

**Preliminary Report
of
The Hakuho Maru Cruise KH-98-4
(Leg 1)**

September 7, 1998 – September 21, 1998

**Studies on ecological profile, material cycle
and ocean environment related to biological production
in western North Pacific (GLOBEC/JGOFS)**

**Ocean Research Institute
University of Tokyo
2002**

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By

The Scientific Members of the Cruise

Edited by

Takashige SUGIMOTO

PREFACE

In order to study physical structure of the front of the Kuroshio Extension, a grid survey with CTD and ADCP had been conducted, although XBT was used in the first day instead of CTD because of bad weather condition. Water sampling for analyses of nutrients, organic particles and chlorophyll, and NORPAC net sampling of zooplankton were also done in this cruise, which also provided data sets for analyses of a warm core ring. Observation in this ring are designed to transect the center of the ring located 143°30'E with 15 mile-interval of CTD, and with 30 mile-interval of water sampling and NORPAC net sampling. After this grid survey around the ring, buoys with sediment traps were released observing vertical daily migration of zooplankton and organic particles. Experiments to measure photosynthesis speed and its increasing rate by addition of iron were also conducted on board. This is a preliminary experiment for future studies on fluctuation of primary production associated with addition of several concentrations of nutrients. These estimated results would be put into numerical ecosystem models to clarify unstable primary and secondary production. In frontal regions of the warm core ring, its fine structure (temperature, salinity, chlorophyll) was observed with a vertically moving aqua-shuttle and these data will be analyzed together with ADCP data set.

We sometimes had bad weather condition. However, receiving enthusiastic cooperation by ship crews. Most of the scheduled observation had been completed. We would like to express our deep appreciation to the crews.

Takashige Sugimoto
Chief Scientist

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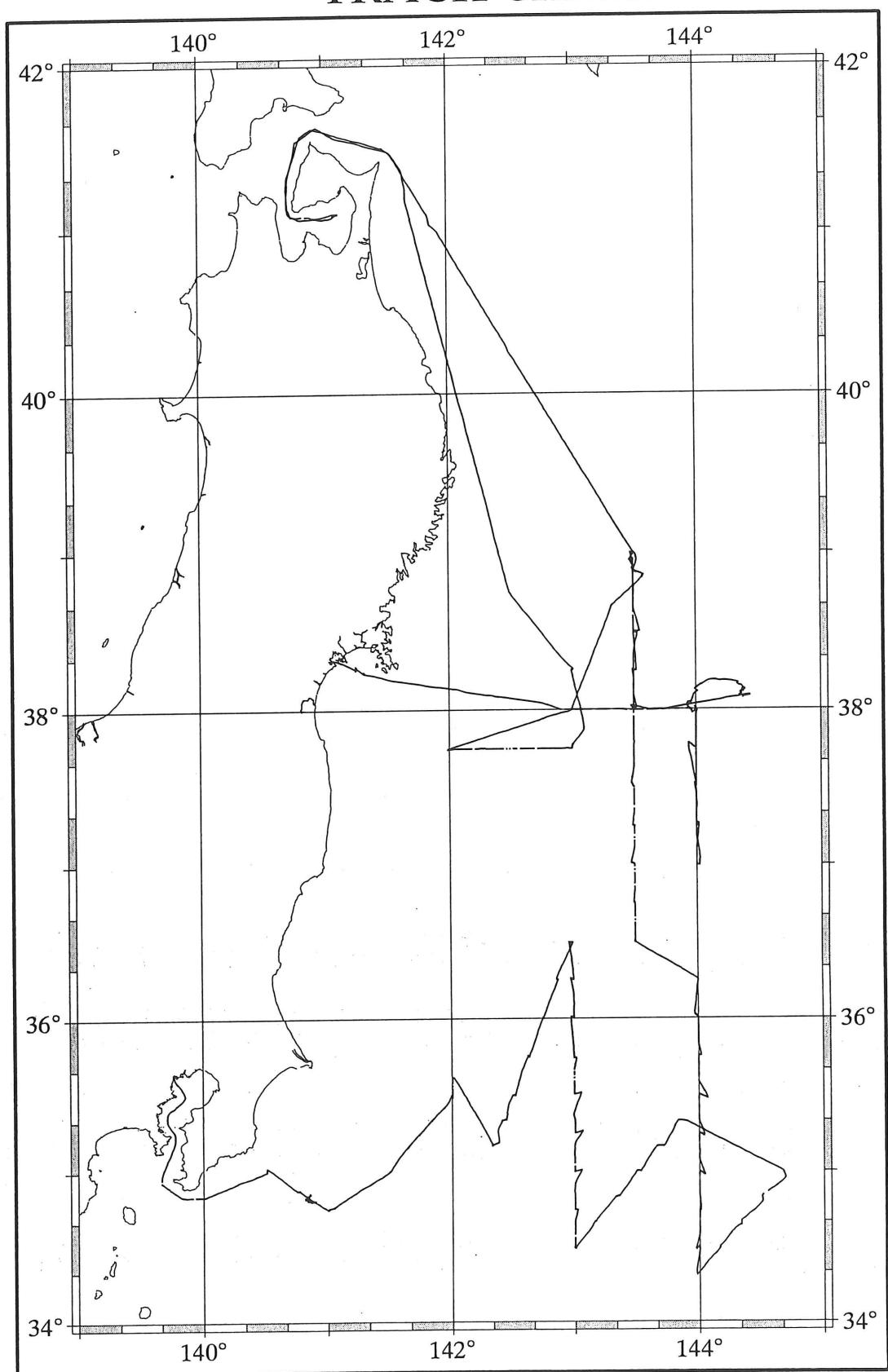
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Scientists aboard (Leg 1,3)

Takashige SUGIMOTO	Ocean Research Institute, The University of Tokyo
Makoto TERAZAKI	Ocean Research Institute, The University of Tokyo
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Shingo KIMURA	Ocean Research Institute, The University of Tokyo
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Hideo NAGAE	Ocean Research Institute, The University of Tokyo
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Masatoshi MOKU	Ocean Research Institute, The University of Tokyo
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Yasuharu KURATA	Ocean Research Institute, The University of Tokyo
Mishra PRAVAKAR	Ocean Research Institute, The University of Tokyo
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Sachihiko ITOH	Ocean Research Institute, The University of Tokyo
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Yasue NAKAMURA	Faculty of Agriculture, Tohoku University
Takeshi HIBINO	Faculty of Agriculture, Tohoku University
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Hiroshi ITO	Sumika Chemical Analysis Service, Ltd. Scientific Instrument Division
Katsuo NAKAMURA	Sumika Chemical Analysis Service, Ltd. Scientific Instrument Division

TRACK CHART



KH-98-4 Leg.1

Observational Table

No.1

Station	Date	Time	Lat.	Lon.	Depth	CTD	RMS	XBT	Norp.	VMPS	MTD	Strap	Chr-a	CMT.
K-1D	9/07	21:20	35 - 01.25	140 - 30.41	220	O								
K-2D		23:20	34 - 52.44	-46.32	2293	O								
K-2-1	9/08	00:50	- 50.00	-50.00	2408	O								
K-2-21			- 46.93	-50.70	2733	O								
K-2-2		10:50	- 47.37	-55.06	2992	O								
K-3-0		13:50	- 45.93	141 - 03.25	3128	O								
K-7		18:53	35 - 00.09	144 - 29.88	4516	O								
K-8		21:30	- 09.56	-38.40	3980	O								
K-9		23:00	- 14.59	145 - 44.05	4382	O								
K-10-1	9/09	00:30	- 19.94	-49.15	4302	O								
K-10-2		00:40	- 20.49	-50.75	4345	O								
K-11		02:00	- 25.06	-56.19	4534	O								
K-12		03:30	- 29.79	-59.90	4603	O								
K-12-1		05:07	- 35.16	142 - 00.29	4112	O								
K-13		06:01	- 27.55	-08.16	6038	O								
K-14-1		06:39	- 18.75	-14.26	8152	O								
K-15		07:38	- 10.00	-20.00	7700	O								
K-15-1		09:20	- 15.29	-22.53	7620	O								
K-16		09:52	- 20.05	-24.80	7191	O								
K-16-1		11:20	- 25.05	-27.47	6537	O								
K-17		11:52	- 29.94	-30.06	6849	O								
K-17-1		13:37	- 37.54	-33.77	6650	O								
K-18		14:22	- 45.19	-37.40	4006	O								
K-19		16:49	36 - 00.03	-44.94	7291	O								
K-20		19:01	- 15.14	-52.41	7812	O								
K-21		21:50	- 29.81	-59.91	7191	O								
K-22	9/10	00:16	- 15.12	-59.78	7502	O								
K-23		02:45	- 00.10	-59.99	6184	O								
K-24		06:15	- 44.47	143 - 00.18	6618	O								
K-24-1		07:26	35 - 39.92	-00.01	6476	O								
K-24-2		07:45	- 35.32	142 - 59.98	6305	O								
K-25		08:13	- 30.24	143 - 00.30	6174	O								
K-25-1		10:07	- 24.38	-00.32	6033	O								
K-25-2		10:27	- 20.00	-00.20	5826	O								
K-26		10:51	15.11	00.24	5705	O								
K-26-1		12:35	- 10.13	-00.04	5641	O								
K-26-2		13:00	- 05.02	142 - 59.93	5707	O								
K-27		13:26	34 - 59.89	143 - 00.56	5834	O								
K-27-1		15:09	- 55.00	-00.00	5849	O								
K-27-2		15:28	- 50.04	142 - 59.94	5962	O								
K-28		15:55	- 44.73	143 - 00.05	5294	O								
K-28-1		17:07	- 39.93	-00.00	5368	O								
K-28-2		17:25	- 35.00	142 - 59.97	5301	O								
K-29		17:57	- 29.63	-59.75	5290	O								
K-30		20:29	- 39.90	143 - 00.68	5255	O								
K-31		22:17	- 49.98	-20.18	5632	O								
K-32	9/11	00:06	35 - 00.08	-30.05	5548	O								

Observational Table

Station	Date	Time	Lat.	Lon.	Depth	CTD	RMS	XBT	Norp.	VMPS	MTD	S trap	Chr-a	CMT.
K-33		01:57	-09.99	-40.27	5614	○								
K-34		03:45	-19.90	-50.37	5746	○								
K-35		07:28	-00.04	144 -39.93	5752	○								
K-36		09:20	34 -49.46	-29.23	5699	○								
K-37		11:01	-39.94	-20.06	5617	○								
K-38		12:50	-30.02	-09.82	5578	○								
K-38-1		14:40	-20.00	-00.04	○	○								
K-39		15:43	-30.06	143 -59.96	5633	○	○							
K-39-1		18:47	-35.11	144 -00.02	5547	○	○							
K-39-2		19:07	-40.06	143 -59.96	5530	○	○							
K-40		19:36	-44.96	144 -00.10	5625	○								
K-40-1		20:54	-49.97	-00.08	5269	○								
K-40-2		21:15	-54.94	-00.04	5814	○	○							
K-41		21:34	-59.94	-00.06	5677	○	○							
K-41-1		23:50	35 -04.93	-00.07	5695	○								
K-41-2	9/12	00:10	-10.00	143 -59.94	5674	○								
K-42		00:40	-14.74	144 -00.18	5695	○	○							
K-42-1		02:06	-20.00	-00.05	5716	○	○							
K-42-2		02:26	-25.00	143 -59.93	5726	○								
K-43		02:56	-29.96	144 -00.26	5719	○	○							
K-43-1		05:14	-35.05	-00.04	5744	○								
K-43-2		05:33	40.05	00.02	5803	○								
K-44		06:05	45.38	00.34	5847	○	○							
K-44-1		07:28	-50.08	-00.04	5741	○								
K-44-2		07:47	-55.07	-00.00	5857	○								
K-45		08:16	36 -00.06	143 -59.83	5717	○	○							
K-46		11:40	-14.90	144 -00.06	4119	○								
C-1		14:50	-29.97	143 -29.93	6471	○	○					○		
C-2		17:25	-45.15	-29.92	7035	○								
C-3		19:24	37 -00.23	-29.78	7572	○	○							
C-4		21:52	-14.94	-30.18	6918	○								
C-5		23:49	-30.09	-29.87	5904	○						○		
C-6	9/13	02:30	-45.11	-30.09	5171	○								
C-7		04:20	38 -00.15	-30.17	4398	○	○					○		
C-8		08:09	-14.99	-30.35	3317	○								
C-9		10:03	40 -30.05	-30.31	2883	○								
C-10		12:40	-44.90	-29.86	2570	○						○		
C-11		16:23	-59.76	-28.74	2470	○						○		
C-12		9/14	07:10	38 -40.03	-20.00	2278	○						○	
C-13		20:34	-20.13	-10.02	2310	○								
C-14		22:59	-00.04	-00.05	1862	○								
C-15	9/15	01:23	37 -00.04	141 -59.81	498	○	○							
C-16		03:15	-44.98	142 -15.06	804	○								
C-17		05:29	-45.04	-39.91	1422	○								
C-18		06:40	-44.99	-00.04	2177	○	○							
C-19		10:18	38 -15.25	-00.10	1563	○								
C-20		12:22	-30.27	142 -44.63	1463	○								

Observational Table

Station	Date	Time	Lat.	Lon.	Depth	CTD	RMS	XBT	Norp.	VMPS	MTD	Strap	Chr-a	CMT.
C-21		13:33	- 44.79	-30.14	1184				O					
C-22	9/18	08:13	- 59.69	-30.65	2508	O	O	O	O					
C-23		11:30	- 45.46	-30.06	2563				O					
C-24		12:30	40 - 30.13	-30.10	2872	O	O	O	O					
C-25		15:25	38 - 15.07	143 -30.00	3356	O								
C-26		17:40	37 - 59.99	-29.79	4374	O	O	O	O					
C-26-1		20:55	- 59.99	-59.57	6007			O						
C-27		22:06	- 45.18	-59.52	7021	O	O	O						
C-28	9/19	01:10	- 30.14	-00.00	6706	O								
C-29		02:25	- 15.52	144 -00.08	6439	O	O	O	O					
C-30		06:09	00..01	00.01	6099	O								
C-31		15:02	38 - 00.84	143 -59.53	7417	O	O	O	O					
C-32	9/20	21:12	37 - 59.97	-45.19	5989				O					
C-33		23:00	- 59.98	-10.24	3976	O								
C-34	9/21	00:00	38 - 01.38	142 -50.12	3132	O								

Aqua shuttle

Argos buoy throw

Observational Table

Station	Date	Time	Lat.	Lon.	Depth	CTD	RMS	XBT	Norp.	IKMT	MTD	S.trap	ORI	photon	Moc	CMT.	Argos buoy throw
W-7	10/16	23:16	37 - 45.36	143 - 59.33	7051	○	○										
WX-1	10/17	00:59	- 47.45	144 - 00.07	6995	○	○										
W-6		01:37	38 - 00.14	143 - 59.95	7432	○	○										
WX-2		03:17	- 07.70	144 - 00.07	7442	○											
W-5		03:55	- 15.10	- 00.08	7174	○											
WX-3		05:19	- 22.50	- 00.04	7046	○	○										
W-4		06:06	- 30.45	- 00.19	7105	○	○										
WX-4		07:45	- 37.50	143 - 59.95	7051	○	○										
W-3		08:18	- 44.90	144 - 00.25	6795	○	○										
WX-5		10:30	- 30.00	- 14.00	6741	○	○										
WX-6		11:29	- 15.00	- 14.96	6413	○	○										
WX-7		12:16	37 - 59.33	- 15.57	6360	○											
WX-8		13:24	- 45.00	- 18.75	6110	○											
WX-9		14:23	- 30.00	- 20.42	5987	○											
W-11	10/19	08:05	36 - 45.45	- 00.55	5944	○											
W-10		10:02	37 - 00.07	- 00.05	6102	○	○										
W-9		12:16	- 15.04	143 - 59.88	6376	○											
W-8		14:24	- 30.10	144 - 00.05	6718	○	○										
W-6-2		19:40	38 - 07.52	- 00.00	7445	○	○										
W-2	10/20	02:33	39 - 00.05	- 00.41	5797	○	○										
W-1		05:02	- 15.01	- 00.20	6849	○	○										
W-17		19:08	38 - 07.76	143 - 14.95	2711	○											
W-18		20:57	- 07.64	- 29.72	3597	○											
W-19		22:59	- 07.71	- 44.78	5773	○											
W-20	10/21	00:55	- 07.50	- 59.72	7443	○	○										
W-21		11:18	- 07.46	144 - 14.77	6433	○											
W-22		13:10	- 07.36	- 29.88	5940	○											
W-28		18:57	- 07.52	145 - 59.95	5198	○											
E-4	10/23	17:30	35 - 45.87	142 - 42.20	3943	○											
E-3		20:25	36 - 02.64	- 51.06	7320	○											
E-5	10/24	00:12	35 - 28.47	- 38.48	6647	○	○										
E-6		03:57	- 03.57	142 - 26.58	6865	○											
E-7		06:32	34 - 59.83	- 19.13	7384	○	○										
E-8	10/25	13:34	- 45.00	- 12.00	7591	○											
E-9	10/26	00:15	27.91	24.75	6359	○	○										
E-10		21:20	- 15.21	141 - 15.42	○												
EX-10-1		22:33	- 19.71	- 14.10	○	○											
EX-10-2		22:52	- 24.76	- 12.82	○	○											
E-11		23:19	- 30.04	- 11.69	○												
EX-11-1	10/27	00:35	- 34.92	- 10.53	○												
EX-11-2		00:53	- 39.92	- 09.05	○												
E-12		01:22	- 45.10	- 07.57	○												
EX-12-1		02:36	- 49.95	- 06.18	○												
EX-12-2		02:55	- 54.96	- 04.94	○												
E-13		03:22	35 - 00.02	- 03.94	○												
EX-13-1		04:41	- 05.03	- 02.57	○												
EX-13-2		04:59	- 09.99	- 01.25	○												
E-14		05:25	- 15.16	140 - 59.82	○												

