.833
175	18.228	34.765	25.036
200	17.922	34.749	25.099
250	17.227	34.715	25.242
300	16.877	34.693	25.308
400	15.205	34.571	25.596
500	12.281	34.398	26.068
600	9.383	34.256	26.474
700	7.053	34.197	26.779
800	5.078	34.209	27.039
900	4.674	34.291	27.150
1000	3.746	34.322	27.273

Station OS13193			
Latitude 29-03.76N			
Longitude 140-32.05E			
Depth(m) 654			
Press.	Temp.	Sal.	SIG-T
5	20.953	34.705	24.282
10	20.956	34.705	24.281
20	20.958	34.705	24.281
30	20.955	34.707	24.283
40	20.932	34.709	24.291
50	20.936	34.711	24.291
75	20.926	34.715	24.297
100	20.825	34.724	24.331
125	20.712	34.728	24.365
150	19.523	34.766	24.708
175	18.826	34.763	24.884
200	18.203	34.756	25.035
250	17.388	34.717	25.205
300	16.741	34.682	25.332
400	14.721	34.541	25.679
500	10.974	34.312	26.245

Station OS13194			
Latitude 30-22.11N			
Longitude 140-18.45E			
Depth(m) 1520			
Press.	Temp.	Sal.	SIG-T
20	20.549	34.731	24.411
30	20.556	34.735	24.412
40	20.558	34.734	24.411
50	20.561	34.734	24.410
75	20.527	34.737	24.421
100	19.961	34.757	24.586
125	18.980	34.774	24.853
150	18.332	34.761	25.007
175	17.926	34.745	25.095
200	17.463	34.715	25.185
250	16.972	34.695	25.287
300	16.074	34.634	25.449
400	14.210	34.503	25.759
500	11.430	34.339	26.182
600	8.914	34.217	26.519
700	6.971	34.163	26.763
800	5.381	34.191	26.990
900	4.452	34.291	27.174
1000	3.832	34.364	27.297

Table 3 Data on vertical long line research

Table 5 Data on vertical long line research								
No. of research		OSVL 1301-1	OSVL 1301-2	OSVL 1301-3	OSVL 1301-4	OSVL 1301-5		
Date		16-Dec						
position of	Lat. (N)	27-08.0	27-07.7	27-07.3	27-06.9	27-06.5		
line set	Long. (E)	141-56.5	141-56.6	141-56.8	141-56.9	141-57.7		
Time	Line set	1157	1203	1207	1211	1216		
(S.M.T.)	Line haul	1328-1542						
Length of main line(m)		500	500	400	400	500		
Depth(m)		1296-1048						
Surface temp. (°C)		22.9						
Wether		bc						
Wind		NW-6						
Blue shark		1						
Pelagic thresher		2	1	1	1			
No. of research		OSVL 1302-1	OSVL 1302-2	OSVL 1302-3	OSVL 1302-4	OSVL 1302-5	OSVL 1302-6	
Date		17-Dec						
position of	Lat. (N)	28-56.9	28-57.1	28-57.4	28-57.5	28-57.9	28-58.2	
line set	Long. (E)	140-43.4	140-43.3	140-43.2	140-43.1	140-43.0	140-42.9	
Time	Line set	0625	0631	0636	0640	0645	0649	
(S.M.T.)	Line haul	0852-1047						
Length of main line(m)		500	500	400	600	500	500	
Depth(m)		3255-3280						
Surface temp. (°C)		21.1						
Wether		bc						
Wind		North-5						
Flying squid		1						
Diamondback squid							1	
No. of research		OSVL 1303-1	OSVL 1303-2	OSVL 1303-3	OSVL 1303-4	OSVL 1303-5	OSVL 1303-6	
Date		17-Dec						
position of	Lat. (N)	29-04.7	29-04.9	29-05.4	29-05.6	29-05.9	29-06.2	
line set	Long. (E)	140-35.8	140-35.8	140-35.5	140-35.4	140-35.2	140-35.1	
Time	Line set	1155	1201	1206	1210	1215	1217	
(S.M.T.)	Line haul	1357-1635						
Length of main line(m)		500	500	500	600	500	500	
Depth(m)		2516						
Surface temp. (°C)		21.1						
Wether		bc						
Wind		NW-4						
Flying squid							1	2
Diamondback squid		1						1
Sickle pomfret				1				

No. of research		OSVL 1304-1	OSVL 1304-2	OSVL 1304-3	OSVL 1304-4	OSVL 1304-5	OSVL 1304-6
Date		18-Dec					
position of	Lat. (N)	30-22.4	30-22.4	30-22.3	30-22.3	30-22.2	30-22.2
line set	Long. (E)	140-22.1	140-21.6	140-21.2	140-20.7	140-20.3	140-19.9
Time	Line set	0458	0503	0507	0512	0517	0521
(S.M.T.)	Line haul	0755-0945					
Length of main line(m)		500	500	500	500	500	500
Depth(m)		1430					
Surface temp. (°C)		20.8					
Wether		r					
Wind		East-5					
Flying squid		2	2				
Swordfish						1	
Oilfish			1		1		1

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

Weather (bc: 25-75% clouded, c: over 75-99% clouded, o: 100% clouded, r: rain, d: drizzling rain, f: fog).

PART II

USHIO MARU CRUISES FROM JANUARY TO DECEMBER IN 2013

**For details of the oceanographic data collected by Ushio Maru, Please visit the website below:
<http://rose.hucc.hokudai.ac.jp/~a20011>**

I . 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

Data Record of Oceanographic Observations and Exploratory Fishingの発行記録

No. 1	May	1957	No.30	March	1987
No. 2	June	1958	No.31	March	1988
No. 3	November	1959	No.32	March	1989
No. 4	March	1960	No.33	March	1990
No. 5	March	1961	No.34	March	1991
No. 6	March	1962	No.35	March	1992
No. 7	March	1963	No.36	March	1993
No. 8	March	1964	No.37	March	1994
No. 9	March	1965	No.38	March	1995
No.10	April	1966	No.39	March	1996
No.11	December	1967	No.40	March	1997
No.12	December	1968	No.41	March	1998
No.13	November	1969	No.42	March	1999
No.14	November	1970	No.42 (Suppl.)	June	1999
No.15	March	1972	No.43	March	2000
No.16	March	1973	No.44	March	2001
No.17	March	1974	No.45	March	2002
No.18	March	1975	No.46	March	2003
No.19	April	1976	No.47	February	2004
No.20	May	1977	No.48	March	2005
No.21	March	1978	No.49	March	2006
No.22	March	1979	No.50	May	2007
No.23	March	1980	No.51	June	2008
No.24	March	1981	No.52	July	2009
No.25	March	1982	No.53	October	2010
No.26	March	1983	No.54	March	2012
No.27	March	1984	No.55	March	2013
No.28	March	1985	No.56	March	2014
No.29	March	1986			

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