doi : 10.17596/0003254

NT08-10
R/V Natsushima-ROV Hyperdolphin
Sagami bay cruise

"Understanding three dimensional (depth, width and time) biogeochemical features at sediment-water interface in deep-sea: in situ observations using with a two dimensional O_2-pH optode and microelectrodes."

Preliminary cruise report

2008. May 29-Jun 2

Japan Agency for Marine-Earth Science and Technology

Contents

1. Introduction

Most of organic materials supplied from water column are remineralized at sediment-water interface (SWI). In previous studies, decomposition of organic materials rate in deep-sea floor were regarded as relatively steady state. However, recent study exhibited the possibility of short time fluctuations of the aerobic decomposition, as well as O_2 consumption (Glud et al., 2007). This insight suggests that macro –meiobenthic activities can be regulated by O_2 fluctuations at SWI. Especially, benthic foraminifera are common and most dominant meiobenthic organisms at SWI, their activities seem to be very important to consider biogeochemical cycles in deep-sea floor. In this cruise, we focused on two major themes. One is to understand chemical environments and the short time fluctuations. The other is to measure remineralization and growth rates of benthic foraminifera. The study site is off Hatsushima (35.00N, 139.15E), water depth of ca. 1190m. To investigate relationships between O_2 fluctuations and benthic activities at SWI, we made a deployment of the short time monitoring of transparent planar O_2 optode, which measures two dimensional O_2 concentration and the transparent images. For the long time O_2 fluctuations, we made the recovery of the planar O_2 optode deployed since NT08-02 cruise. Combining with these results, bioturbation and bioirrigation processes and the corresponding O_2 fluctuations can be calculated. These results will identify time-series fluctuations of O_2 uptake controlled by physical and biological mixings. From a point of view to investigate and quantify meiobenthic activities, we made in situ incubation of benthic foraminifera using with incubation devises and ^{13}C-labeled algae. We also attempted to get sediment cores expected to contain foraminifera marked with a fluorescent dye. These data will provides us remineralization and calcification rates of benthic foraminifera. The results from these experiments will provide new insights on roles of foraminifera to biogeochemical cycles in deep-sea.

Kazumasa Oguri

2. Cruise information

2.1. Overview of the cruise

(1) Cruise Number, Research Vessel and Submersible

NT08-10, R/V Natsushima and ROV "Hyperdolphin"

(2) Title of the cruise

FY2008 Deep-sea research using with ROV "Hyperdolphin"

(3) Proposal number and research title

S08-14, Understanding three dimensional (depth, width and time) biogeochemical features at sediment-water interface in deep-sea: in situ observations using with a two dimensional O_2-pH optode and microelectrodes.

(4) Cruise period and port call

2008/5/29 (JAMSTEC pier)-6/2 (JAMSTEC pier)

(5) Research site

Off Hatsushima, Sagami bay, Japan (around 35.00N, 139.15E, Water depth =1190m)

2.2.Cruise and dive schedules

May. 29 9:00: Depart from JAMSTEC pier

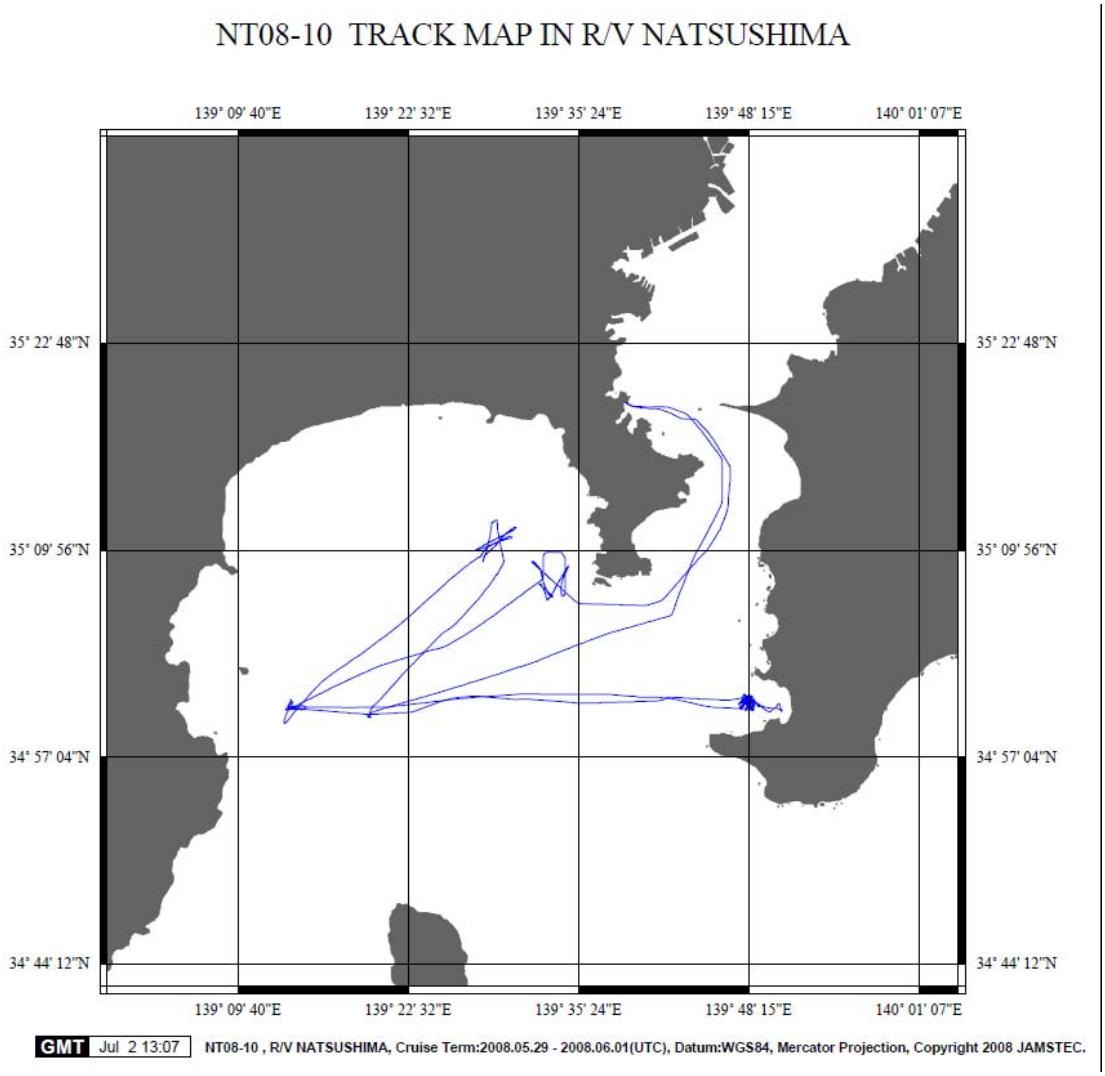
May. 30 : Off Hatsushima, Dive #844, #845

May. 31 : Occasional date.

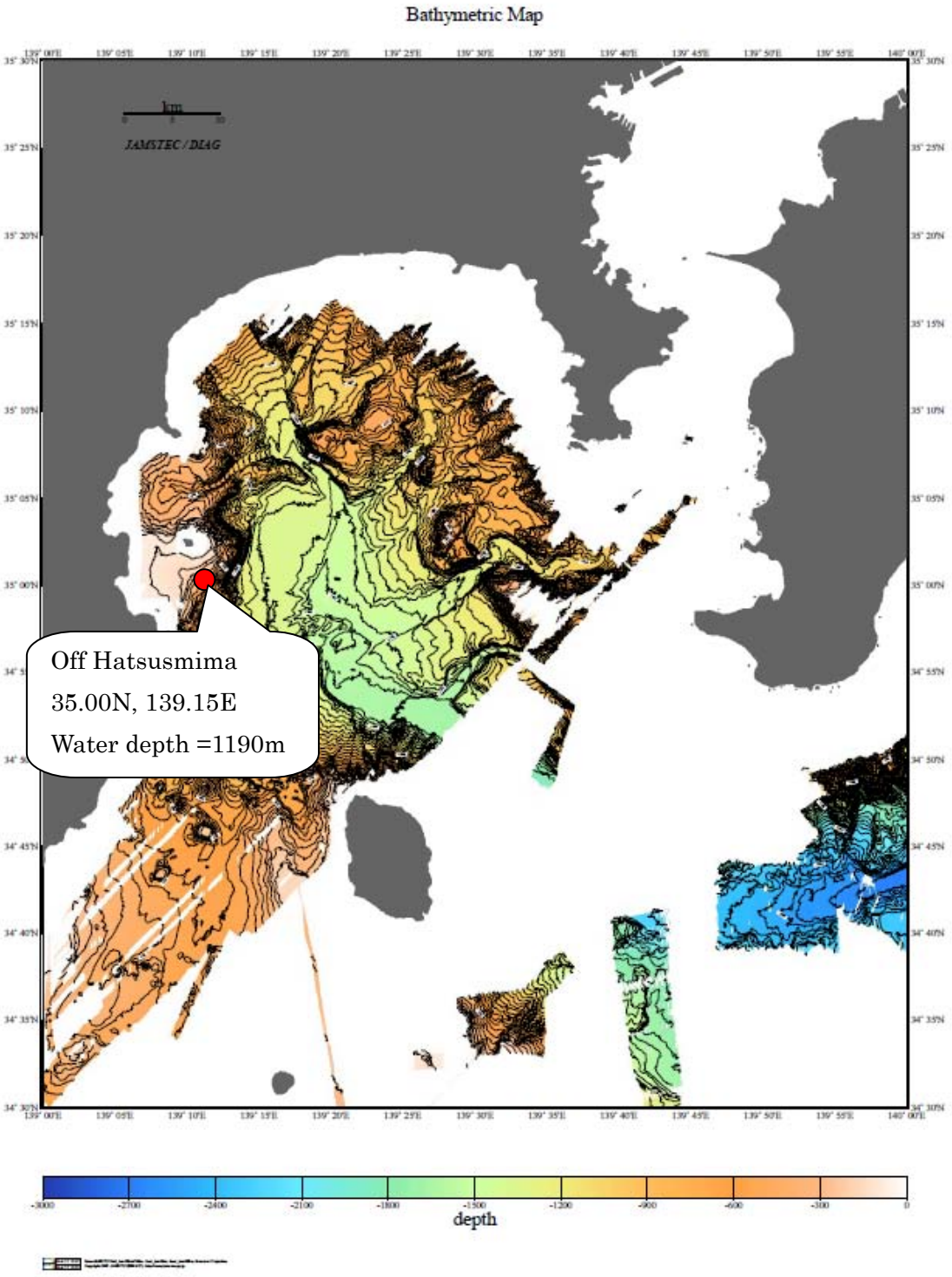
Jun. 1 : Off Hatsushima, Dive #846, 847

Jun. 2 8:00 : Arrive at JAMSTEC pier

2.3. Track map.


NT08-10 TRACK MAP IN R/V NATSUSHIMA
139° 09' 40"E
139° 22' 32"E
139° 35' 24"E
139° 48' 15"E
140° 01' 07"E
35° 22' 48"N
35° 09' 56"N
34° 57' 04"N
34° 44' 12"N
GMT Jul 2 13:07
NT08-10 , R/V NATSUSHIMA, Cruise Term:2008.05.29 - 2008.06.01(UTC), Datum:WGS84, Mercator Projection, Copyright 2008 JAMSTEC.

2.4. Research site



2.5. Participants (scientists)

Chief scientist	Kazumasa Oguri	JAMSTEC/IFREE
Co-Chief scientist	Hitoshi Kitazato	JAMSTEC/IFREE
Scientist	Tahashi Toyofuku	JAMSTEC/IFREE
Scientist	Hidetaka Nomaki	JAMSTEC/IFREE
Scientist	Joan Bernhard	Woods Hole Oceanographic Institution
Scientist	Philip Forte	Woods Hole Oceanographic Institution
Marine technitian	Satomi Minamizawa	Nippon Marine Enterprises

3. Preliminary results

3.2. Preliminary results

3.2.1. Planar O_2 optode experiment

Kazumasa Oguri and Hiroshi Kitazato

Short term O_2 monitoring at sediment-water interface.

To investigate relationship between O_2 fluctuations and bioturbation effects at sediment-water interface, we deployed planar O_2 optode system. The principle of planar O_2 optode is based on luminescence quenching of O_2 sensitive dye (Kautsky, 1939). The combination of a transparent planar O_2 sensor foil and multi-gateable CCD camera can image two dimensional O_2 profiles and the corresponding images at sediment-water interface. The optode system was installed with the lander system (Janke and Christansen, 1982). At dive #844 the system was released from the ship. At the sea bottom, ROV Hyperdolphin hang the settled lander up and put at undisturbed sediment surface. However, the optode was not functional due to program bug in the microcontroller.

Recovery of planar O_2 optode system for long-term O_2 monitoring.

At dive #847, another planar optode system for long-term monitoring which was deployed in NT08-02 cruise was recovered. During the deployment from Jan/21st, we obtained 1991 two dimensional O_2 data in total. The actual period measured O_2 profiles was 10 days and 8 hours. The calculation of two dimensional O_2 profiles and further analyses for investigating O_2 dynamics will be performed based on luminescent lifetime imaging method (Holst and Grunward, 2001) .

Test of microsensor system for in situ measurement.

At dive #845, we made a settling test of newly designed microsensor system for *in situ* measurements (see payload picture taken at dive #845). The microsensor modules and the control units are sealed in the respective pressure cylinders fixed in the frame. The frame is designed in order to mount into the payload of Hyperdolphin. In the settling test, the microsensor system was put perpendicularly. However, the frame was penetrated too much due to the heavier weight.

3.2.2. Benthic foraminiferal calcification studies.

Hiroshi Kitazato, Hidetaka Nomaki and Joan Bernhard

Sediment samples were obtained from 9 pushcores collected with the ROV Hyperdolphin. The cores were collected from an experimental area defined by a 50x50 cm barrier that had been placed at the site (1180 m) in January 2008. The samples will be used to determine calcification rates and migration patterns of calcareous benthic foraminifera.

Samples collected: 60 pushcore sediment samples of ~24 cm^3 or 48 cm^3, preserved in buffered formalin.

3.2.3. Test deployments of new *in situ* incubation cores at the seafloor

Nomaki Hidetaka, Oguri Kazumasa, Toyofuku Takashi, Kitazato Hiroshi

Materials and Methods

Four incubation chambers having 6 different types of fan were prepared for this cruise. Widths, heights, and numbers of blades were listed in Table 1.

Fans 1-4 were deployed at the Dive#845, off Hatsushima (water depth 1191m). Fan 5 and 6 were deployed at the Dive#846, off Hatsushima (water depth 1237m). Triggers of injection syringes were also tested whether it works well or not.

Results

Active rotations were observed for the Fan 2, 3, 4 during both descending and ascending (dive speed: up to 70cm s^{-1}) of the Dive#845. The fan 1 also rotated somewhat at the same time. However, no fan rotated during the deployment on the seafloor.

Triggers did not work well. It was due to the tight Teflon-sealing of lower end of syringes.

Fan 5 and 6 were tested at the Dive#846. Both fans rotated quite well during descending and ascending. However, these fans did not work at the seafloor, too. The core declined somewhat on the seafloor, so it is supposed to be that the fans required much stronger current than a horizontal deployment.

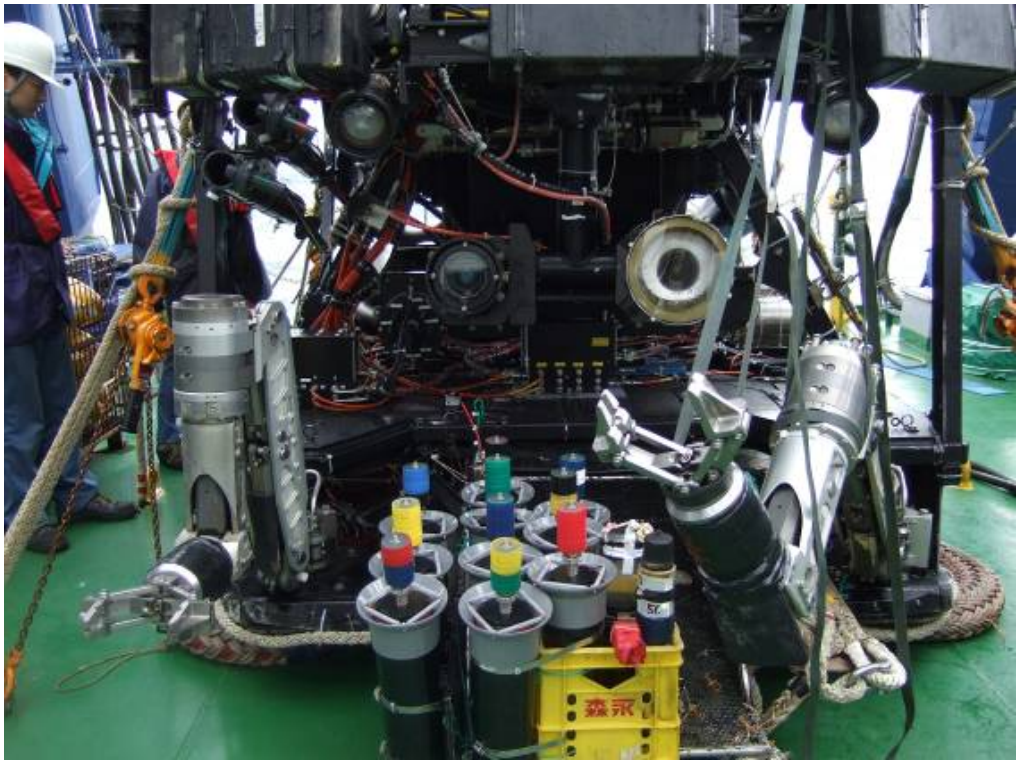
Syringes were gently lowered after triggering. The strength of the spring and sealing were well balanced each other.

Table 1. Detail information of the fan 1-6 and their results on the seafloor. Width is a blade width, not a diameter of fan.

	Fan 1	Fan 2	Fan 3	Fan 4	Fan 5	Fan 6
Width (mm)	7	10	6	8	8	18
Height (mm)	5	30	30	30	50	50
Blade #	8	4	4	4	4	4

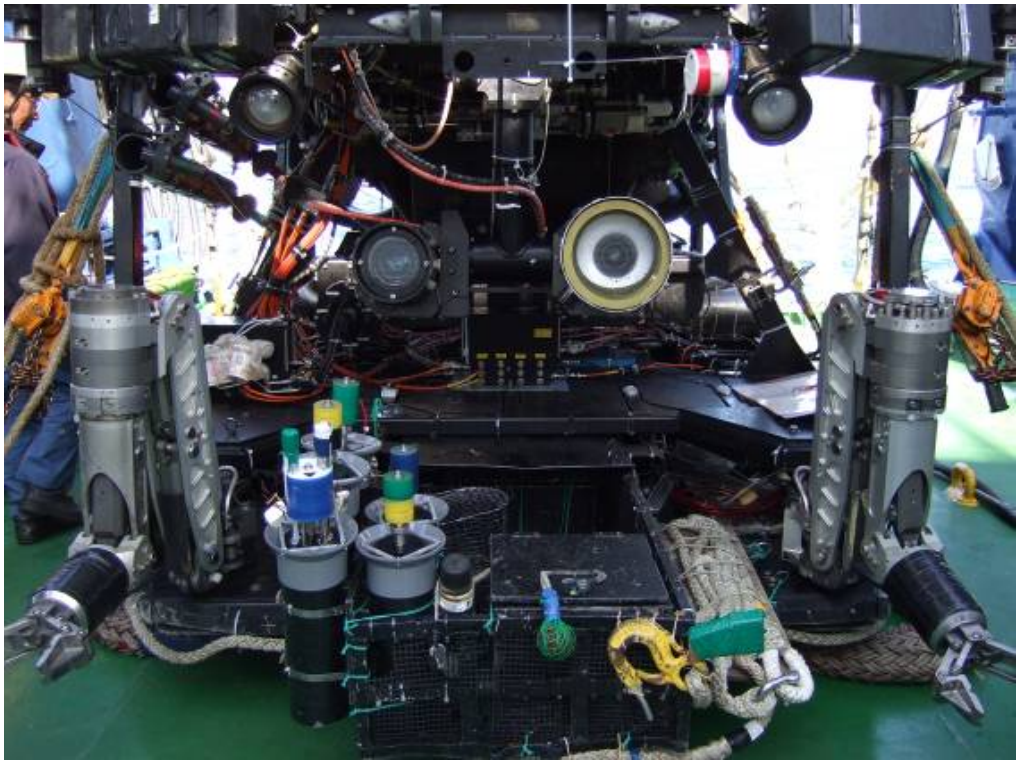
3.3. Dive information

3.3.1. Payload pictures

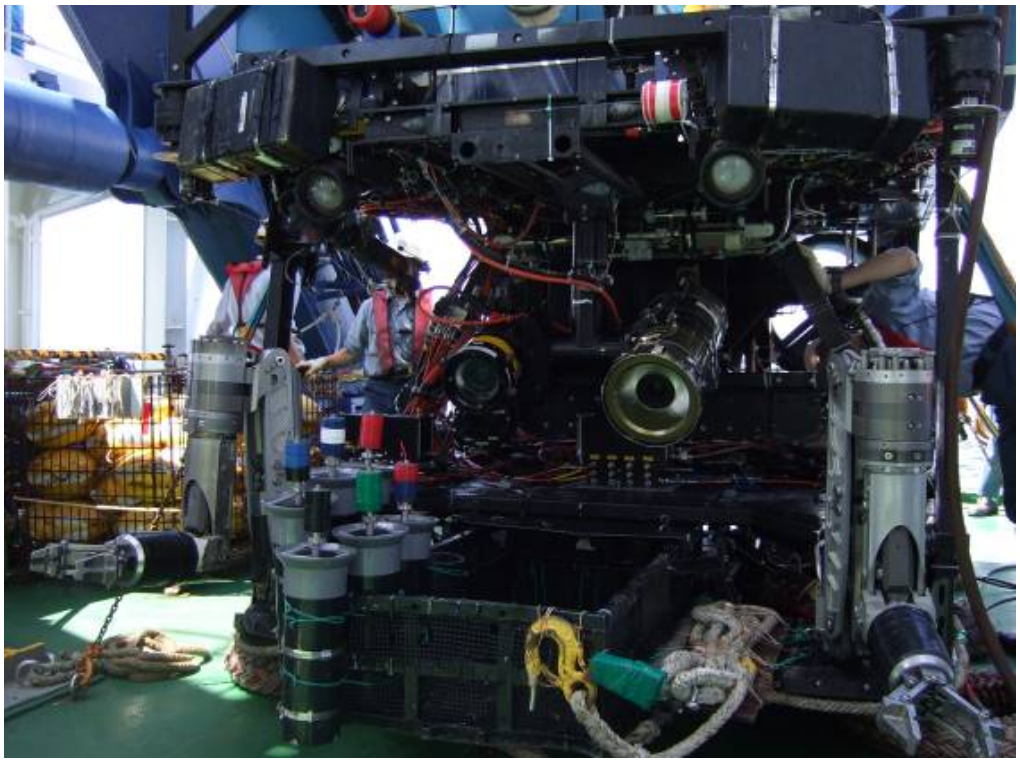


Dive #844

Dive #845



Dive #846



Dive #847

3.3.2. Dive log

Dive Log of HPD Dive #844 **SAGAMI-WAN HATSUSHIMA-OKI** **2008/05/30**

Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Description	Remarks
08:35	0	-	-	HPD Dive#844 start	
09:17	1234		280	Arrived at bottom, sea floor is mud	
09:18				Shifting to the short-term lander point	
09:19	1234	3.4	259.4	Arrived at the short-term Lander point	
09:21	1234	3.4	2112.4	Shifting to an appropriate point with Lander	
09:22	1235	6.1	153	Arrived at a point	
09:23	1237	0	127	HPD landed on sea floor	
09:25				Turn on the switch, light on (but not continuously)	
				Light did not turn on after 5 minutes	
09:33	1237	0	207.9	Shifting to sampling point	
09:37	1175	53.8	279.5	Transit next point	
09:50	1176	4.5	302	Found the PMMA Sample Box, box is buried	
09:51				Found crab beside the Box	
09:51	1180	0	249.5	HPD landed, sea floor is mud	
09:54	1180	0	248.9	Started to open left side lid of the Box	
09:55				Finished to open the Box	
09:56				Started sampling, MBARI push in the BOX at the back left	MBARI RED
09:58				at the center back	MBARI Bla&Y
09:59				at the back right	MBARI B&W
10:01				at the middle left	MBARI Y&G
10:02				at the middle center	MBARI B
10:03				at the middle right	MBARI G
10:04				Across White fish	

10:05				Push the core at the front of righat	MBARI Black
10:06				at the center front	MBARI R&B
10:07				Across the fish again	
10:08				Found crab	
10:08				Push the core at the front of left	MBARI Y
10:09				Push the core at outside Box	MBARI B&Bla
10:11	1180	0	247.1	Sediment sampling	MBARIB &Bla
10:12				Sediment sampling	MBARI Black
10:13				Sediment sampling	MBARI R&B
10:15				Sediment sampling	MBARI Y
10:16				Sediment sampling	MBARI Y&G
10:17				Sediment sampling	MBARI Blue
10:18				Sediment sampling	MBARI G
10:20				Sediment sampling	MBARI R
10:21				Sediment sampling	MBARI Bla&Y
10:22				Sediment sampling	MBARI B&W
10:28	1180	0	247.1	Niskin R&G sampling	
10:25	1180	0	257.1	HPD moced forward	
10:27			226.2	Heding change	
10:29				Picked up the fixation-liquid tube	
10:31	1180	0	226.3	The plug did not open due to pressure	
10:32				Put the fixation-liquid tube into the PMMA box	
10:33				Crush the tube and spread the fixation-liquid	
10:36	1180	0	225.8	waiting a circulation	

10:41				confirm the tube has crushed	
10:42				Started to close the Box	
10:52	1180	0	226	Finished	
10:53				ROV homer standed (ROV homer laid down before)	
10:54	1180	0	226.3	Left this point and move to the Hatsushima STATION	
10:56	1181	1.6	349.7	shifting	
10:58	11880	2.1	299.6	Approaching to the station from east side	
10:59	1178	2.1	308.4	*Calyptogena* colony	
11;00	1176	1..5	359.4	Other devices had confirmed	
11:01				Arrived at the STATION	
11:02	1177	0	15.8	HPD landed, sea floor is mud	
11:04	1177	0	15.2	The foot of the cable has been damaged (short?)	
11:08	1177	0	20.8	Plug off the cable	
11:21	1177	0	20.9	Insert the dummy plug	
	1174	4.8		HPD moved to the long-term lander with the cable	
11:30	1164	3.3		confirm the long-term lander	
11:31	1167	0.3	158.2	landed on the bottom	
11:37	1170	0	158.2	Attached the cable to the parking port of the long-term lander	
				Moved to the short term lander	
12:00	1233	3.8	87	Arrived to the short-term lander	
12:00	1237	0	100	landed on the bottom	
12:04	1237	0	98	Pull off the light sensor switch	
				Light off??	
12:11				Pull off the light sensor switch completely	
12:12				Recover the switch to the sample basket	
				The short-term lander does not work…	
12:15	1237	0	97	Left the bottom	

Dive Log of SAGAMI-WAN 2008/05/30

HPD Dive #845 HATSUSHIMA-OKI

Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Description	Remarks
15:17	0	-	-	HPD Dive#845 start	
15:59	1191	0	271.9	Arrived at bottom, sea floor is mud	
16:03	1191	0	269.8	Put microsensor system on sea floor. The frame was too penetrated.	
16:07	1191	0.4	271.1	HPD back	
16:10	1191	0	270.3	Put incubation devise（green）	
16:13				Removed the cap of the incubation devise. Wire was cut off.	
16:14				Water turbine does not function.	
16:15				Completion of the set.	
16:15	1191	0	270.7	Put incubation devise（Blue）	
16:17				Removed the cap of the incubation devise. Wire was cut off.	
16:18				Water turbine does not function.	
16:19				Completion of the set.	
19:19	1191	0	270.8	Put incubation devise（Red）.	
16:20				Removed the cap.	
16:21				Water turbine does not function.	
16:21				Completion of the set.	
16:24				All turbines in each devise did not work.	
16:24	1191	0	270.9	Recovery of respective caps.	
16:26				Completion of the recovery.	
16:27	1191	0	271	Start recovery of the incubation devises	
16:28	1191	0	270.8	Recovered (blue)	
16:28	1191	0	270.9	Recovered (green)	
16:29	1191	0	270.8	Recovered (red)	
16:33	1191	0.5	270.4	Shifting	
16:33	1191	0	270.5	Recovery of the microsensor system	
16:44	1191	0	268.2	Recovery completed	
16:44	1191	0	268.1	Left the bottom	

				HPD ascend. Water turbines of the incubation devises are rotated.	

Dive Log of **SAGAMI-WAN** **2008/06/0**

HPD Dive #846 **HATSUSHIMA-OKI** **1**

Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Description	Remarks
08:02	0	-	-	HPD Dive#846 start	
08:52	1172	0	178.5	Landed. Seafloor is mud. Inside *Calyptogena* colony. Start moving to find bacteria mat.	
08:54	1174	0.9		Found a weight of Shinkai 6500	
08:55	1174	0	179.4	Land on bacteria mat sediment.	
08:56	1175	0	179.1	Water sampling (Niskin bottoles, red and green)	Niskin R&G
08:57	1175	0	177.9	Push core sampling MBARI(Yellow-green) Inside *Calyptogena* colony, on bacteria mat.	MBARI G&Y
08:59	1173	0.8	193	Shift	
09:01	1174	0	197	Land at outside *Calyptogena* colony and close to bacteria mat.	
09:02	1174	0	197.9	Push core sampling MBARI(Blue) Inside *Calyptogena* colony, on bacteria mat.	
				Push core sampling MBARI(Yellow-black) Inside *Calyptogena* colony, on bacteria mat.	
				Grip of the push core was removed.	
09:13	1174	0	196.6	Recover push core head MBARI(Yellow-black)	MBARI Y&Bla
09:16				Recover Push core tube MBARI(Yellow-black)	
09:20	1172	1.2	198.3	Shift (look for *Calyptogena*)	
09:21	1172	0	197.8	Land (inside *Calyptogena* colony)	
09:22				Start *Calyptogena* sampling	
09:28	1172	0	197.2	Complete *Calyptogena* sampling	in Box
09:29	1171	1.6	250	Shift	
09:30	1172	0	250	Land	
09:30				Start *Calyptogena* sampling	

09:36				Sampling	in Box
09:36	1172	0	247.2	Shift	
09:37				Start *Calyptogena* sampling	
09:42	1172	0	245.7	Complete *Calyptogena* sampling	in Box
09:43	1171	0	249	Start *Calyptogena* sampling	
09:46	1172	0	248.5	Complete *Calyptogena* sampling	in Basket
09:47	1171	0.5	245.7	Shift	
09:48	1171	0	243.8	Land at bottom in *Calyptogena* colony	
09:49	1171	0	240	Start *Calyptogena* sampling	
09:51	1171	0	242	Complete *Calyptogena* sampling	in Basket
09:52	1169	1.2	270.7	Shift	
09:53	1169	1.3	271.1	Found a PET bottle	
09:55	1167	1.6	271.3	Confirm 2K memorial marker	
09:59	1166	0	316	Land at bottom Southwest of plastic pipe	
10:00	1166	0	316.6	Start tube worm sampling	
10:03	1166	0	315.4	Complete tube worm sampling	in the Box
10:05	1166	0	316.1	Recovery of ID53 homer	
10:09	1166	0	315.6	Shift toward sort time deployment lander	
10:10	1156	11.5	90.6	Shift	
10:18				Confirm Jellyfish	
10:31	1233	2.3	10.1	Confirm sea bottom	
10:32	1235	1.2	12	Confirm the lander	
10:35	1235	1.5	101.7	Inverted periscope did not work correctly.	
10:36	1236	0	101.3	Land at bottom (mud).	
10:38	1236	0	100	Push core sampling (Green)	MBARI Green
10:39	1236	0	100.2	Set incubation devise (blue)	
10:42				Remove the cap (green)	
10:43				Shrimp	
10:43				Remove the cap (blue)	
10:45				Completion of the setup. Turbines do not work.	
10:47	1236	0	343.6	Shifted in front of the incubation devise.	
10:49	1236	0	343.7	Observation complete. Start recovery of the devise.	

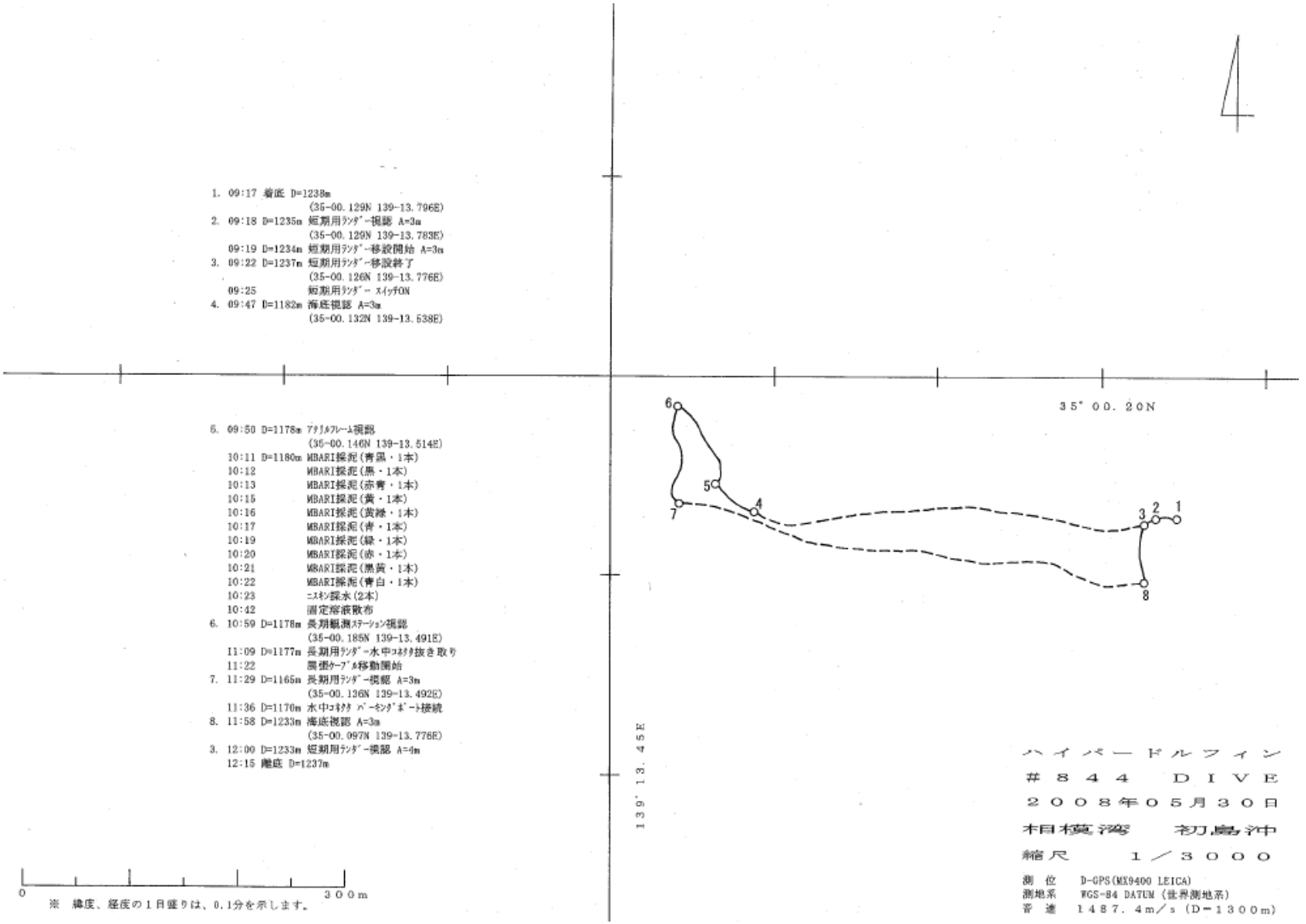
10:50				Completion of the recovery.	
10:52	1236	0	3.4	Shift toward the lander.	
10:55				Squid.	
10:57	1237	0	195.4	Landed closed to the short time deployment lander.	
				Observed the lander, inverted periscope of the planar optode sensor was not worked.	
10:59	1237	0	194	Recovery of the short time lander.	
11:00				Recovery finished.	
11:03	1237	0	193.3	Left the bottom.	

Dive Log of SAGAMI-WAN 2008/06/01

HPD Dive #847 HATSUSHIMA-OKI

Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Description	Remarks
13:38	0	-	-	HPD Dive#847 start	
14:29	1185	0	269.1	Landed. Seafloor is mud.	
14:30	1185	1.5	295.6	Shift toward S-OBEM	
14:32	1179	2	292.5	Confirm S-OBEM	
14:33	1179	0	215.3	Landed on mud bottom	
14:34	1179	0	215	Recovery of homer ID43	
14:34	1178	2	216	Shift toward long term observation lander	
14:35				Confirm the lander	
14:37			251.1	Confirm *Calyptogena* colony	
14:37	1178	0	254.5	Landed in the colony	
14:38	1178	0	254.4	Water sampling (Niskin)	Niskin Red
14:41	1178	0	255.1	Sediment sampling (Black)	MBARI Black
14:43	1178	0	254.3	Sediment sampling (Blue-black)	MBARI B&Bla
14:45	1178	0	254.6	Sediment sampling (Blue-white)	MBARI B&W
14:46	1178	0	254.1	Shift toward PMMA frame	
14:43	1173	3		Confirm JAMSTEC float	
14:48	1166	11.3	109.1	Change directions	
14:51	1191	2.2	199.3	Confirm sea bottom	
14:52				Black fish	
14:54				Confrm PMMA frame	
14:55	1181	0	239.9	Landed at mud bottom	
14:56	1181	0	239.3	Recovery of ROV homer ID58	
15:00	1180	0	239.6	Recovery of PMMA frame	
15:02				Recovery of chemical cylinder for the fixation	
15:02	1180	0	238.3	Shift toward the lander	
15:05	1171	2.7	243.1	Confirm the lander	

15:06	1174	0	245.8	Landed	
15:08	1173	0	244	Sediment sampling (Red)	MBARI R
15:10	1173	0	243.8	Sediment sampling (Green)	MBARI G
15:12	1173	0	243.5	Sediment sampling (Red-blue)	MBARI R&B
15:19	1173	0	243.4	Recovery of the lander	
15:20	1170	0	255.2	Forward	
15:21	1170	0	30.4	Confirm white spots on the lander frame.	
15:26	1170	0	35.2	Recovery of the lander	
15:27				Completion of the recovery	
15:28	1170	0	35.2	Leave. Recovery of the extension cable (100m)	

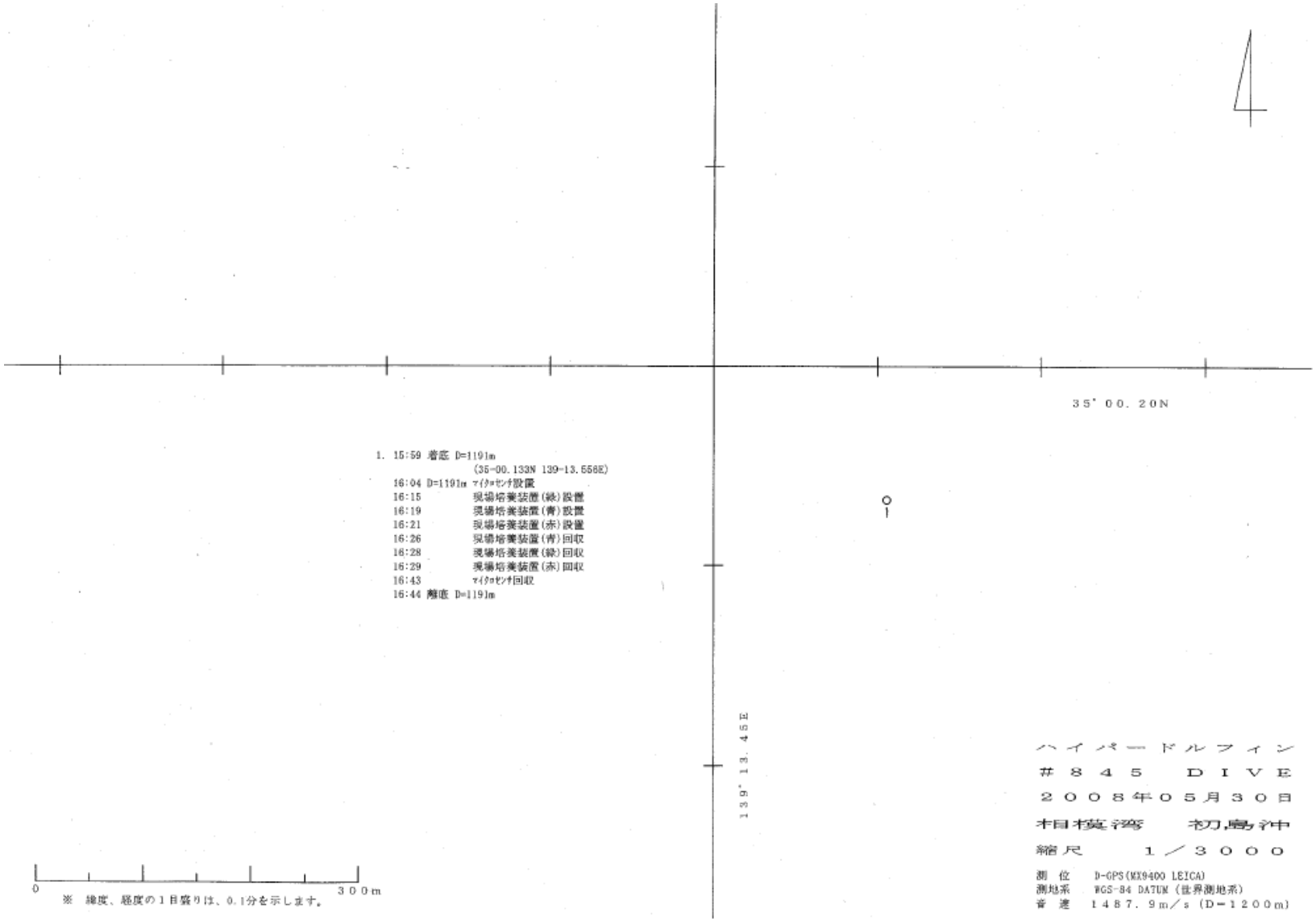


1. 09:17 着底 D=1238m
(35-00.129N 139-13.796E)
2. 09:18 D=1235m 短期用ﾗﾝﾀﾞｰ視認 A=3m
(35-00.129N 139-13.783E)
09:19 D=1234m 短期用ﾗﾝﾀﾞｰ移設開始 A=3m
3. 09:22 D=1237m 短期用ﾗﾝﾀﾞｰ移設終了
(35-00.126N 139-13.776E)
09:25 短期用ﾗﾝﾀﾞｰ ｽｲｯﾁON
4. 09:47 D=1182m 海底視認 A=3m
(35-00.132N 139-13.538E)

5. 09:50 D=1178m ｱｸﾘﾙﾌﾚｰﾑ視認
(35-00.146N 139-13.514E)
10:11 D=1180m MBARI採泥(青黒・1本)
10:12 MBARI採泥(黒・1本)
10:13 MBARI採泥(赤青・1本)
10:15 MBARI採泥(黄・1本)
10:16 MBARI採泥(黄緑・1本)
10:17 MBARI採泥(青・1本)
10:19 MBARI採泥(緑・1本)
10:20 MBARI採泥(赤・1本)
10:21 MBARI採泥(黒黄・1本)
10:22 MBARI採泥(青白・1本)
10:23 ﾆｽｷﾝ採水(2本)
10:42 固定溶液散布
6. 10:59 D=1178m 長期観測ｽﾃｰｼｮﾝ視認
(35-00.185N 139-13.491E)
11:09 D=1177m 長期用ﾗﾝﾀﾞｰ水中ｺﾈｸﾀ抜き取り
11:22 展張ｹｰﾌﾞﾙ移動開始
7. 11:29 D=1165m 長期用ﾗﾝﾀﾞｰ視認 A=3m
(35-00.136N 139-13.492E)
11:36 D=1170m 水中ｺﾈｸﾀ ﾊﾞｰｷﾝｸﾞﾎﾞｰﾄ接続
8. 11:58 D=1233m 海底視認 A=3m
(35-00.097N 139-13.776E)
3. 12:00 D=1233m 短期用ﾗﾝﾀﾞｰ揚収 A=4m
12:15 離底 D=1237m

0 300m
※ 緯度、経度の1目盛りは、0.1分を示します。

ハイパードルフィン
#844 DIVE
2008年05月30日
相模湾 初島沖
縮尺 1／3000
測 位 D-GPS(MX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 1487.4m／s (D=1300m)



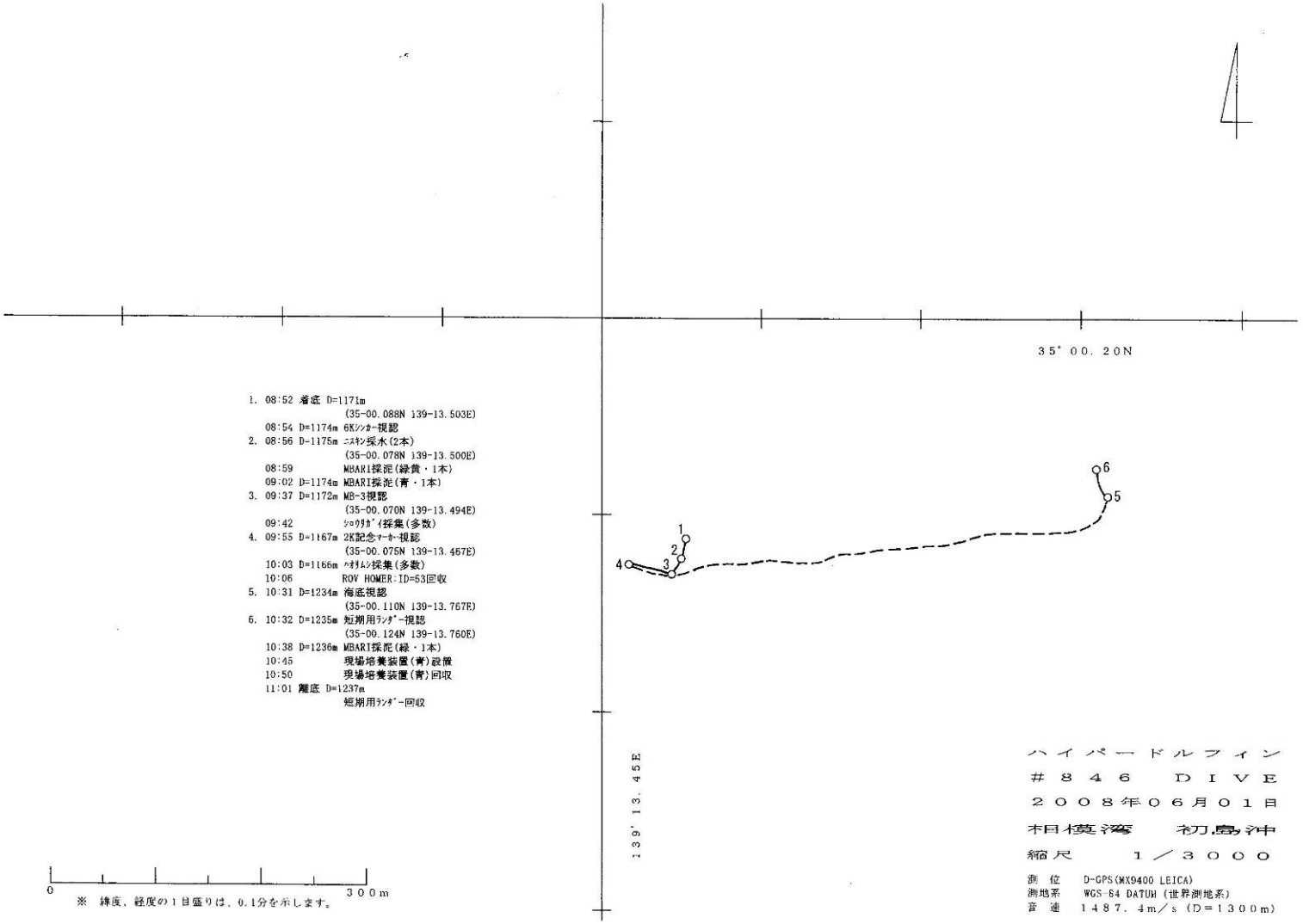
1. 15:59 着底 D=119m
(35-00.133N 139-13.558E)
16:04 D=119m マイクロセンチ設置
16:15 現場培養装置(緑)設置
16:19 現場培養装置(青)設置
16:21 現場培養装置(赤)設置
16:26 現場培養装置(青)回収
16:28 現場培養装置(緑)回収
16:29 現場培養装置(赤)回収
16:43 マイクロセンチ回収
16:44 離底 D=119m

0 300m

※ 緯度、経度の１目盛りは、0.1分を示します。

ハイパードルフィン
＃８４５ ＤＩＶＥ
２００８年０５月３０日
相模湾 初島沖
縮尺 １／３０００

測 位 D-GPS(MX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 １４８７．９m／s (D=１２００m)



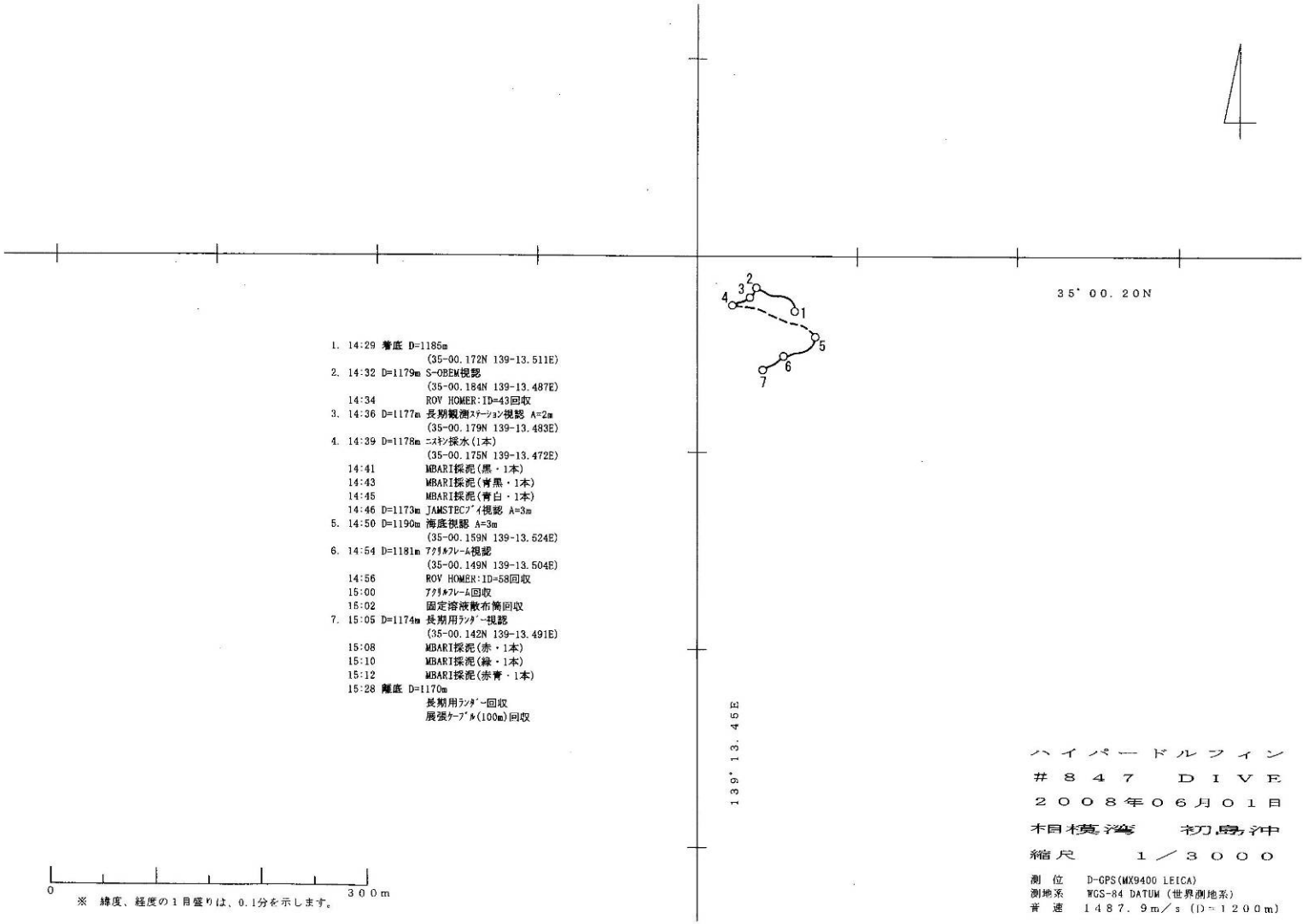
1. 08:52 着底 D=1171m
   (35-00.088N 139-13.503E)
   08:54 D=1174m 6Kｼﾝｶｰ視認
2. 08:56 D-1175m ﾆｽｷﾝ採水(2本)
   (35-00.078N 139-13.500E)
   08:59 MBARI採泥(緑黄・1本)
   09:02 D=1174m MBARI採泥(青・1本)
3. 09:37 D=1172m MB-3視認
   (35-00.070N 139-13.494E)
   09:42 ｼｮｳｼｶﾞｲ採集(多数)
4. 09:55 D=1167m 2K記念ﾏｰｶｰ視認
   (35-00.075N 139-13.467E)
   10:03 D=1166m ﾍｵﾘﾑｼ採集(多数)
   10:06 ROV HOMER:ID=53回収
5. 10:31 D=1234m 海底視認
   (35-00.110N 139-13.767E)
6. 10:32 D=1235m 短期用ﾗﾝﾀﾞｰ視認
   (35-00.124N 139-13.760E)
   10:38 D=1236m MBARI採泥(緑・1本)
   10:45 現場培養装置(青)設置
   10:50 現場培養装置(青)回収
   11:01 離底 D=1237m
   短期用ﾗﾝﾀﾞｰ回収

0 300m

※ 緯度、経度の1目盛りは、0.1分を示します。

ハイパードルフィン
＃８４６ ＤＩＶＥ
２００８年０６月０１日
相模湾 初島沖
縮尺 １／３０００

測 位 D-GPS(MX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 １４８７．４m／s (D＝１３００m)



1. 14:29 着底 D=1185m
   (35-00.172N 139-13.511E)
2. 14:32 D=1179m S-OBEM視認
   (35-00.184N 139-13.487E)
   14:34 ROV HOMER:ID=43回収
3. 14:36 D=1177m 長期観測ステーション視認 A=2m
   (35-00.179N 139-13.483E)
4. 14:39 D=1178m ニスキン採水(1本)
   (35-00.175N 139-13.472E)
   14:41 MBARI採泥(黒・1本)
   14:43 MBARI採泥(青黒・1本)
   14:45 MBARI採泥(青白・1本)
   14:46 D=1173m JAMSTECブイ視認 A=3m
5. 14:50 D=1190m 海底視認 A=3m
   (35-00.159N 139-13.524E)
6. 14:54 D=1181m アクリルフレーム視認
   (35-00.149N 139-13.504E)
   14:56 ROV HOMER:ID=58回収
   15:00 アクリルフレーム回収
   15:02 固定溶液散布筒回収
7. 15:05 D=1174m 長期用ランダー視認
   (35-00.142N 139-13.491E)
   15:08 MBARI採泥(赤・1本)
   15:10 MBARI採泥(緑・1本)
   15:12 MBARI採泥(赤青・1本)
   15:28 離底 D=1170m
   長期用ランダー回収
   展張ケーブル(100m)回収

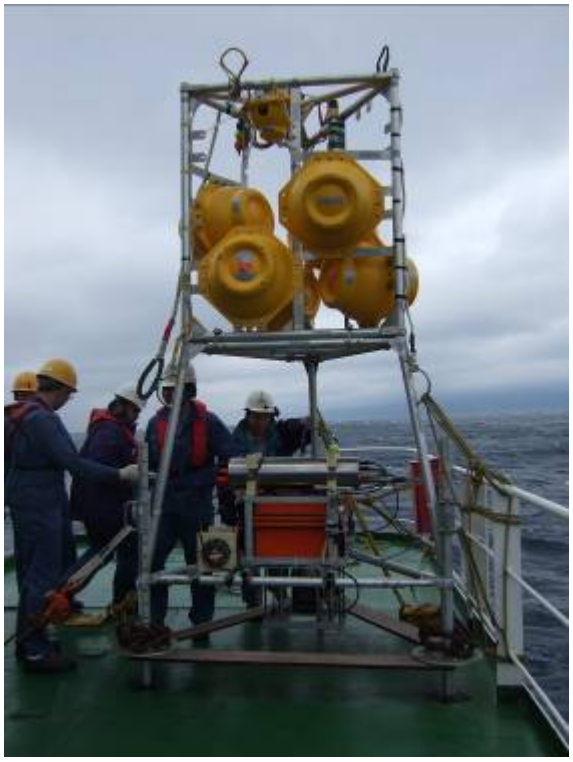
0 300m

※ 緯度、経度の1目盛りは、0.1分を示します。

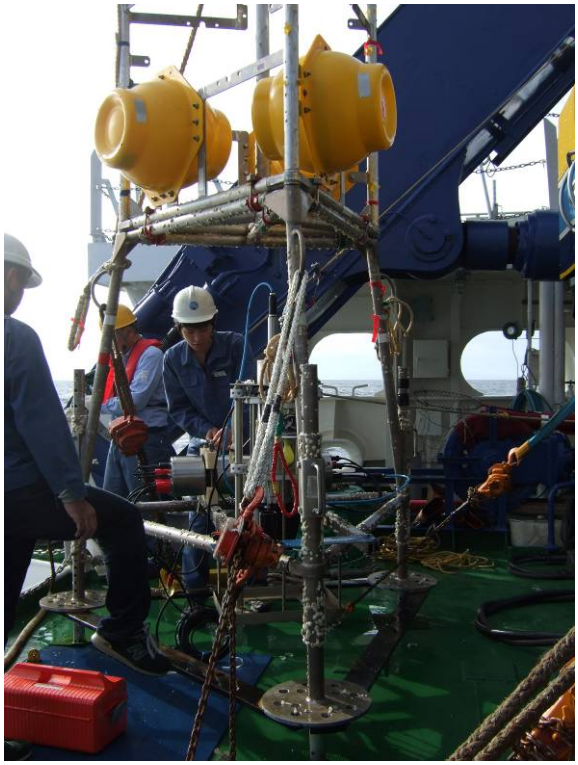
ハイパードルフィン
#847 DIVE
2008年06月01日
相模湾 初島沖
縮尺 1／3000

測 位 D-GPS(MX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 1487.9m／s (D=1200m)

3.3.4. Equipment pictures

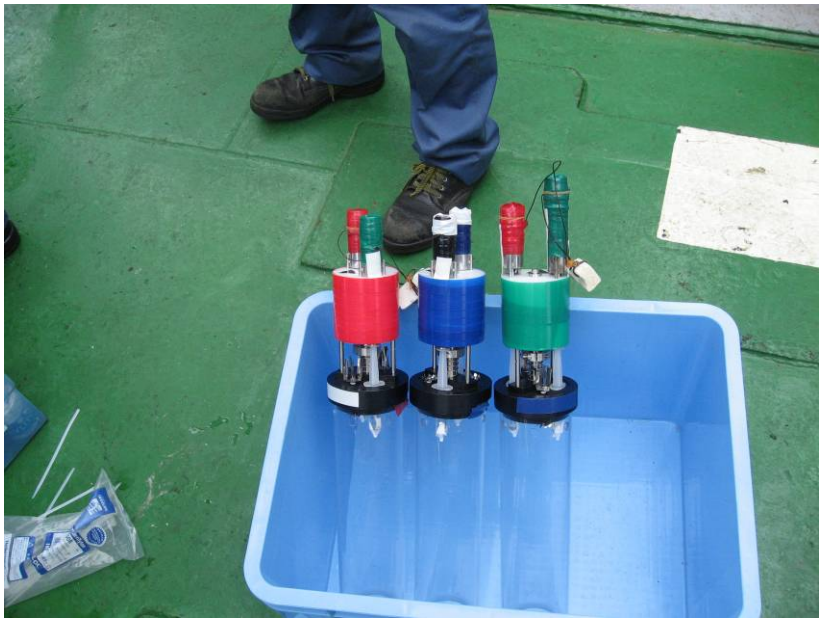


Lander- planar O_2 optode for short time monitoring



Lander- planar O_2 optode recovered from off Hatsushima.

In situ microelectrode system (under construction).



Incubation devises.

3.3.5. Deployment & recovery info

Equipment	Objective	Power supply	Deployment	Recovery
Lander	O_2 measurement	Battery	#844	#845
Lander	O_2 measurement	Cable extension	NT08-02 cruise	#847

3.3.6. Sample list

3.3.6.1. Sediment cores

No.	N	E	Depth (m)	Dive #	Date
1	35.0024	139.2252	1180	844	2008/5/30
2	35.0024	139.2252	1180	844	2008/5/30
3	35.0024	139.2252	1180	844	2008/5/30
4	35.0024	139.2252	1180	844	2008/5/30
5	35.0024	139.2252	1180	844	2008/5/30
6	35.0024	139.2252	1180	844	2008/5/30
7	35.0024	139.2252	1180	844	2008/5/30
8	35.0024	139.2252	1180	844	2008/5/30
9	35.0024	139.2252	1180	844	2008/5/30
10	35.0024	139.2252	1180	844	2008/5/30
11	35.0013	139.225	1175	845	2008/5/30
12	35.0013	139.225	1174	846	2008/6/1
13	35.0021	139.2293	1236	846	2008/6/1
14	35.0021	139.2293	1236	846	2008/6/1
15	35.0029	139.2245	1178	847	2008/6/1
16	35.0029	139.2245	1178	847	2008/6/1
17	35.0029	139.2245	1178	847	2008/6/1
18	35.0024	139.2249	1174	847	2008/6/1
19	35.0024	139.2249	1174	847	2008/6/1
20	35.0024	139.2249	1174	847	2008/6/1

3.3.6.2. Biological samples

No.	N	E	Depth (m)	Date	Dive	Remarks
1	35.0117	139.2249	1172	2008/6/1	846	*Calyptogena* sp. (34)
2	35.0117	139.2249	1172	2008/6/1	846	Polychaeta (>10)
3	35.0117	139.2249	1172	2008/6/1	846	Sipunculidea (1)
4	35.0117	139.2249	1172	2008/6/1	846	*Margarites shinkai* (5)
5	35.0117	139.2249	1172	2008/6/1	846	Clam (unidentified, 3)
6	35.0117	139.2249	1172	2008/6/1	846	Clam (unidentified, 1)
7	35.0125	139.2245	1166	2008/6/1	846	Tubeworms

3.3.6.3. Water samples

Using with two Niskin bottles (2 litter), bottom water samples were collected at dives #844 and #847, respectively. They were mainly used for sample treatments on board.

4. Notice on using

This cruise report is a preliminary documentation as of the end of the cruise. It may not be corrected even if changes on content (i.e. taxonomic classifications) are found after publication. It may also be changed without notice. Data on the cruise report may be raw or not processed. Please ask the PI(s) for the latest information before using. Users of data or results of this cruise are requested to submit their results to Data Integration and Analysis Group (DIAG), JAMSTEC.