
MR05-04 Cruise Summary



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Principal Investigator of MR05-04

1. Outline

This cruise was a long (45 days') cruise between 13 September and 27 October 2005, and started at Sekinehama, Mutsu and ended at San Diego in U.S.A. Principal missions were to recover and deploy time-series mooring systems and to compare oceanography between the western and eastern North Pacific. Although we were so exhausted, we felt satisfied to collect a plenty of oceanographic samples.

We successfully recovered a time-series mooring system for biogeochemistry (BGC mooring) at station K2. This mooring system was deployed in the last March during MR05-01 cruise. This was the first deployment after we lost a BGC mooring system in 2003. Although we certified renewed mooring system was too strong to be partitioned by two weeks deployment in the sea, all concerned have felt unease. However this mooring system was kept for approximately six months. Most of automatic sampling gears such as water sampler and sediment traps worked on schedule. Owing to that, time-series sample such as seawater and sinking particles from late winter to autumn, when biological activity changes drastically, were successfully collected. Especially sediment trap samples from 150 m and 500 m is useful for the study of materials' vertical flux in the mesopelagic layer or "twilight" zone. These samples will reveal precise mechanism of seasonal change in the biological pump.

Another mission was also accomplished. We conducted a transect observation from the northwestern North Pacific to eastern North Pacific. Along transect line in approximately 45 – 50 degree North, underway observation such as pCO₂ and total dissolved inorganic carbon and air sampling was conducted continuously. At 12 stations along transect, several hydrocastings were conducted and chemical and biological components such as nutrients, carbonate system, rare earth elements and pigments were measured. At 8 stations, we also deployed a drifter for 24 hours in order to conduct in situ incubation for measurement of primary productivity and to collect sinking particles, and deployed in situ pumping system (Large Volume Pump: LVP) to collect suspended particles for measurement of radionuclide (²³⁰Th). Comprehensive observations at time-series stations in the western North Pacific (stations KNOT and K2) and in the eastern North Pacific (station OSP) are valuable for comparison of oceanography, especially biological pump between western and eastern gyres. In addition, we collected successfully sea-floor sediment by using piston corer at the Emperor seamount in the Western Subarctic Gyre and at the Cambella seamount in the Alaskan Gyre. Approximately 15 m and 13 m sea-floor sediment was obtained at the former and the later, respectively. These will reveal geological time-scale change in biological pump and difference between both areas. I would like to appreciate all efforts by ship's crews and marine technicians.

2. Track and log

2.1 Cruise track

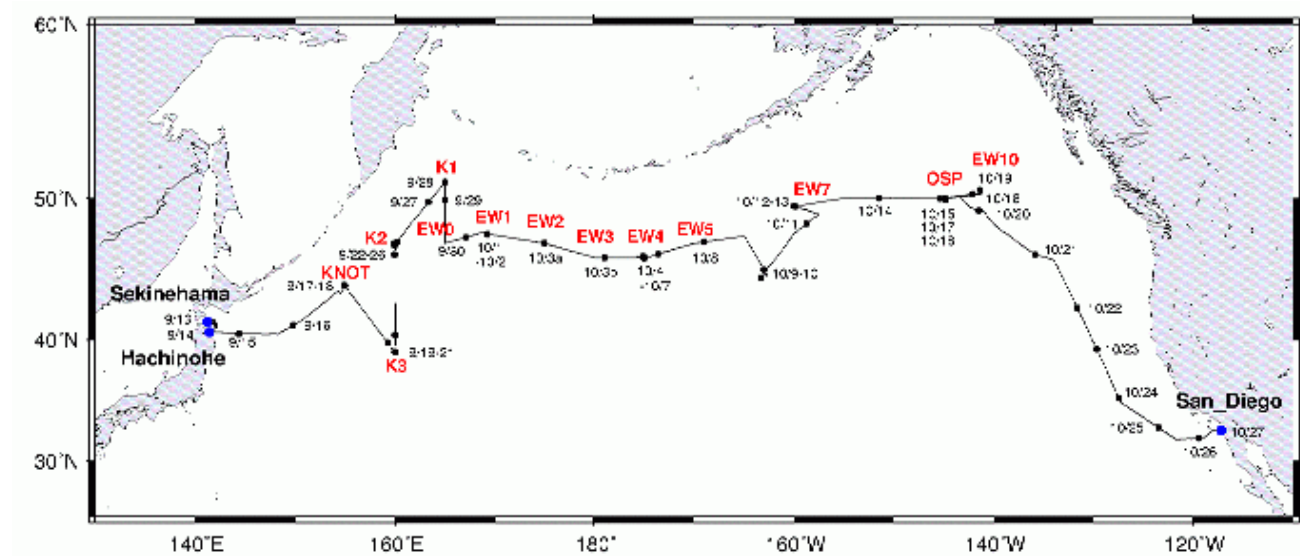


Figure 1.2.1-1. Noon Position

2.2 Cruise log

S.M.T.		U.T.C.		Position		Events
Date	Time	Date	Time	Lat.	Lon.	
9/13	16:00	9/13	7:00	41-21.97N	141-14.38E	Departure of Sekinehama
9/14	8:40	9/13	23:40	40-33.28N	141-30.01E	Arrival at Hachinohe
9/14	16:00	9/14	7:00	40-33.28N	141-30.01E	Departure of Hachinohe
9/15	7:58	9/14	22:58	40-26.12N	144-24.50E	CTD cable Free Fall #1 (7,350m)
9/15	13:55	9/15	4:55	40-26.43N	144-24.38E	CTD cable Free Fall #2 (7,350m)
9/15	18:10	9/15	9:10	40-26.51N	144-25.11E	XBT launch
9/15	22:00	9/15	13:00	-	-	Time adjustment (+1hr)
9/16	12:40	9/16	2:40	40-56.35N	149-29.68E	Optical Profiler #1
9/16	22:00	9/15	12:00	-	-	Time adjustment (+1hr)
9/17	10:54	9/16	23:54	44-00N	155-00E	Arrived at Station KNOT
	10:57		23:57	43-59.95N	155-00.04E	CTD cast #1 (70m)

9/17	12:10	9/17	01:10	43-59.88N	154-59.95E	CTD cast #2 (300m)
	13:28		02:28	43-59.99N	154-59.95E	Drifting Sediment Trap #1 deployment (Buoy let it go)
	14:02		03:02	44-00.11N	154-92.92E	CTD cast #3 (5,300m)
9/18		9/17		44-03N	154-57E	Releaser Test (5,000m)
9/18	12:43	9/18	1:43	44-05.28N	154-55.63E	Optical Profiler #2
	13:56		2:56	44-04.66N	154-55.76E	Drifting Sediment Trap #1 recovery (Weight on deck)
	14:00		3:00			Departure of Station KNOT
9/19	12:50	9/19	1:50	39-36.75N	159-25.44E	Optical Profiler #3
9/19	18:00	9/19	7:00	39-00N	160-00E	Arrived at Station K3
9/20	4:28	9/19	17:28	39-00.10N	160-00.13E	CTD cast #4 (200m)
	6:34		19:34	39-00.98N	159-59.90E	Drifting Sediment Trap #2 deployment
	6:57		19:57	39-02.29N	159-59.88E	CTD cast #5 (5,492m)
9/20	12:40	9/20	1:40	39-02.47N	160-02.38E	Optical Profiler #4
	13:02		2:02	39-02.69N	160-02.89E	CTD cast #6
9/21	6:32	9/20	19:32	39-00.82N	160-07.41E	Drifting Sediment Trap #2 recovery
	6:36		19:36			Departure of Station K3
9/22	15:24	9/22	4:24	47-00N	160-00E	Arrived at Station K2
	15:28		4:28	46-57.85N	159-57.39E	CTD cast #7 (2,000m)
9/23	11:32	9/23	0:32	47-00.02N	159-55.84E	BGC mooring recovery (Releaser on deck)
	12:59		1:59	46-59.45N	159-56.71E	Optical Profiler #5
	14:40		3:40	47-00.56N	160-00.52E	In-situ Pumping #1 (2 hr)
9/24	13:13	9/24	2:13	46-52.01N	159-58.88E	PO mooring deployment (Sinker let it go)
	16:30		7:30	46-52.52N	160-01.69E	In-situ Pumping #2 (2 hr)
9/25	4:28	9/24	17:28	47-00.46N	159-58.54E	CTD cast #8 (200m)
	6:24		19:24	47-06.76N	160-07.38E	Drifting Sediment Trap #3 deployment
9/25	7:58	9/24	20:58	47-05.84N	160-11.28E	CTD cast #9 (5,167m)
9/25	14:21	9/25	3:21	47-04.71N	160-09.14E	Additional GPS buoy deployment
	15:48		4:48	47-03.47N	160-12.71E	GPS buoy recovery
9/26	6:30	9/25	19:30	47-03.86N	160-10.93E	Drifting Sediment Trap #3 recovery
9/26	13:30	9/26	2:30	47-00.59N	159-58.65E	BGC mooring deployment (Sinker let it go)
	16:09		5:09	47-04.72N	160-11.99E	CTD cast #10 (300m)
	17:58		6:58	47-04.67N	160-12.06E	CTD cast #11 (50m)
	18:18		7:18			Departure of Station K2

9/27	12:45	9/27	1:45	49-52.09N	163-30.49E	Optical Profiler #6
9/28	21:00	9/27	10:00	51-00N	165-00E	Arrived at Station K1
	3:54		16:54	51-00.32N	164-59.69E	CTD cast #12 (200m)
	5:55		18:55	51-00.00N	165-00.44E	Drifting Sediment Trap #4 deployment
	6:07		19:07	51-00.04N	164-59.51E	CTD cast #13 (4,769m)
	10:15		23:15	51-02.13N	164-59.38E	In-situ Pumping #3 (1 hr)
9/28	12:43	9/28	1:43	51-00.13N	164-59.87E	Optical Profiler #7
	13:05		2:05	51-00.70N	164-59.57E	CTD cast #14 (300m)
9/29	6:05	9/28	19:05	51-17.60N	165-02.96E	Drifting Sediment Trap #4 recovery
	6:06		19:06			Departure of Station K1
9/29	19:00	9/29	8:00	-	-	Time adjustment (+1hr)
9/30	0:30	9/29	12:30	47-00N	165-00E	Arrived at Station EW0
	0:37		12:37	47-00.00N	164-59.96E	CTD cast #15 (300m)
	2:03		14:03	46-59.78N	164-59.78E	CTD cast #16 (5,850m)
	6:00		18:00			Departure of Station EW0
9/30	12:41	9/30	0:41	47-27.77N	167-20.65E	Optical Profiler #8
9/30	17:30	9/30	5:30	47-00N	169-00E	Arrived at Station EW1
	17:30		5:30			Site Survey mapping (8hr)
10/1	4:28	9/30	16:28	47-38.91N	169-16.78E	CTD cast #17 (200m)
	6:19		18:19	47-38.65N	169-16.87E	Drifting Sediment Trap #5 deployment
	7:59		19:58	47-40.00N	169-15.83E	Multiple Corer penetrate #1 (2,240m)
	8:53		20:53	47-39.54N	169-15.62E	CTD cast #18 (2,190m)
10/1	12:46	10/1	0:46	47-38.72N	169-15.65E	Optical Profiler #9
	13:11		1:11	47-38.81N	169-15.66E	CTD cast #19 (200m)
	14:35		2:35	47-38.40N	169-15.52E	Piston Corer penetrate #1 (2,174m)
	17:30		5:30	47-38.46N	169-16.22E	In-situ Pumping #4 (1hr)
10/2	7:07	10/1	19:07	47-36.30N	169-19.31E	Drifting Sediment Trap #5 recovery
10/2	14:26	10/2	2:26	47-38.41N	169-165.49E	Piston Corer penetrate #2 (2,175m)
	15:30		3:30			Departure of Station EW1
10/3A	7:48	10/2	19:48	47-00N	175-00E	Arrived at Station EW2
	7:54		19:54	46-79.72N	174-59.93E	CTD cast #20 (300m)

	9:29		21:29	47-01.08N	174-58.61E	CTD cast #21 (5,621m)
10/3A	13:19	10/3	1:19	47-00.44N	174-59.70E	ARGO float deployment #1
	13:30		1:30			Departure of Station EW2
	20:39		8:39	46-30.07N	177-29.72E	ARGO float deployment #2
10/3B	4:30	10/3	16:30			Crossed Date line
10/3B	4:30	10/3	16:30	46-00N	180-00W	Arrived at Station EW3
	4:36		16:36	45-59.90N	179-59.57W	CTD cast #22 (300m)
	6:24		18:24	46-00.26N	179-58.51E	CTD cast #23 (3,000m)
	8:26		20:26	45-59.92N	179-59.36E	ARGO float deployment #3
	8:30		20:30			Departure of EW3
10/3B	12:49	10/4	0:49	45-59.66N	178-45.00W	ARGO float deployment #4
	17:18		5:18	45-59.95N	177-30.12W	ARGO float deployment #5
	21:45		9:45	45-59.73N	176-15.01W	ARGO float deployment #6
10/4	2:00	10/4	14:00	46-00N	175-00W	Arrived at Station EW4
	2:00		14:00			Site Survey mapping (4hr 40mn)
10/4	22:00	10/5	10:00	-	-	Time adjustment (+1hr)
10/5	8:26	10/5	19:26	45-58.85N	175-01.06W	CTD cast #24 (5,738m)
	12:43		23:43	45-58.70N	175-01.42W	Optical Profiler #10
10/5	13:57	10/6	0:57	46-00.19N	174-59.85W	CTD cast #25 (300m)
10/6	4:56	10/6	15:56	45-59.78N	175-00.01W	CTD cast #26 (200m)
	6:46		17:46	45-58.92N	175-02.45W	Drifting Sediment Trap #6 deployment
	9:54		20:54	46-00.00N	175-00.05W	Multiple Corer penetrate #2 (5,757m)
	12:43		23:43	46-00.31N	175-01.22W	Optical Profiler #11
10/6	13:40	10/7	0:40	46-00.72N	175-00.32W	In-situ Pumping #5 (1hr)
10/7	7:51	10/7	18:51	45-59.06N	174-57.03W	Drifting Sediment Trap #6 recovery
	7:55		18:55	45-59.15N	174-57.02W	ARGO float deployment #7
	8:00		19:00			Departure of Station EW4
10/7	15:28	10/8	2:28	46-29.97N	172-30.08W	ARGO float deployment #8

	22:48		9:48	47-00N	170-00W	Arrived at Station EW5
	22:55		9:55	46-59.86N	170-00.21W	CTD cast #27 (300m)
10/8	8:48	10/8	19:55	47-00.03N	169-59.90W	ARGO float deployment #9
	9:00		20:00			Departure of Station EW5
10/8	16:27	10/9	3:27	47-15.03N	167-30.32W	ARGO float deployment #10
	23:48		10:48	47-29.93N	165-00.12W	ARGO float deployment #11
10/9	12:55	10/9	23:55	45-00.08N	162-54.27W	ARGO float deployment #12
	12:57		23:57	44-59.91N	162-54.15W	ARGO float deployment #13
10/10	19:10	10/11	6:10	45-24.32N	162-30.01W	ARGO float deployment #14
10/11	16:36	10/12	3:36	48-57.41N	157-30.00W	ARGO float deployment #15
10/12	8:00	10/12	19:00	49-30N	160-00W	Arrived at Station EW7
	9:25		20:25	49-29.80N	160-00.25W	CTD cast #28 (300m)
	10:40		21:40	49-29.92N	160-00.50W	Optical Profiler #12
	11:07		22:07	49-30.10N	160-00.78W	CTD cast #29 (200m)
10/12	13:21	10/13	0:21	49-30.78N	160-00.88W	Drifting Sediment Trap #7 deployment
	13:32		0:32	49-30.26N	160-01.11W	CTD cast #30 (4,974m)
	17:59		4:59	49-29.11N	159-58.09W	8noji kousou
10/13	9:30	10/13	20:30	49-29.73N	159-58.86W	In-situ Pumping #6 (1hr)
10/13	13:41	10/14	0:41	49-28.15N	159-53.42W	Drifting Sediment Trap #7 recovery
	13:45		0:45	49-28.03N	159-53.28W	ARGO float deployment #16
	14:00		1:00			Departure of Station EW7
10/13	22:00	10/14	9:00	-	-	Time adjustment (+1hr)
10/16	2:00	10/16	12:00	50-15N	140-00W	Arrived at Station EW10
	2:00		12:00			Site Survey mapping (4hr 50mn)
	7:00		17:00			Departure of Station EW10
10/17	3:00	10/17	13:00	50-00N	145-00W	Arrived at Station OSP
	9:00		19:00	49-57.37N	144-55.44W	In-situ Pumping #7 (1hr)
	10:24		20:24	49-56.70N	144-56.60W	Optical Profiler #13
	10:54		20:54	49-54.95N	144-56.90W	CTD cast #31 (200m)

	13:15		23:15	49-54.64N	144-53.22W	Drifting Sediment Trap #8 deployment
	13:28		23:28	49-54.08N	144-53.80W	CTD cast #32 (300m)
10/17	14:58	10/18	0:58	49-53.52N	144-54.08W	CTD cast #33 (300m)
10/18	6:00	10/18	16:00	49-55.99N	144-51.27W	In-situ Pumping #8 (5hr)
	11:28		21:28	50-00.13N	144-55.11W	Optical Profiler #14
	13:53		23:53	49-59.90N	144-55.11W	Drifting Sediment Trap #8 recovery
10/18	14:00	10/19	0:00			Departure of Station OSP
10/18	22:30	10/19	8:30	50-15N	140-00W	Arrived at Station EW10
	22:30		8:30			Site Survey mapping (8hr 10mn)
10/19	9:46	10/19	19:46	50-31.88N	141-23.56W	Piston Corer penetrate #3 (3,413m)
	12:40		22:40			Site Survey mapping (0hr 20mn)
	13:00		23:00			Departure of Station EW10
10/20	22:00	10/21	8:00	-	-	Time adjustment (+1hr)
10/22	22:00	10/23	7:00	-	-	Time adjustment (+1hr)
10/24	22:00	10/25	6:00	-	-	Time adjustment (+1hr)
10/27	8:40	10/27	15:40	32-42.97N	117-10.54W	Arrived at San Diego

3. List of participants

Name	Affiliation
Makio HONDA(Principal Investigator)	Japan agency for Marine–Earth Science and Technology (JAMSTEC)Mutsu Institute for Oceanography (MIO)
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Ai YASUDA	MWJ
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