Cruise Report

OS180
LEG 2 and 3
(IPY Cruise 2007)

July 24 - August 15, 2007

Leg 2: Dutch Harbor – Nome
Leg 3: Nome - Nome

1. Preface

The Bering Sea and Chukchi Sea have distinct marine ecosystems that are affected by seasonal sea ice. During the summer, the water column is stratified by melt water from retreating sea ice and phytoplankton are found near the sea surface, where the incoming sunlight is sufficient for photosynthesis. These summer conditions result in the highest primary production in the world's oceans and support high levels of fishery resources. Algae that live on the bottom of sea ice also play an important role in maintaining fishery resources by falling and decomposing on the sea floor in summer. Recently, global climate change has become a cause for concern. The greenhouse effect, produced by increasing anthropogenic CO_2 emissions, has induced increases in atmospheric and seawater temperatures. The effect of such increases on the cryosphere of the Arctic is already visible, and understanding its direct and indirect effects on the physical and chemical environments and the responses of marine ecosystems is critical. We have conducted previous research examining the marine environments in the Bering and Chukchi seas. However, the knowledge of most aspects and responses of marine ecosystems to global climate change is still inadequate. Based on results from the Oshoro-Maru research cruises during the International Polar Year (IPY) 2007-2008 and previous research, we will examine the features and mechanisms of the responses of marine ecosystems to global climate change in the Bering and Chukchi seas.

This volume includes the simply notes instruments, methods, and preliminary results obtained on-board of the OS180 legs 2 and 3 cruises carried out by T/S Oshoro-Maru in the Bering Sea and the Chukchi Sea in summer 2007. The cruise is divided in two legs of which research area are the Bering Sea (from Dutch Harbor to Nome; leg. 2) and the Arctic area (from Nome to Nome; leg. 3). The investigation started in (leg 2), and then to (leg 3). Main purpose of this cruise is to understand of Marine Ecosystem Responses to Global Climate Change in the Bering and Chukchi Seas.

The main observation items are conductivity, temperature, and depth observation and water collection in the water column (CTD/Rosette sampler) and its physical and chemical analyses (Temperature, Salinity, dissolved oxygen, total carbonate, Dissolved Fe, Total Fe, Radium-223, Radium-224, pH, nutrients, primary productivity and Chl *a*), XCTD measurements, fish larvae collection (Bongo net) and plankton collection (twin-NORPAC net and closing NORPAC net). We also successfully operated bottom trawling, frame trawling, long-line and ROV for fish communities study and beam trawling for benthos study, and carried out bio-optical measurements for satellite oceanography. The cetacean sighting survey was also conducted from the upper bridge of T/S Oshoro-maru.

The cruise has been completed almost of what we planed. On behalf of the scientists on-board, I thank all Japanese, American and the other foreign authorities; the Ministry of Education, Culture, Sports, Science, and Technology of Japan, the Japan Aerospace Exploration Agency (JAXA), the Ministries of Foreign Affair of Japan, and USA, the Coast Guard of USA, the National Oceanic and Atmospheric Administration (NOAA), for allowing us to work inside the American EEZ. Without their help, the cruise would have never been realized. I really appreciate Captain, Prof. Meguro, Chief officer, Mr. Kajiwara, and crew members for their hard works on board the ship. Finally, I would like to thank Dr. Toru Hirawake for his best efforts about investigation planning and coordination for research works on-board in both leg 2 and leg 3. This cruise is partly supported by Grant-in-Aid for Scientific Research No.19405002 and the IARC-JAXA (IJIS) program.

OS180 Legs 2 and 3 Chief Scientist
Sei-Ichi Saitoh
Faculty of Fisheries Sciences
Hokkaido University

2. Cruise summary

2.1 Ship

T/S Oshoro-Maru
L x B x D 72.85m x 12.60m x 5.7m
International Gross Tonnage 1,792 tons

2.2 Cruise Code

OS180

2.3 Title of the cruise

Study on Marine Ecosystem Responses to Global Climate Change in the Bering and Chukchi Seas (Oshoro-Maru IPY Cruise 2007-2008)

2.4 IPY Activity ID No: 155

2.4.1 Title of Activity

Ecosystem Studies of Subarctic and Arctic Regions

2.4.2 Short Form Title of Proposed Activity

ESSAR

2.4.3 Activity Leader Details

Kenneth Drinkwater
Institute of Marine Research
Norway

2.4.4 Lead International Organization

Ecosystem of Sub-Arctic Seas (ESSAS)-Regional Program of GLOBEC

2.5 Institute

Faculty of Fisheries Sciences and Faculty of Fisheries
Hokkaido University
3-1-1, Minato-cho
Hakodate, Hokkaido 041-8611
Japan

2.6 Chief Scientist

Sei-Ichi Saitoh (Hokkaido University)

2.7 Cruise periods and ports of call

Leg.2: July 24, 2007 (Dutch Harbor, USA) to August 3, 2007 (Nome, USA)
Leg.3: August 5, 2007 (Nome, USA) to August 15, 2007 (Nome, USA) (call at Dutch harbor, USA for July 21-24, 2007 and at Nome, USA, for August 3-5 and 15-16, 2007)

2.8 Observation summary

CTD/water sampling: 35 (Leg.2) and 32 (Leg.3) casts
XCTD: 15(Leg.2) and 22(Leg.3) casts
Primary Production: 9(Leg.2) and 8(Leg.3)
Plankton net: Twin NORPAC net 35 (Leg.2) and 32 (leg.3) casts , Closing NORPAC net 13 (Leg.2) and 6 (Leg.3) casts.
Bongo net: 19(Leg.2) and 13(Leg.3) casts
Bottom Trawling: 7(Leg.2) and 9(Leg.3) casts
Frame Trawling: 20(Leg.2 only) casts
Long-line: 4(Leg.2) and 3(Leg.3) casts
Beam Trawling: 16(Leg.3 only) casts
ROV operation: 6(Leg.2) and 7(Leg.3) casts

2.9 Data Policy

All data collected during this cruise will be under the control of the Data Management Committee of Faculty of Fisheries, Hokkaido University.

2.10 Overview

(1) Leg.2: July 24, 2007 (Dutch Harbor) – August 3, 2007 (Nome)

On July 24 (local time), T/S Oshoro-Maru left for the Bering Sea from Dutch harbor. We conducted 35 CTD stations from St.OS07078 to St.OS07112 (Table 1 and Figure 1) and 7 Bottom trawling stations in this Leg. 2. We carried out the observation in the three regions; southeastern shelf region, off the St. Lawrence Island Polynya (SLIP) region and the mouth of Yukon River region. 47 researchers from US, Korea, Malaysia and Japan were aboard in this cruise.

On August 3rd (local time), T/S Oshoro-Maru arrived at port of Nome safely.

(2) Leg.3: August 5, 2007 (Nome) – August 15, 2007 (Nome)

On August 5th (local time), T/S Oshoro-Maru left for the Chukchi Sea from Nome and observed high productive area in the northern part of the Bering Strait (OS07115:67°05’N, 168°51’W). We conducted 32 CTD stations from St.OS07113 to St.OS07144 (Table 2 and Figure 2) and 9 Bottom trawling stations in this Leg. 3. We also conducted recovering the JAMSTEC mooring system which was lost two years ago. Most northern point in this Leg was at 71°05’N, 167°04’W. 50 researchers from US, Korea, Malaysia and Japan were aboard in this cruise. Minimum sea ice coverage in the Arctic was recorded in this summer. Our investigated region in the Chukchi Sea was covered by sea ice in 1991 and 1992, but we didn't sea the sea ice during 2007 cruise. Very warm sea surface temperature of 14 °C was also observed in the coastal region. Moreover, much less abundance of fish than 1991/1992 was apparent, and effects of sea ice coverage on the abundance are concerned.

On August 15th (local time), T/S Oshoro-Maru again arrived at port of Nome safely.

Table 1. Summary of Observation Stations of T/S Oshoro Maru during IPY 2007 cruise

Leg 2: Bering Sea (Dutch Harbor – Nome)

OS Station	Station/Port	Latitude deg	min		Longitude deg	min		Depth (m)	Arrival Date GMT	Arrival Date LT	Departure Date LT	Obs. time
Dutch Harbor	Dutch Harbor	53	54.00	N	166	30.00	W	–	–	–	2007/7/24 10:00	
OS07078	**B01**	55	0.00	N	165	59.90	W	135	2007/7/25 00:50	2007/7/24 16:50	2007/7/24 19:20	02:30
OS07079	B02	55	30.00	N	166	0.00	W	119	2007/7/25 06:25	2007/7/24 22:25	2007/7/24 23:00	00:35
OS07080	**B03**	56	0.00	N	166	0.00	W	113	2007/7/25 10:30	2007/7/25 02:30	2007/7/25 04:40	02:10
OS07081	B04	56	0.20	N	166	59.60	W	132	2007/7/25 16:00	2007/7/25 08:00	2007/7/25 09:30	01:30
OS07082	B05	56	0.00	N	168	0.00	W	136	2007/7/25 20:55	2007/7/25 12:55	2007/7/25 13:45	00:50
	Start XCTD	56	0.00	N	168	40.00	W	–	2007/7/25 23:53	2007/7/25 15:53		
	End XCTD	56	0.00	N	169	16.00	W	–			2007/7/25 17:57	02:04
OS07083	**B07**	56	0.20	N	170	0.20	W	147	2007/7/26 04:10	2007/7/25 20:10	2007/7/25 22:30	02:20
OS07084	**B09**	56	30.00	N	169	0.00	W	102	2007/7/26 10:35	2007/7/26 02:35	2007/7/26 04:30	01:55
OS07085	B10	56	30.00	N	168	0.00	W	114	2007/7/26 17:05	2007/7/26 09:05	2007/7/26 11:05	02:00
OS07086	B11	56	29.90	N	167	0.00	W	103	2007/7/27 02:55	2007/7/26 18:55	2007/7/26 19:46	00:51
OS07087	B12	56	30.00	N	166	0.00	W	85	2007/7/27 06:35	2007/7/26 22:35	2007/7/26 23:20	00:45
OS07088	**B13**	57	0.00	N	166	0.00	W	71	2007/7/27 10:00	2007/7/27 02:00	2007/7/27 04:15	02:15
OS07089	B14	57	0.00	N	167	0.00	W	71	2007/7/27 15:35	2007/7/27 07:35	2007/7/27 14:00	06:25
OS07090	**B15**	57	0.00	N	168	0.00	W	76	2007/7/28 00:10	2007/7/27 16:10	2007/7/27 18:50	02:40
OS07091	B16	57	0.00	N	169	0.00	W	77	2007/7/28 06:00	2007/7/27 22:00	2007/7/27 22:50	00:50
OS07092	B19	57	30.00	N	169	0.00	W	69	2007/7/28 09:35	2007/7/28 01:35	2007/7/28 02:50	01:15
OS07093	B20	57	30.00	N	168	0.00	W	69	2007/7/28 13:25	2007/7/28 05:25	2007/7/28 07:20	01:55
OS07094	**B21**	57	30.00	N	167	0.00	W	66	2007/7/28 19:30	2007/7/28 11:30	2007/7/28 13:20	01:50
OS07095	B22	57	30.00	N	166	0.00	W	64	2007/7/29 01:10	2007/7/28 17:10	2007/7/28 18:08	00:58
OS07096	**B23**	58	0.00	N	166	0.00	W	54	2007/7/29 04:40	2007/7/28 20:40	2007/7/28 22:45	02:05
OS07097	**B25**	59	0.00	N	166	0.00	W	26	2007/7/29 12:10	2007/7/29 04:10	2007/7/29 05:25	01:15
OS07098	E01	60	30.00	N	168	0.00	W	28	2007/7/30 00:30	2007/7/29 16:30	2007/7/29 17:00	00:30
OS07099	**B26**	62	0.00	N	174	0.00	W	64	2007/7/30 17:35	2007/7/30 09:35	2007/7/30 13:00	03:25
OS07100	**B37**	62	31.90	N	174	28.70	W	70	2007/7/31 01:15	2007/7/30 17:15	2007/7/30 19:23	02:08
OS07101	**B28**	62	20.00	N	172	40.00	W	55	2007/7/31 08:15	2007/7/31 00:15	2007/7/31 01:35	01:20
OS07102	**B40**	62	54.40	N	173	16.5	W	68	2007/7/31 12:50	2007/7/31 04:50	2007/7/31 10:00	05:10
OS07103	**B33**	62	38.40	N	171	14.70	W	42	2007/8/1 02:13	2007/7/31 18:13	2007/7/31 20:40	02:27
OS07104	KKK	62	54.39	N	167	23.04	W	34	2007/8/1 14:30	2007/8/1 06:30	2007/8/1 07:06	00:36
OS07105	**B42**	62	57.00	N	166	45.0	W	25	2007/8/1 18:15	2007/8/1 10:15	2007/8/1 11:40	01:25
OS07106	B44	63	10.50	N	167	30.0	W	32	2007/8/1 21:30	2007/8/1 13:30	2007/8/1 14:00	00:30
OS07107	B46	63	52.00	N	167	45.0	W	33	2007/8/2 01:30	2007/8/1 17:30	2007/8/1 18:20	00:50
OS07108	**B47**	63	36.00	N	167	0.0	W	25	2007/8/2 04:45	2007/8/1 20:45	2007/8/1 21:15	00:30
OS07109	**B49**	63	18.00	N	166	15.0	W	21	2007/8/2 08:10	2007/8/2 00:10	2007/8/2 01:00	00:50
OS07110	**B50**	63	39.20	N	165	36.3	W	18	2007/8/2 16:57	2007/8/2 08:57	2007/8/2 09:40	00:43
OS07111	**B52**	63	54.00	N	166	12.0	W	24	2007/8/2 19:30	2007/8/2 11:30	2007/8/2 12:10	00:40
OS07112	**B53**	64	9.80	N	166	49.6	W	28	2007/8/2 22:30	2007/8/2 14:30	2007/8/2 15:35	01:05
	Nome	64	30.00	N	165	24.6	W	–	2007/8/3 21:00	2007/8/3 13:00		

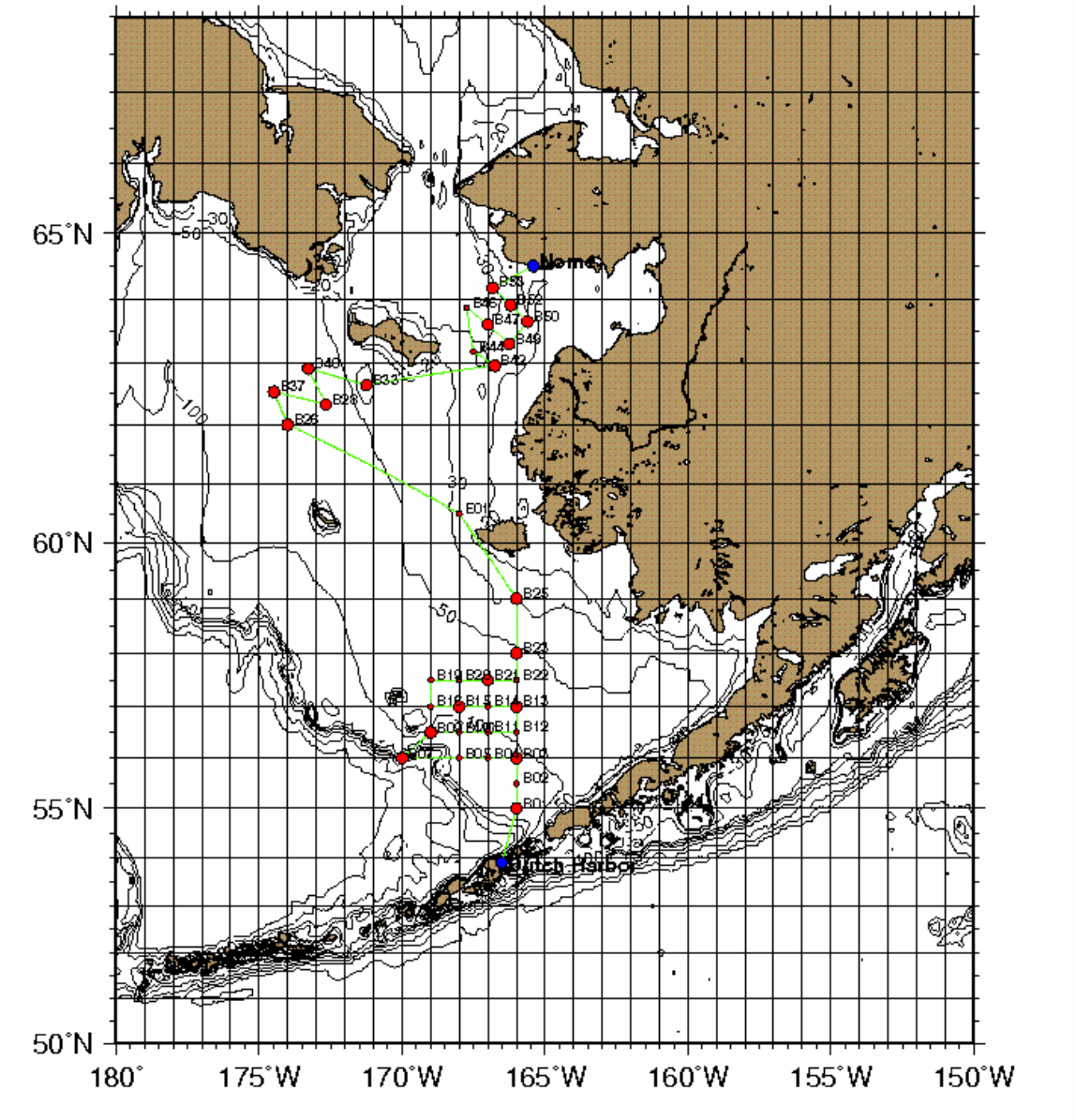

Figure 1 Station Map of Leg.2 in the Bering Sea

Table 2. Summary of Observation Stations of T/S Oshoro Maru during IPY 2007 cruise

Leg 3: Chukchi Sea (Nome – Nome)

OS Station	Station/Port	Latitude deg	min		Longitude deg	min		Depth (m)	Arrival Date GMT	Arrival Date LT	Departure Date LT	Obs. Time
	Nome	64	30.0	N	165	24.60	W	–	–	–	2007/8/5 09:10	
OS07113	C01	66	10.5	N	168	52.10	W	53	2007/8/6 05:35	2007/8/5 21:35	2007/8/5 22:40	01:05
	XCTD-1	66	24.2	N	168	51.90	W					00:00
OS07114	**C02**	66	37.9	N	168	51.90	W	42	2007/8/6 09:10	2007/8/6 01:10	2007/8/6 02:20	01:10
	XCTD-2	66	51.4	N	168	51.42	W					00:00
OS07115	C03	67	5.1	N	168	51.00	W	46	2007/8/6 12:30	2007/8/6 04:30	2007/8/6 05:50	01:20
	XCTD-3	67	18.8	N	168	50.94	W					00:00
OS07116	**C04**	67	32.5	N	168	50.80	W	46	2007/8/6 18:33	2007/8/6 10:33	2007/8/6 12:30	01:57
OS07117	C05	67	40.2	N	168	31.01	W	46	2007/8/6 22:20	2007/8/6 14:20	2007/8/6 15:16	00:56
OS07118	C06	67	48.0	N	168	11.50	W	50	2007/8/7 00:05	2007/8/6 16:05	2007/8/6 17:03	00:58
OS07119	**C07**	67	55.8	N	167	51.90	W	52	2007/8/7 03:00	2007/8/6 19:00	2007/8/6 19:42	00:42
OS07120	C08	68	3.6	N	167	32.30	W	51	2007/8/7 04:50	2007/8/6 20:50	2007/8/6 21:25	00:35
OS07121	**C09**	68	11.7	N	167	14.40	W	43	2007/8/7 06:15	2007/8/6 22:15	2007/8/6 23:15	01:00
OS07122	**C10**	68	52.2	N	166	48.40	W	42	2007/8/7 15:00	2007/8/7 07:00	2007/8/7 16:45	09:45
	XCTD-4	68	52.3	N	167	17.85	W					00:00
OS07123	**C12**	68	52.3	N	167	50.20	W	46	2007/8/8 02:30	2007/8/7 18:30	2007/8/7 19:12	00:42
	XCTD-5	68	41.4	N	168	12.30	W					00:00
OS07124	**C14**	68	31.2	N	168	33.30	W	49	2007/8/8 05:30	2007/8/7 21:30	2007/8/7 23:10	01:40
	XCTD-6	68	41.4	N	168	44.55	W					00:00
OS07125	C15	68	52.3	N	168	54.70	W	50	2007/8/8 21:05	2007/8/8 13:05	2007/8/8 13:50	00:45
	XCTD-7	69	1.9	N	168	53.73	W					00:00
	XCTD-8	69	11.5	N	168	52.87	W					00:00
	XCTD-9	69	21.1	N	168	52.00	W					00:00
	XCTD-10	69	30.8	N	168	51.14	W					00:00
	XCTD-11	69	40.4	N	168	50.28	W					00:00
	M03-04	69	50.0	N	168	49.41	W	43				00:00
	XCTD-12	69	55.0	N	168	24.50	W					00:00
OS07126	**C16**	70	0.0	N	167	59.70	W	45	2007/8/9 10:30	2007/8/9 02:30	2007/8/9 03:15	00:45
	XCTD-13	70	2.7	N	167	33.18	W					00:00
	XCTD-14	70	5.4	N	167	6.76	W					00:00
	XCTD-15	70	8.0	N	166	40.34	W					00:00
OS07127	C17	70	10.6	N	166	13.60	W	42	2007/8/9 13:40	2007/8/9 05:40	2007/8/9 10:30	04:50
	XCTD-16	70	8.2	N	165	35.85	W					00:00
OS07128	**C18**	70	5.7	N	164	58.00	W	38	2007/8/10 01:15	2007/8/9 17:15	2007/8/9 17:50	00:35
	XCTD-17	70	3.3	N	164	19.74	W					00:00
OS07129	**C19**	70	0.8	N	163	41.50	W	25	2007/8/10 04:15	2007/8/9 20:15	2007/8/9 21:05	00:50
OS07130	**C20**	70	24.8	N	163	29.70	W	31	2007/8/10 07:10	2007/8/9 23:10	2007/8/10 00:10	01:00
OS07131	**C21**	70	29.8	N	164	45.70	W	42	2007/8/10 10:15	2007/8/10 02:15	2007/8/10 05:00	02:45
OS07132	C22	70	34.6	N	166	2.00	W	41	2007/8/10 16:15	2007/8/10 08:15	2007/8/10 09:10	00:55
	M04-04	70	38.0	N	166	45.24	W	47				00:00
OS07133	**C23**	70	39.7	N	167	18.00	W	51	2007/8/11 01:20	2007/8/10 17:20	2007/8/10 18:30	01:10
OS07134	**C24**	71	3.8	N	167	6.70	W	43	2007/8/11 04:30	2007/8/10 20:30	2007/8/10 22:15	01:45
OS07135	C25	70	58.9	N	165	48.70	W	40	2007/8/10 08:25	2007/8/10 00:25	2007/8/10 01:00	00:35
OS07136	**C26**	70	53.9	N	164	34.20	W	32	2007/8/10 11:45	2007/8/10 03:45	2007/8/10 04:20	00:35
OS07137	C27	70	48.9	N	163	17.40	W	41	2007/8/10 14:00	2007/8/10 06:00	2007/8/10 17:50	11:50
OS07138	**C28**	70	43.8	N	162	1.60	W	38	2007/8/11 03:55	2007/8/10 19:55	2007/8/10 20:45	00:50
OS07139	C29	69	30.0	N	166	0.00	W	36	2007/8/11 16:55	2007/8/11 08:55	2007/8/11 10:50	01:55
OS07140	C14	68	30.7	N	168	34.50	W	50	2007/8/12 04:25	2007/8/11 20:25	2007/8/11 21:25	01:00
	XCTD-18	68	20.9	N	168	37.20	W					00:00
	XCTD-19	68	11.2	N	168	39.90	W					00:00
	XCTD-20	68	1.5	N	168	42.60	W					00:00
	XCTD-21	67	51.8	N	168	45.30	W					00:00
	XCTD-22	67	42.1	N	168	48.00	W					00:00
	a/c (C04)	67	32.4	N	168	50.70	W					00:00
OS07141	C03	67	5.2	N	168	51.00	W	45	2007/8/12 17:00	2007/8/12 09:00	2007/8/12 10:00	01:00
OS07142	C02	66	37.9	N	168	51.80	W	42	2007/8/12 20:40	2007/8/12 12:40	2007/8/12 13:10	00:30
OS07143	C01	66	10.5	N	168	52.60	W	54	2007/8/12 23:55	2007/8/12 15:55	2007/8/12 16:25	00:30
OS07144	C30	65	22.9	N	168	13.30	W	55	2007/8/13 05:40	2007/8/12 21:40	2007/8/12 22:30	00:50
	Nome	64	30.0	N	165	24.60	W		2007/8/13 17:00	2007/8/13 09:00		

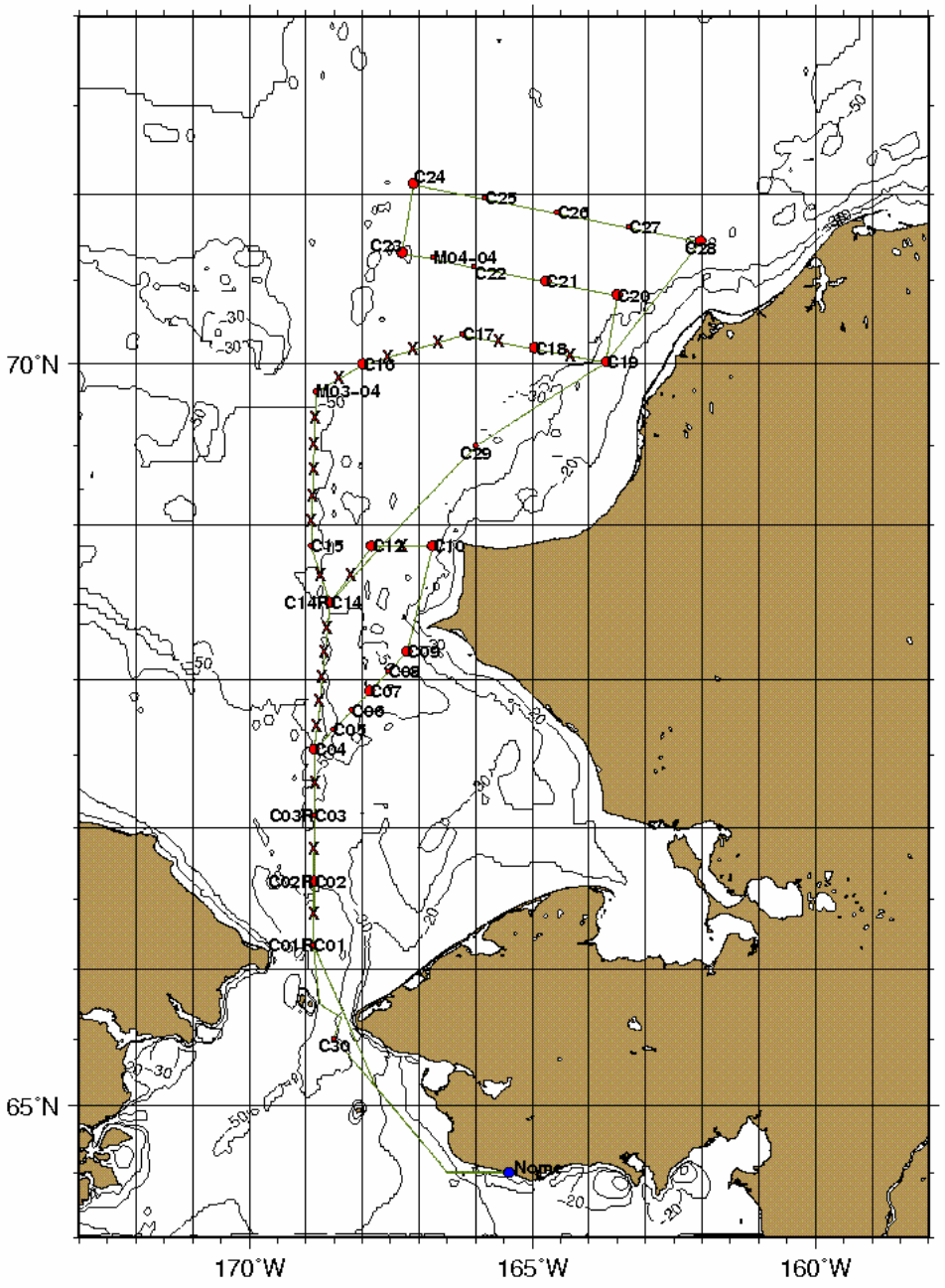

Figure 2 Station Map of Leg.3 in the Chukchi Sea

3. List of Participants

Table 3. List of Participants in Leg.2 and Leg.3 (O indicates participation leg.)

Name	Affiliation	Occupation	F/M	Leg 2	Leg 3	Group
Kohei Mizobata	IARC/UAF	Post-Doctoral Fellow	M		O	Phys
Hiroshi Yahaba	Hokkaido Univ	Graduate Student	M	O	O	Phys
Mayuko Obara	Hokkaido Univ	Undergraduate Student	F	O	O	Phys
Reiko Harada	Hokkaido Univ	Undergraduate Student	F	O	O	Phys
Hirotoshi Makihara	Hokkaido Univ	Undergraduate Student	M	O	O	Phys
Kensi Kuma	Hokkaido Univ	Professor	M	O	O	Chem
Yukiko Matsumura	Hokkaido Univ	Graduate Student	F	O	O	Chem
Shotaro Nishimura	Hokkaido Univ	Undergraduate Student	M	O	O	Chem
Satoko Ishikawa	Hokkaido Univ	Undergraduate Student	F	O	O	Chem
Takeshi Yoshimura	Central Research Institute of Electric Power Industr	Principal Investigator	M	O		Chem
Mitsuru Yanada	Hokkaido Univ	Professor	M	O	O	Chem
Koichiro Hirata	Hokkaido Univ	Undergraduate Student	M	O	O	Chem
Kazuki Matsukawa	Hokkaido Univ	Undergraduate Student	M	O	O	Chem
Kei Mikuniya	Hokkaido Univ	Undergraduate Student	M	O	O	Chem
Yoshiyuki Ishitani	Kyushu Univ	Graduate Student	M	O	O	Chem
Atsushi Ohashi	Kyushu Univ	Graduate Student	M	O	O	Chem
Jeremy Mull	Univ of Alaska	Graduate Student	M		O	Chem
Prae Ratsirin Supcharoen	Woods Hole Oceanographic Institution	Graduate Student	F	O		Chem
Deanna Maxine McCadney	Woods Hole Oceanographic Institution	Graduate Student	F	O		Chem
Sang Heon Lee	KOPRI	Research Scientist	M	O	O	Chem
Hyoung Min Joo	KOPRI	Research Scientist	M	O	O	Chem
Sei-Ichi Saitoh	Hokkaido Univ	Professor	M	O	O	Optics
Toru Hirawake	Hokkaido Univ	Associate Professor	M	O	O	Optics
Amane Fujiwara	Hokkaido Univ	Graduate Student	M	O	O	Optics
Ayako Enoki	Hokkaido Univ	Graduate Student	F	O	O	Optics
Mitsuhiro Toratani	Tokai Univ	Associate Professor	M	O	O	Optics
Atsushi Yamaguchi	Hokkaido Univ	Research Associate	M	O	O	Plankton
Kohei Matsuno	Hokkaido Univ	Undergraduate Student	M	O	O	Plankton
Aya Omata	Hokkaido Univ	Undergraduate Student	F	O	O	Plankton
Kosho Ishiguro	Hokkaido Univ	Undergraduate Student	M	O	O	Plankton
Chu Wan Loy	Univ of Malaya	Associate Professor	M	O	O	Plankton
Hyoung Chul Shin	KOPRI	Research Scientist	M	O	O	Plankton
Masahide Kaeriyama	Hokkaido Univ	Professor	M	O	O	Fish
Hideaki Kudo	Hokkaido Univ	Associate Professor	M	O	O	Fish
Ikue Mio	Hokkaido Univ	Graduate Student	F	O	O	Fish
Sinya Nagashima	Hokkaido Univ	Undergraduate Student	M	O	O	Fish
Kate Myers	Univ. of Washington	Professor	F	O	O	Fish
Heidi Herter	UAF	Research Scientist	F	O		Fish
Agnes Colleen Odden	Kawerak Inc.	Research Scientist	F		O	Fish
Ian Gleadall	Tohoku Bunka Gakuen University	Professor	M	O	O	Fish
Osamu Tsuruoka	Hokkaido Univ	Graduate Student	M	O	O	Fish
S. Paige Drobny	Univ of Alaska	Graduate Student	F		O	Fish
Brenda A. Holladay	Univ of Alaska	Research Scientist	F		O	Fish
Kevin Bailey	NOAA	Research Scientist	M	O		Fish
Morgan Busby	NOAA	Research Scientist	M	O		Fish
Colleen Harpold	NOAA	Research Scientist	F	O		Fish
Jun Yamamoto	Hokkaido Univ	Research Scientist	M	O	O	Fish
Ikko Sasaki	Hokkaido Univ	Undergraduate Student	M	O	O	Fish
Keisuke Okaji	Hokkaido Univ	Undergraduate Student	M	O	O	Fish
Sarah Mincks	Univ of Alaska	Research Scientist	F		O	Benthos
Dominic Hondolero	Univ of Alaska	Undergraduate Student	M		O	Benthos
Keiko Sekiguchi	Univ of Hawai	Professor	F	O	O	Whale
Kenji Yamashiro	Univ of Hawai	Research Scientist	M	O	O	Whale
Takashi Uyama	Hokkaido Univ	Graduate Student	M	O	O	Whale
Gen Hashimoto	The Asahi Shimbun Company	Photographer	M		O	Media
Jun Matsui	The Asahi Shimbun Company	Reporter	M		O	Media
Total Number				47	50	