



HOKKAIDO UNIVERSITY

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THE " USHIO MARU "

CRUISE 342

CRUISE 343

CRUISE 344

IN SEPTEMBER 2015

IN OCTOBER 2015

1.Cruise Itinerary

Cruise 342

Departure from Hakodate	Sep.	14, 2015
Start marine mammal research		14
Start hydrographic research (US15404) and echo sounding research		15
Finish hydrographic research (US15409) and echo sounding research		16
Start and finish fishing research		16
Start and finish ADCP research		16
Return to Hakodate		18
Total coverage 807.6 miles		

Cruise 343

Departure from Hakodate	Sep.	24, 2015
Start hydrographic research (US15410)		24
Finish hydrographic research (US15416)		24
Return to Hakodate		25
Total coverage 133.5 miles		

Cruise 344

Departure from Hakodate	Oct.	5, 2015
Start hydrographic research (US15417)		6
Sampling by tuna long line		6
Finish hydrographic research (US15424)		7
Sampling by tuna long line		7
Return to Hakodate		8
Total coverage 252.3 miles		

2. Data on Temperature, Salinity and Computed Dynamic Depth Anomaly

Hydrographic work on deck and the data processing were made by the deck officers, crews, research staff and cadets of the “Ushio Maru”. Temperature and salinity were measured by CTD (Seabird SBE-9Plus and SBE-19). Dynamic computations were made using a desk-top computer aboard the “Ushio Maru”.

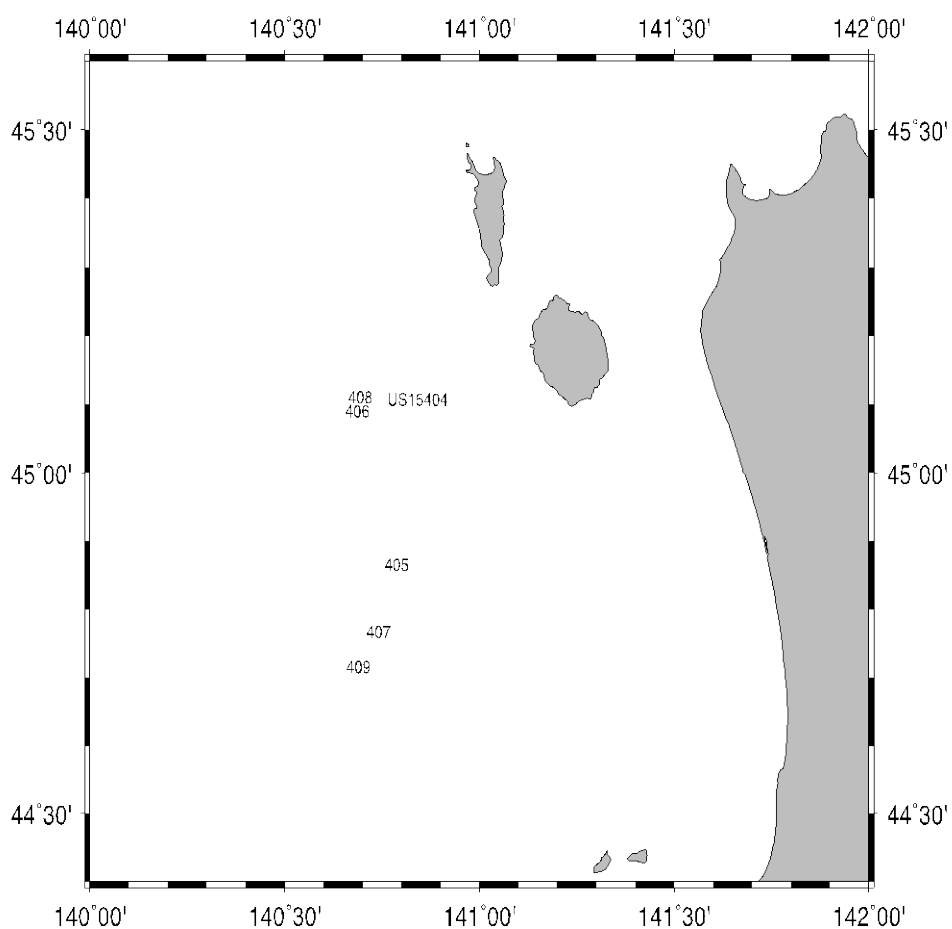


Figure 1. Oceanographic stations (Cruise 342)

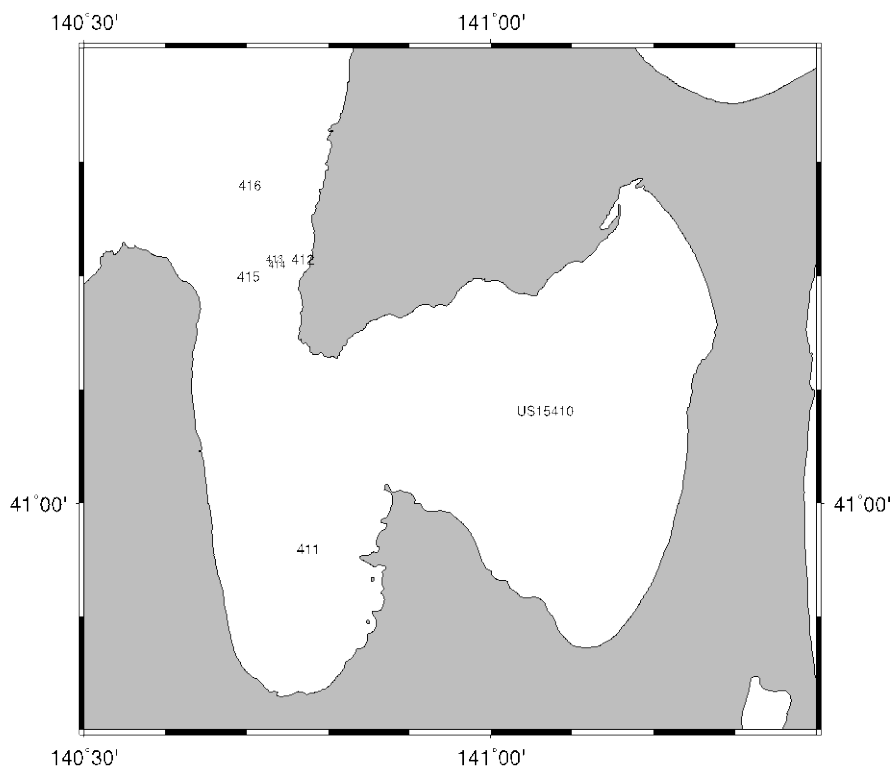


Figure 2. Oceanographic stations (Cruise 343)

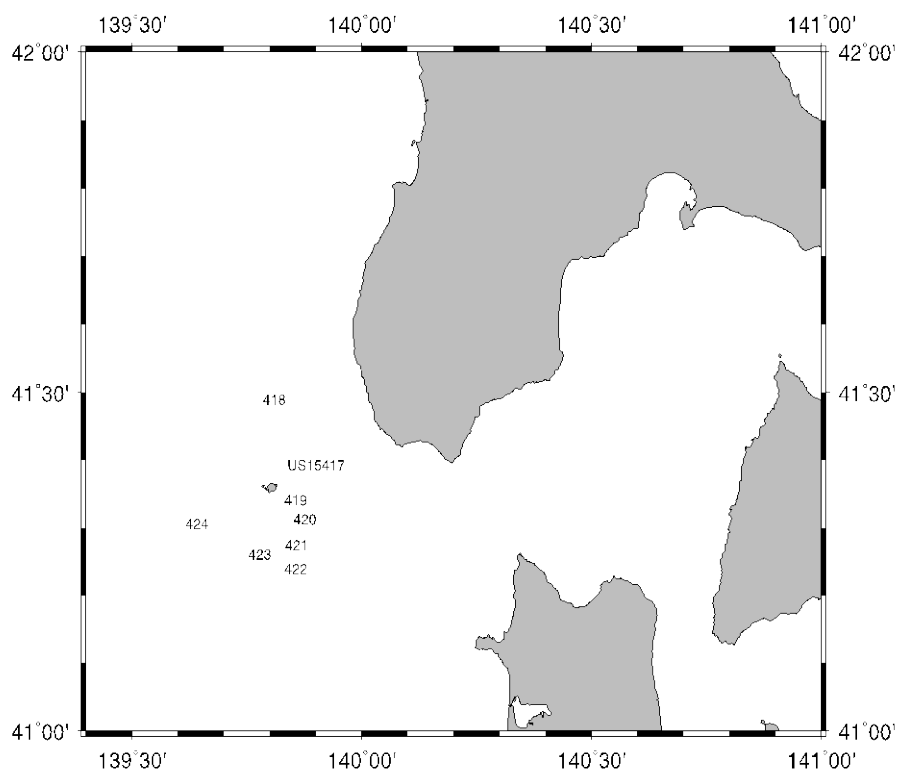


Figure 3. Oceanographic stations (Cruise 344)

Table 1. List of Oceanographic Station

Cruise 342												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15404	45-05.9	140-45.8	9/15	1548-1602	313	SW-2	SW-1	SW-3	21.1	20.5	b	1021.6
US15405	44-51.4	140-45.4	9/15	1746-1755	209	WSW-2	SW-1	West-3	20.5	20.9	bc	1021.6
US15406	45-06.0	140-43.1	9/15	1955-2008	353	NW-1	SW-1	NW-2	19.3	20.4	bc	1021.5
US15407	44-45.5	140-42.6	9/15	2240-2252	204	NW-1	SW-1	NW-2	19.9	20.8	bc	1021.5
US15408	45-06.1	140-39.8	9/16	0143-0204	355	NNW-1	SW-1	NNW-2	19.2	20.6	bc	1021.5
US15409	44-42.4	140-39.5	9/16	0501-0512	209	calm	SW-1	calm	19.1	20.6	b	1021.2

Cruise 343												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15410	41-04.6	141-01.9	9/24	1341-1351	46	East-2	ESE-1	East-4	20.7	20.7	c	1014.8
US15411	40-57.3	140-45.7	9/24	1610-1621	49	East-3	ENE-1	East-5	20.8	20.8	c	1013.5
US15412	41-12.6	140-45.3	9/24	1748-1802	63	ESE-3	SE-1	ESE-5	19.7	21.4	c	1013.1
US15413	41-12.7	140-44.7	9/24	1810-1821	66	East-3	SE-1	East-5	19.7	21.4	c	1013.2
US15414	41-12.4	140-43.6	9/24	1833-1845	72	SE-3	SE-1	SE-5	19.7	21.3	c	1013.6
US15415	41-11.7	140-41.3	9/24	1857-1908	68	ESE-3	SE-1	ESE-4	19.9	21.3	c	1013.7
US15416	41-16.5	140-41.4	9/24	1938-1950	144	ESE-2	SE-1	ESE-4	19.7	21.4	c	1014.0

Cruise 344												
Station	Lat. (N)*	Long. (E)*	Date	S.M.T.	Depth (m)	Wave	Swell	Wind	Air Temp.	Sea Temp.	Wr.	Bar. (hPa)
US15417	41-23.1	139-50.3	10/6	0836-0843	565	calm	WNW-1	calm	16.1	17.6	bc	1025.3
US15418	41-28.9	139-47.1	10/6	1025-1031	1394	calm	WNW-1	calm	18.1	16.8	bc	1025.6
US15419	41-20.0	139-49.9	10/6	1400-1408	344	calm	WNW-1	calm	19.2	18.8	b	1024.3
US15420	41-18.3	139-51.1	10/6	1427-1434	744	North-1	WNW-1	North-2	20.6	19.2	b	1024.3
US15421	41-16.0	139-50.0	10/6	1455-1501	863	North-1	NW-1	North-2	21.0	18.7	b	1024.0
US15422	41-13.9	139-49.9	10/6	1519-1526	1169	North-1	North-1	North-2	19.5	19.5	b	1024.0
US15423	41-15.2	139-45.1	10/7	0347-0356	1332	ENE-2	NE-1	ENE-4	16.5	18.9	b	1023.0
US15424	41-17.9	139-37.0	10/7	0507-0513	1381	East-1	NE-2	East-4	16.1	17.9	bc	1022.8

(*) : Fixed position by Global Positioning System

Table 2. Oceanographic data

STATION US15404				STATION US15405				STATION US15406			
LATITUDE 45-05.9 N				LATITUDE 44-51.4 N				LATITUDE 42-06.0 N			
LONGITUDE 140-45.8 E				LONGITUDE 140-45.4 E				LONGITUDE 140-43.1 E			
DEPTH (m) 313				DEPTH (m) 209				DEPTH (m) 353			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.453	33.991	23.873	5	21.091	33.934	23.658	5	20.637	33.950	23.792
10	20.430	33.993	23.880	10	21.030	33.923	23.666	10	20.589	33.943	23.800
20	16.582	34.034	24.871	20	20.919	33.930	23.701	20	19.018	33.884	24.164
30	14.521	34.149	25.419	30	17.674	33.934	24.533	30	14.768	34.056	25.295
40	13.189	34.198	25.734	40	14.690	34.332	25.524	40	13.820	34.129	25.552
50	12.234	34.268	25.958	50	12.646	34.241	25.875	50	12.702	34.167	25.806
75	10.840	34.242	26.214	75	9.778	34.185	26.353	75	10.879	34.228	26.196
100	9.734	34.221	26.388	100	8.411	34.170	26.560	100	9.883	34.202	26.349
125	8.587	34.176	26.538	125	7.240	34.122	26.694	125	7.985	34.139	26.600
150	8.057	34.160	26.605	150	6.257	34.102	26.810	150	7.400	34.143	26.688
175	5.785	34.054	26.832	175	5.014	34.073	26.939	175	6.110	34.080	26.812
200	4.502	34.063	26.988					200	4.255	34.028	26.986
250	1.523	34.037	27.236					250	1.564	34.034	27.231
290	1.014	34.052	27.282					300	1.038	34.048	27.278

STATION US15407				STATION US15408				STATION US15409			
LATITUDE 44-45.5 N				LATITUDE 45-06.1 N				LATITUDE 44-42.4 N			
LONGITUDE 140-42.6 E				LONGITUDE 140-39.8 E				LONGITUDE 140-39.5 E			
DEPTH (m) 204				DEPTH (m) 355				DEPTH (m) 209			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	21.050	33.932	23.667	5	20.806	33.917	23.722	5	20.932	33.949	23.712
10	21.054	33.933	23.667	10	20.804	33.917	23.799	10	20.935	33.948	23.711
20	21.092	33.930	23.672	20	20.265	33.829	25.177	20	20.899	33.943	23.717
30	20.035	33.921	23.930	30	15.352	34.070	25.640	30	17.123	33.966	24.692
40	13.853	34.239	25.630	40	13.752	34.225	25.874	40	13.071	34.283	25.823
50	11.881	34.246	26.026	50	12.490	34.200	26.215	50	11.047	34.161	26.114
75	8.992	34.149	26.453	75	10.791	34.232	26.401	75	8.735	34.187	26.524
100	7.333	34.122	26.681	100	9.370	34.160	26.613	100	6.730	34.098	26.745
125	5.863	34.075	26.838	125	7.908	34.142	26.796	125	5.345	34.061	26.891
150	4.768	34.036	26.937	150	6.314	34.093	26.922	150	4.178	34.058	27.018
175	3.723	34.047	27.056	175	5.093	34.063	27.056	175	3.614	34.051	27.070
				200	3.554	34.027	27.237				
				250	1.487	34.035	27.288				
				300	0.965	34.055	27.308				

STATION US15410				STATION US15411				STATION US15412			
LATITUDE 41-04.7 N				LATITUDE 40-57.3 N				LATITUDE 41-12.7 N			
LONGITUDE 141-02.0 E				LONGITUDE 140-45.7 E				LONGITUDE 140-45.3 E			
DEPTH (m) 46				DEPTH (m) 49				DEPTH (m) 63			
Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T	Press.	Temp.	Salinity	Sigma-T
5	20.833	33.402	23.323	5	20.937	33.563	23.417	5	21.494	33.683	23.357
10	20.819	33.398	23.324	10	20.933	33.586	23.436	10	21.476	33.678	23.358
20	20.718	33.378	23.335	20	20.899	33.614	23.466	20	21.255	33.659	23.404
30	20.674	33.433	23.389	30	20.853	33.647	23.503	30	21.214	33.704	23.450
40	20.342	33.577	23.586	40	20.654	33.867	23.725	40	21.250	33.744	23.470
								40	21.202	33.756	23.493

STATION US15413			
LATITUDE 41-12.8 N			
LONGITUDE 140-45.0 E			
DEPTH (m) 66			
Press.	Temp.	Salinity	Sigma-T
5	21.502	33.692	23.362
10	21.496	33.689	23.361
20	21.500	33.691	23.362
30	21.103	33.664	23.450
40	20.749	33.733	23.597
50	20.813	33.774	23.611

STATION US15416			
LATITUDE 41-16.6 N			
LONGITUDE 140-41.4 E			
DEPTH (m) 144			
Press.	Temp.	Salinity	Sigma-T
5	21.677	33.638	23.273
10	21.677	33.640	23.274
20	21.669	33.642	23.278
30	21.602	33.654	23.306
40	21.473	33.666	23.350
50	19.063	33.823	24.106
75	15.104	34.152	25.296
100	14.115	34.231	25.568
125	13.392	34.263	25.743

STATION US15419			
LATITUDE 41-20.0 N			
LONGITUDE 139-49.9 E			
DEPTH (m) 344			
Press.	Temp.	Salinity	Sigma-T
5	18.962	33.612	23.970
10	18.731	33.637	24.047
20	18.307	33.686	24.191
30	17.709	33.760	24.394
40	16.701	33.837	24.691
50	13.149	34.174	25.723
75	9.786	34.155	26.328
100	7.736	34.136	26.634
125	5.759	34.063	26.843

STATION US15422			
LATITUDE 41-13.9 N			
LONGITUDE 139-49.9 E			
DEPTH (m) 1169			
Press.	Temp.	Salinity	Sigma-T
5	19.500	33.523	23.765
10	19.465	33.526	23.776
20	19.408	33.534	23.797
30	18.900	33.594	23.972
40	18.508	33.642	24.107
50	17.331	33.849	24.552
75	11.738	34.243	26.050
100	10.162	34.220	26.315
125	8.028	34.170	26.618

STATION US15414			
LATITUDE 41-12.4 N			
LONGITUDE 140-43.6 E			
DEPTH (m) 72			
Press.	Temp.	Salinity	Sigma-T
5	21.421	33.656	23.357
10	21.426	33.655	23.355
20	21.381	33.660	23.371
30	21.307	33.664	23.394
40	20.906	33.689	23.522
50	20.356	33.744	23.710

STATION US15417			
LATITUDE 41-23.1 N			
LONGITUDE 139-50.3 E			
DEPTH (m) 565			
Press.	Temp.	Salinity	Sigma-T
5	17.120	33.839	24.595
10	17.116	33.841	24.598
20	17.098	33.847	24.606
30	16.626	33.869	24.734
40	16.069	33.932	24.911
50	15.536	34.009	25.090
75	6.757	34.090	26.735
100	6.353	34.128	26.818
125	4.919	34.037	26.921

STATION US15420			
LATITUDE 41-18.3 N			
LONGITUDE 139-51.1 E			
DEPTH (m) 744			
Press.	Temp.	Salinity	Sigma-T
5	18.818	33.601	23.998
10	18.607	33.634	24.077
20	18.110	33.691	24.243
30	17.377	33.755	24.496
40	16.174	33.938	24.891
50	14.401	34.177	25.467
75	11.317	34.254	26.137
100	8.555	34.155	26.526
125	6.604	34.070	26.740

STATION US15423			
LATITUDE 41-15.2 N			
LONGITUDE 139-45.1 E			
DEPTH (m) 1332			
Press.	Temp.	Salinity	Sigma-T
5	19.236	33.545	23.849
10	19.237	33.544	23.849
20	19.216	33.555	23.862
30	19.167	33.576	23.891
40	17.809	33.748	24.360
50	14.678	34.108	25.354
75	10.097	34.190	26.303
100	7.291	34.111	26.678
125	5.896	34.071	26.831

STATION US15415			
LATITUDE 41-11.7 N			
LONGITUDE 140-41.3 E			
DEPTH (m) 68			
Press.	Temp.	Salinity	Sigma-T
5	21.407	33.650	23.356
10	21.411	33.649	23.354
20	21.403	33.650	23.357
30	21.335	33.654	23.378
40	21.251	33.661	23.407
50	20.599	33.720	23.628

STATION US15418			
LATITUDE 41-28.9 N			
LONGITUDE 139-47.1 E			
DEPTH (m) 1394			
Press.	Temp.	Salinity	Sigma-T
5	16.936	33.773	24.588
10	16.927	33.776	24.592
20	16.598	33.815	24.699
30	15.688	33.921	24.988
40	13.684	34.177	25.617
50	13.032	34.209	25.773
75	9.104	34.147	26.434
100	4.858	34.005	26.902
125	3.709	34.025	27.040

STATION US15421			
LATITUDE 41-16.0 N			
LONGITUDE 139-50.0 E			
DEPTH (m) 863			
Press.	Temp.	Salinity	Sigma-T
5	19.047	33.600	23.939
10	18.875	33.602	23.985
20	18.091	33.655	24.220
30	17.796	33.726	24.346
40	17.131	33.744	24.520
50	16.560	33.735	24.646
75	11.545	34.239	26.083
100	9.541	34.140	26.357
125	7.170	34.131	26.711
145	5.824	34.018	26.799

STATION US15424			
LATITUDE 41-17.9 N			
LONGITUDE 139-37.0 E			
DEPTH (m) 1381			
Press.	Temp.	Salinity	Sigma-T
5	17.434	33.734	24.440
10	16.421	33.744	24.685
20	15.906	33.752	24.809
30	15.667	33.794	24.895
40	14.342	33.753	25.152
50	11.597	33.843	25.766
75	6.802	34.080	26.721
100	4.530	33.992	26.928
125	3.230	33.984	27.053