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Title	2. The "Oshoro maru" Cruise 253 to Tsuruga-Wan in April 2013
Citation	海洋調査漁業試験要報, 57, 9-14
Issue Date	2016-03-31
Doc URL	https://hdl.handle.net/2115/77510
Type	dataset
File Information	Data.Rec.Oceanogr.Obs.Expl.Fish.57.9.pdf



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

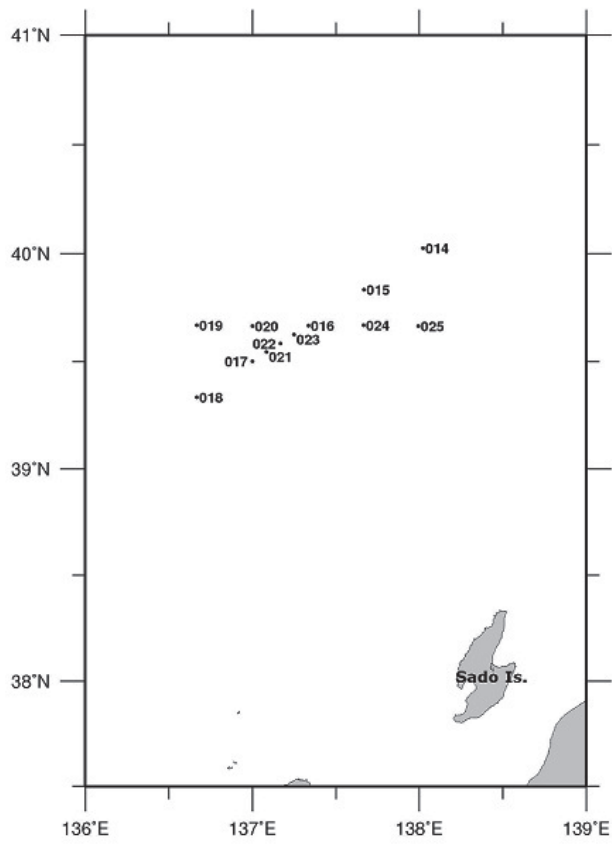


Fig. 1. Oceanographic stations

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