



Title	1. The "Ushio Maru" Cruise 185,186 and 187 in January 2010
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1

**THE " USHIO MARU "**

**CRUISE 185**

**CRUISE 186**

**CRUISE 187**

**IN JANUARY 2010**

## 1. Cruise Itinerary

### Cruise 185

Departure from Hakodate	Jan. 6 , 2010
Start hydrographic research (US10001)	7
Arrival at Hakodate	7
Departure from Hakodate	8
Finish hydrographic research (US10015)	8
Return to Hakodate	9

Total coverage 190.9 miles

### Cruise 186

Departure from Hakodate	Jan. 20 , 2010
Return to Hakodate	21

Total coverage 0.5 miles

### Cruise 187

Departure from Hakodate	Jan. 26 , 2010
Start hydrographic research (US10016)	26
Arrival at Hakodate	26
Departure from Hakodate	27
Finish hydrographic research (US10027)	27
Return to Hakodate	27

Total coverage 86.4 miles

## 2. Vessel Personnel

Captain:		Professor	Toshimi Meguro
Crew:	Chief Officer	Assistant Professor	Osamu Kimura
	Second Officer	Assistant Professor	Naoto Kobayashi
	And 13 men		

### Cruise 185

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Tetsuya Takatsu
Graduate Students:	Chair of Marine Bioresource Science:		2 persons
Under Graduate Students:	Department of Marine Biological Science:		2 persons

### Cruise 186

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Toshikuni Nakatani
Graduate Students:	Chair of Marine Bioresource Science:		4 persons
Under Graduate Students:	Department of Marine Biological Science:		1 person

### Cruise 187

Research Staff:	Associate Professor	(Laboratory of Marine Bioresource Science)	Tetsuya Takatsu
Graduate Students:	Chair of Marine Bioresource Science:		4 persons
Under Graduate Students:	Department of Marine Biological Science (Third grade):		1 person

### 3. Data on Temperature, Salinity and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the “Ushio Maru”. Temperature and salinity were measured by CTD (Seabird SBE9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

Figure 1: Oceanographic stations (Cruise 185)

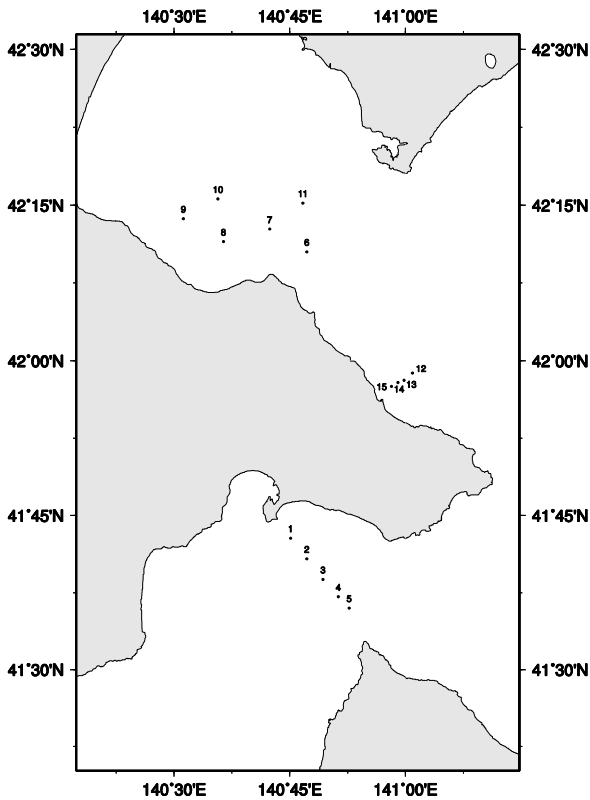


Figure 2: Oceanographic stations (Cruise 187)

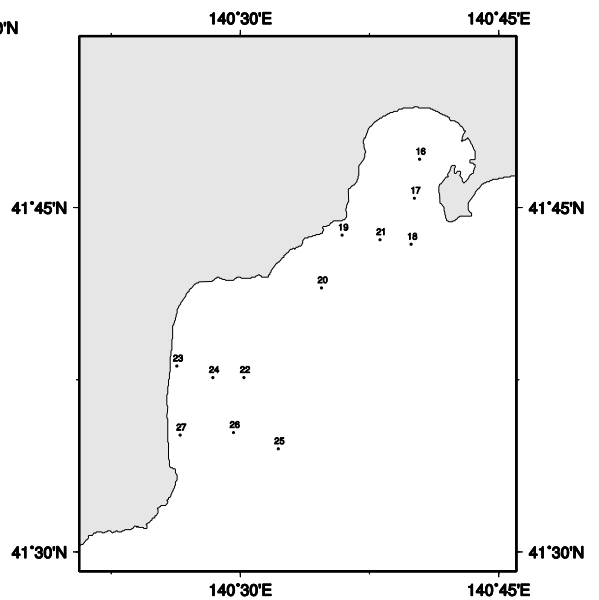


Table 1: List of oceanographic stations

Cruise 185												
Station	Lat. (N)*	Long (E)*	Date	S.M.T	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US10001	41-42.8	140-45.1	1/7	0700-0703	86	NNW-2	East-1	NNW-4	4.3	10.9	c	1006.5
US10002	41-40.8	140-47.2	1/7	0720-0730	225	North-2	East-1	North-4	4.2	11.0	c	1006.6
US10003	41-38.8	140-49.3	1/7	0748-0800	336	North-3	East-1	North-5	4.6	10.9	bc	1006.7
US10004	41-37.1	140-51.3	1/7	0815-0820	101	NNE-3	East-1	NNE-5	4.6	11.4	bc	1007.3
US10005	41-36.0	140-52.7	1/7	0831-0834	47	NNE-3	East-1	NNE-5	4.9	11.4	bc	1007.3
US10006	42-10.5	140-47.2	1/8	1157-1201	93	NNW-1	ESE-1	NNW-3	1.3	5.9	bc	1012.4
US10007	42-12.7	140-42.4	1/8	1243-1247	92	NW -1	ESE-1	NW -2	1.7	6.0	bc	1012.1
US10008	42-11.5	140-36.4	1/8	1336-1340	83	SW -1	East-1	SW -2	2.5	6.1	bc	1012.2
US10009	42-13.7	140-31.2	1/8	1427-1431	83	West-2	East-1	West-4	1.0	6.2	s	1012.2
US10010	42-15.6	140-35.7	1/8	1516-1520	92	West-3	East-1	West-5	1.0	6.2	s	1012.6
US10011	42-15.2	140-46.7	1/8	1618-1622	75	NW -3	East-1	NW -5	2.3	5.7	c	1012.6
US10012	41-58.8	141-00.9	1/8	1818-1823	96	NW -3	East-1	NW -5	2.1	5.8	c	1013.1
US10013	41-58.1	140-59.8	1/8	1830-1834	90	West-3	East-1	West-5	1.9	6.1	s	1012.7
US10014	41-57.9	140-59.0	1/8	1839-1843	86	West-3	East-1	West-5	1.8	6.0	s	1013.0
US10015	41-57.5	140-58.2	1/8	1849-1853	80	WNW-3	East-1	WNW-5	1.4	6.0	c	1013.1
Cruise 186		No data										
Cruise 187												
Station	Lat. (N)	Long (E)	Date	S.M.T	Depth	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US10016	41-47.1	140-40.4	1/26	0853-0855	21	NW -3	SW -1	NW -5	-4.7	6.9	s	1015.6
US10017	41-45.4	140-40.1	1/26	0921-0923	40	West-3	SW -1	West-5	-5.0	7.1	s	1016.1
US10018	41-43.4	140-39.9	1/26	0955-0959	68	West-3	SW -1	West-5	-4.1	8.9	s	1016.1
US10019	41-43.8	140-35.9	1/26	1125-1127	17	West-3	SW -1	West-5	-3.8	9.0	s	1016.2
US10020	41-41.5	140-34.7	1/26	1205-1207	42	WNW-4	SW -1	WNW-6	-4.2	9.7	s	1016.1
US10021	41-43.6	140-38.1	1/26	1238-1243	58	West-4	SW -1	West-6	-2.2	9.7	c	1016.1
US10022	41-37.6	140-30.2	1/27	0901-0903	31	West-1	SW -1	West-3	2.4	8.7	bc	1021.1
US10023	41-38.1	140-26.3	1/27	0923-0925	13	SW -1	South-1	SW -2	2.8	8.6	bc	1020.7
US10024	41-37.6	140-28.4	1/27	0953-0955	24	SW -1	South-1	SW -2	3.4	8.6	bc	1020.5
US10025	41-34.5	140-32.2	1/27	1030-1033	62	WSW-3	SSW-1	WSW-5	5.3	9.5	bc	1019.6
US10026	41-35.2	140-29.6	1/27	1057-1100	42	SW -2	SSW-1	SW -4	6.3	9.4	bc	1019.0
US10027	41-35.1	140-26.5	1/27	1136-1138	13	SW -2	South-1	SW -4	6.0	8.6	c	1018.0

(\*): Fixed position by Global Positioning System

Table 2: Oceanographic data

STATION US10001				STATION US10002				STATION US10003			
LATITUDE	41-42.8	N		LATITUDE	41-40.8	N		LATITUDE	41-38.8	N	
LONGITUDE	140-45.1	E		LONGITUDE	140-47.2	E		LONGITUDE	140-49.3	E	
DEPTH (m)	86			DEPTH (m)	225			DEPTH (m)	336		
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.184	34.019	25.978	5	11.243	34.044	25.987	5	11.578	34.044	25.926
10	11.191	33.998	25.961	10	11.230	34.043	25.989	10	11.576	34.042	25.925
20	11.189	33.999	25.962	20	11.120	34.032	26.000	20	11.474	34.032	25.936
30	11.183	33.996	25.961	30	11.045	34.039	26.019	30	11.416	34.026	25.941
40	11.189	33.997	25.961	40	10.990	34.041	26.030	40	11.396	34.027	25.946
50	11.194	34.005	25.966	50	10.954	34.041	26.037	50	11.332	34.032	25.962
75	11.037	34.033	26.016	75	10.742	34.042	26.075	75	11.257	34.037	25.979
				100	10.555	34.046	26.111	100	11.239	34.040	25.985
				125	10.449	34.049	26.133	125	10.980	34.040	26.032
				150	10.319	34.046	26.152	150	10.961	34.044	26.038
				175	10.182	34.046	26.176	175	10.828	34.045	26.062
								200	10.610	34.037	26.095
								250	9.900	34.061	26.235
								300	9.888	34.062	26.238
STATION US10004				STATION US10005				STATION US10006			
LATITUDE	41-37.1	N		LATITUDE	41-36.0	N		LATITUDE	42-10.5	N	
LONGITUDE	140-51.3	E		LONGITUDE	140-52.7	E		LONGITUDE	140-47.2	E	
DEPTH (m)	101			DEPTH (m)	47			DEPTH (m)	93		
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	11.747	34.035	25.887	5	11.667	33.993	25.870	5	6.232	33.300	26.180
10	11.757	34.034	25.884	10	11.636	34.005	25.885	10	6.234	33.312	26.190
20	11.743	34.034	25.888	20	11.619	34.006	25.888	20	6.199	33.304	26.188
30	11.710	34.037	25.896	30	11.610	34.009	25.892	30	6.193	33.303	26.187
40	11.656	34.033	25.903	40	11.610	34.008	25.892	40	6.197	33.304	26.188
50	11.591	34.025	25.908					50	6.215	33.311	26.191
75	11.576	34.025	25.911					75	6.087	33.327	26.220
STATION US10007				STATION US10008				STATION US10009			
LATITUDE	42-12.7	N		LATITUDE	42-11.5	N		LATITUDE	42-13.7	N	
LONGITUDE	140-42.4	E		LONGITUDE	140-36.4	E		LONGITUDE	140-31.2	E	
DEPTH (m)	92			DEPTH (m)	83			DEPTH (m)	83		
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	6.498	33.263	26.117	5	6.424	33.281	26.141	5	6.527	33.264	26.114
10	6.455	33.306	26.156	10	6.412	33.290	26.150	10	6.494	33.292	26.141
20	6.312	33.304	26.173	20	6.386	33.289	26.152	20	6.484	33.294	26.144
30	6.263	33.313	26.187	30	6.365	33.288	26.154	30	6.479	33.294	26.144
40	6.251	33.315	26.190	40	6.359	33.288	26.155	40	6.471	33.295	26.146
50	6.243	33.315	26.191	50	6.360	33.289	26.155	50	6.471	33.295	26.146
75	6.233	33.319	26.195	75	6.366	33.290	26.155	75	6.452	33.306	26.157

STATION		US10010	
LATITUDE	42-15.6	N	
LONGITUDE	140-35.7	E	
DEPTH (m)	92		
Press.	Temp.	Salinity	Sigma-T
5	6.473	33.299	26.148
10	6.448	33.304	26.156
20	6.324	33.309	26.175
30	6.279	33.312	26.184
40	6.273	33.315	26.187
50	6.262	33.315	26.189
75	6.285	33.322	26.191

STATION		US10011	
LATITUDE	42-15.2	N	
LONGITUDE	140-46.7	E	
DEPTH (m)	75		
Press.	Temp.	Salinity	Sigma-T
5	6.072	33.281	26.186
10	6.139	33.302	26.193
20	6.164	33.310	26.197
30	6.188	33.312	26.195
40	6.149	33.306	26.195
50	6.043	33.294	26.199

STATION		US10012	
LATITUDE	41-58.8	N	
LONGITUDE	141-00.9	E	
DEPTH (m)	96		
Press.	Temp.	Salinity	Sigma-T
5	6.253	33.343	26.212
10	6.252	33.344	26.212
20	6.207	33.351	26.224
30	6.202	33.355	26.227
40	6.195	33.355	26.229
50	6.192	33.356	26.230
75	6.191	33.356	26.230

STATION		US10013	
LATITUDE	41-58.1	N	
LONGITUDE	140-59.8	E	
DEPTH (m)	90		
Press.	Temp.	Salinity	Sigma-T
5	6.410	33.300	26.158
10	6.417	33.312	26.166
20	6.392	33.307	26.165
30	6.316	33.323	26.188
40	6.298	33.329	26.195
50	6.304	33.330	26.195
75	6.192	33.353	26.227

STATION		US10014	
LATITUDE	41-57.9	N	
LONGITUDE	140-59.0	E	
DEPTH (m)	86		
Press.	Temp.	Salinity	Sigma-T
5	6.379	33.302	26.163
10	6.385	33.300	26.161
20	6.385	33.304	26.164
30	6.379	33.310	26.170
40	6.368	33.313	26.173
50	6.367	33.313	26.174

STATION		US10015	
LATITUDE	41-57.5	N	
LONGITUDE	140-58.2	E	
DEPTH (m)	80		
Press.	Temp.	Salinity	Sigma-T
5	6.429	33.299	26.154
10	6.440	33.302	26.156
20	6.436	33.299	26.154
30	6.356	33.288	26.155
40	6.350	33.288	26.155

STATION		US10016	
LATITUDE	41-47.1	N	
LONGITUDE	140-40.4	E	
DEPTH (m)	21		
Press.	Temp.	Salinity	Sigma-T
5	7.761	32.992	25.731
10	8.418	33.555	26.077

STATION		US10017	
LATITUDE	41-45.4	N	
LONGITUDE	140-40.1	E	
DEPTH (m)	40		
Press.	Temp.	Salinity	Sigma-T
5	8.763	33.400	25.902
10	9.449	33.910	26.192
20	9.639	33.925	26.173
30	9.603	33.914	26.170

STATION		US10018	
LATITUDE	41-43.4	N	
LONGITUDE	140-39.9	E	
DEPTH (m)	68		
Press.	Temp.	Salinity	Sigma-T
5	9.969	33.981	26.162
10	9.991	33.993	26.168
20	10.000	34.013	26.181
30	9.995	34.010	26.179
40	9.999	34.013	26.182
50	10.006	34.015	26.182

STATION		US10019	
LATITUDE	41-43.8	N	
LONGITUDE	140-35.9	E	
DEPTH (m)	17		
Press.	Temp.	Salinity	Sigma-T
5	9.254	33.873	26.195
10	9.250	33.902	26.218

STATION		US10020	
LATITUDE	41-41.5	N	
LONGITUDE	140-34.7	E	
DEPTH (m)	42		
Press.	Temp.	Salinity	Sigma-T
5	9.880	34.013	26.201
10	9.875	34.017	26.205
20	9.890	34.014	26.200
30	9.853	34.010	26.204
40	9.820	34.005	26.205

STATION		US10021	
LATITUDE	41-43.6	N	
LONGITUDE	140-38.1	E	
DEPTH (m)	58		
Press.	Temp.	Salinity	Sigma-T
5	9.923	33.795	26.024
10	9.942	34.011	26.189
20	9.947	34.012	26.190
30	9.954	34.004	26.182
40	9.953	34.007	26.185
50	9.964	34.011	26.186

STATION		US10022	
LATITUDE	41-37.6	N	
LONGITUDE	140-30.2	E	
DEPTH (m)	31		
Press.	Temp.	Salinity	Sigma-T
5	8.867	33.959	26.324
10	8.851	33.958	26.326
20	8.847	33.946	26.317

STATION		US10023	
LATITUDE	41-38.1	N	
LONGITUDE	140-26.3	E	
DEPTH (m)	13		
Press.	Temp.	Salinity	Sigma-T
5	8.851	33.830	26.226

STATION		US10024	
LATITUDE	41-37.6	N	
LONGITUDE	140-28.4	E	
DEPTH (m)	24		
Press.	Temp.	Salinity	Sigma-T
5	8.945	33.956	26.309
10	8.945	33.957	26.310
20	8.949	33.959	26.311

STATION		US10025	
LATITUDE	41-34.5	N	
LONGITUDE	140-32.2	E	
DEPTH (m)	62		
Press.	Temp.	Salinity	Sigma-T
5	9.843	34.001	26.198
10	9.848	34.021	26.213
20	9.846	34.019	26.212
30	9.808	34.020	26.219
40	9.777	34.023	26.226
50	9.776	34.023	26.226

STATION		US10026	
LATITUDE	41-35.2	N	
LONGITUDE	140-29.6	E	
DEPTH (m)	42		
Press.	Temp.	Salinity	Sigma-T
5	9.191	33.996	26.301
10	9.179	33.998	26.305
20	9.208	34.010	26.310
30	9.237	34.009	26.304
40	9.255	34.013	26.304

STATION		US10027	
LATITUDE	41-35.1	N	
LONGITUDE	140-26.5	E	
DEPTH (m)	13		
Press.	Temp.	Salinity	Sigma-T
5	8.888	33.902	26.276
10	8.885	33.919	26.290