

NATSUSHIMA Cruise Report

NT10-06 Leg.1

**Investigation of animal communities associated with
hydrothermal environments in the Iheya north field,
Okinawa Trough**

Northern part of Iheya Ridge, Okinawa Trough

Apr. 02, 2010 – Apr. 04, 2010

**Japan Agency for Marine-Earth Science and Technology
(JAMSTEC)**

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I. Cruise Information

Cruise ID: NT10-06 Leg.1

Name of Vessel: R/V Natsushima

Title of the Cruise: Investigation for animal communities associated with hydrothermal environments in the Iheya north field, Okinawa Trough

Chief Scientist: Takuro NUNOURA (JAMSTEC)

Cruise Period: 2010.4.2 – 2010.4.4

Port of Call: Kagoshima Port. Directly connected to NT10-06 Leg.2

Research Area: Northern part of the Iheya Ridge, Okinawa Trough

Shipboard Log:

Date Time Log

2010/04/02 (Leg1)

Weather: overcast/ Wind direction: NW/ Wind force: 4/ Wave: 3 m/ Swell: 3 m/

Visibility: 6 nautical miles (12:00 JST)

08:00 Onboard

09:00 Departure from KAGOSHIMA

09:30-10:00 Scientific Meeting

10:30-11:20 Briefing about onboard life and safety

16:40-17:00 KONPIRASAN ceremony

2010/04/03

Weather: fine but cloudy/ Wind direction: NNE/ Wind force: 5/ Wave: 4 m/ Swell:

3 m/ Visibility: 8 nautical miles (12:00 JST)

06:00 Arrive at work area

07:20 Start of Free fall of ROV's Cable

13:32 Finish of Free Fall of ROV's Cable

14:00 Transit to survey area "IHEYA North"

2010/04/04

Weather: overcast / Wind direction: ENE/ Wind force: 5/ Wave: 4 m/ Swell: 4 m/

Visibility: 6 nautical miles (12:00 JST)

07:30 Arrived at survey area "North IHEYA"

10:25 XBT

11:28 Launch HPD (HPD#1104dive)

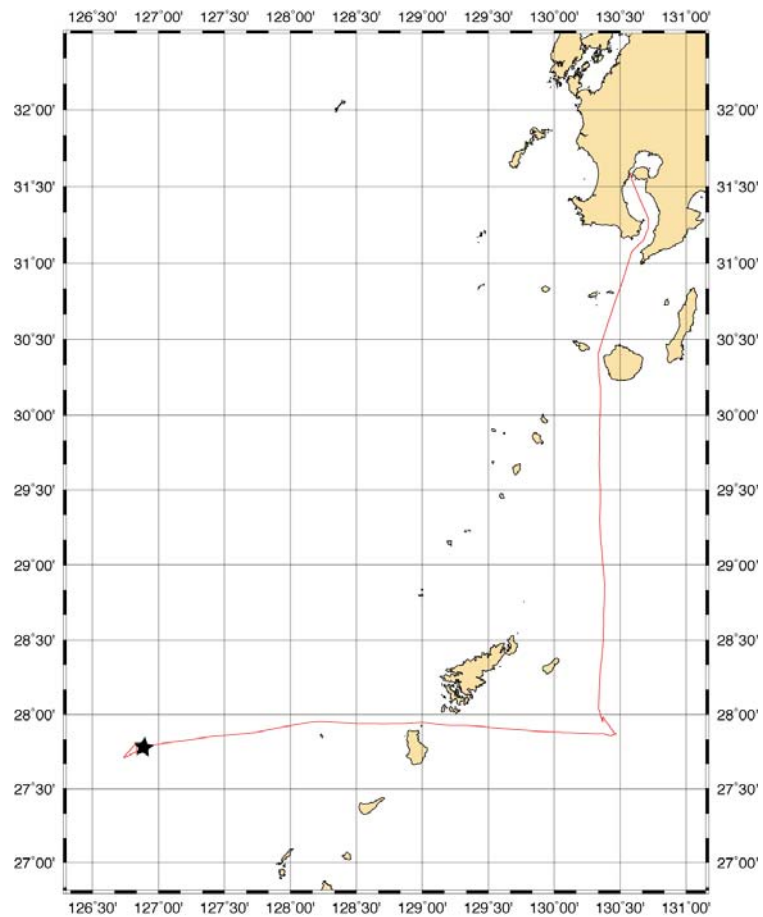
12:23 HPD lands (1,047m)

Stop the operation because of the communication error with HPD

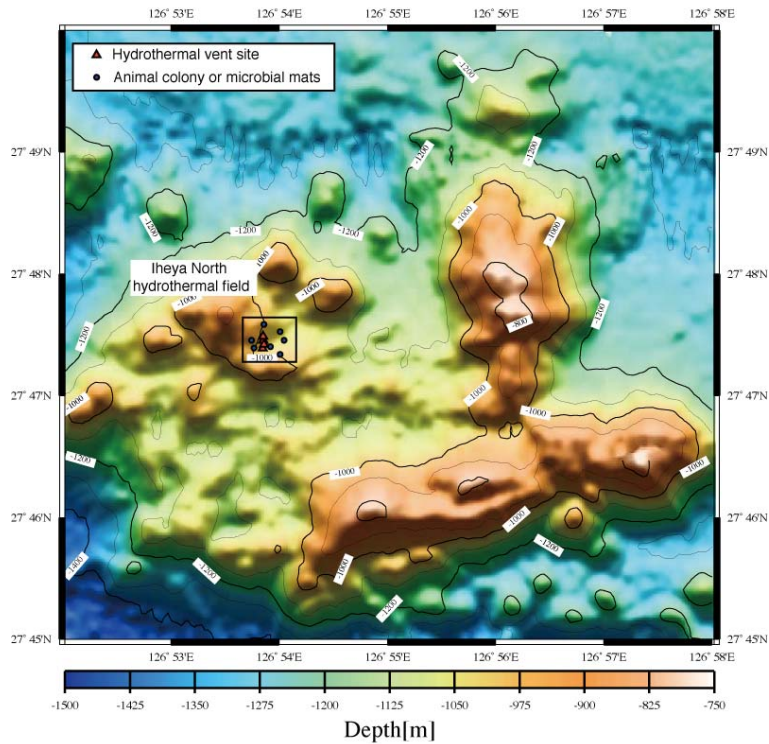
13:47 HPD leaves the bottom (1,030m)

14:51 HPD on deck

16:00 Finish Leg1.



A Track of the cruise. Location of the IHEYA North hydrothermal field is shown by a star.



Bathymetry map of the Iheya North.

Acknowledgements

We are grateful to Captain Mr. Susami and all members of the “R/V Natsushima” for their safe navigations during the cruise. We also appreciate commander Mr. Ohno and “Hyper Dolphin” operation team for their operation. Finally, we would like to appreciate all the person who supported directly or indirectly this cruise.

II. Science Party:

On board scientists

Takuro NUNOURA (JAMSTEC, Chief Scientist)

Hiromi WATANABE (JAMSTEC)

MiHye SEO (AORI, University of Tokyo)

Marine Technician

Shinichi HOSOYA (NME)

III. Observation

1. Background

In the Iheya North hydrothermal field, science drilling for subvent biosphere will be conducted by Drilling vessel “Chikyu” in IODP (Integrated Ocean Drilling Program) in September 2010. We expect that drilling will give some impacts on animal communities associated with hydrothermal vent activities directly or indirectly. In order to evaluate the effects of drilling, we conducted a research cruise for mapping of animal colonies, biomass evaluation and animal diversity in the Iheya North hydrothermal field prior to the drilling.

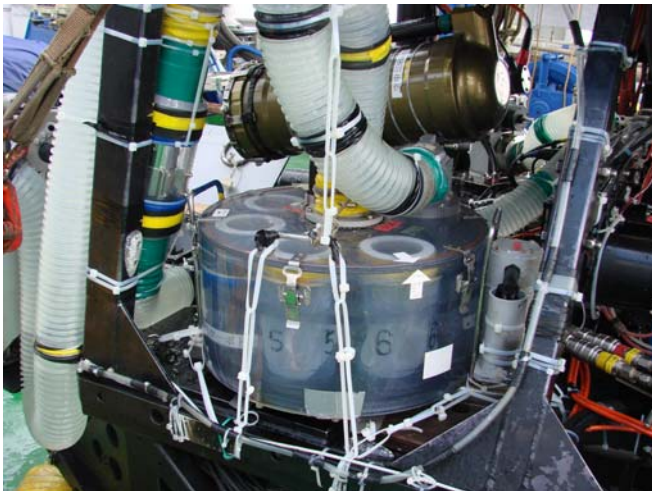
2. List of Observation Instruments

I. Push corer (MBARI type)

II. Scoop sampler

III. Slurp gun (Suction sampler)

“Slurp gun” system is consisted of two parts, gun (or pump) and canister. The gun is worked by hydraulic pressure of *Hyper-Dolphin*, and the multi-bottle canister needs DC 24V. Samples can be collected into the canister through ϕ 10cm plastic tube.



2-1. Methods

We had 3 strategies for achieve our objectives in this cruise.

1. Camera survey for making a map that presents animal colonies and hydrothermal vents and diffusing flow sites.
2. Direct sampling targeting representative animal colonies by suction sampler in order to evaluate animal diversity and biomass.
3. Taking sediments by push corers and clams by a scoop sampler to examine diversity and biomass of benthic macro- and micro-faunas, respectively.

2-2. Research results

Due to a mechanical trouble in *Hyper-Dolphin* system, we only obtained samples for benthic macro- and micro-faunas, and could not take samples for vent-associated animals represented by *Bathymodiolus* mussels and gratheid crabs during the cruise.

2-3. Future plans

We will have one more cruise in August for investigations of vent associated-animals in order to make a map for animal colony distribution and to evaluate animal biomass and diversity. Combined with results from the NT10-06 and the August cruises, we will achieve the objectives of the cruise before the IODP drilling. Furthermore, in September, we will join another cruise in the Iheya North hydrothermal field to investigate the effects of drilling just after the drilling.

3. Dive Information

Dive report: Hyper Dolphin Dive #1104

Date: 4 April, 2010

Site: Iheya North hydrothermal field

Landing: 27-47.415N, 126-54.092E, 1047m

Leaving: 27-47.416N, 126-54.833E, 1030m

Observer: Hiromi Watanabe & Takuro Nunoura (JAMSTEC)

Objectives:

Objectives of this dive are 1) seafloor observation for mapping animal community at the Iheya North hydrothermal field, 2) taking macro benthic animals by scoop sampler and micro benthic animals by push sediment corer, and 3) vent-associated macro animals by scoop sampler.

Dive summary:

The ROV landed on eastern area of the hydrothermal field and head west to find *Calyptogena* clam site that is the one of the drilling site of the IODP science plan. We soon found IODP marker and active *Calyptogena* colonies. At this site, we took sediment sample adjacent to a white bacterial mat, but could not obtain any sediment under a bacterial mat. Sediments under a bacterial mat may be consolidated by carbonate or silicate due to the hydrothermal fluid flux and/or microbial activity. In addition, *Calyptogena* clams were taken by scoop and suction samplers. Then, we went west to survey SBC (South Big Chimney) area to observe *Bathymodiolus* mussels colonies. However, unfortunately, a trouble happened in the Hyper Dolphin system and the dive finished.

Payloads:

Push corers (MBARI type)

Scoop sampler

Suction sampler

Sample box

M-type scoop sediment sampler

Location of events:

Time	Position	Depth	Events
12:23	27-47.415N, 126-54.092E	1047m	Landing:
12:36	27-47.416N, 126-54.038E	1060m	Found <i>Calyptogena</i> colony site
12:49	27-47.416N, 126-54.038E	1060m	Taking sediments on bacterial mat (no recovery; sediments were consolidated)
12:51	27-47.416N, 126-54.038E	1060m	Taking sediments adjacent to

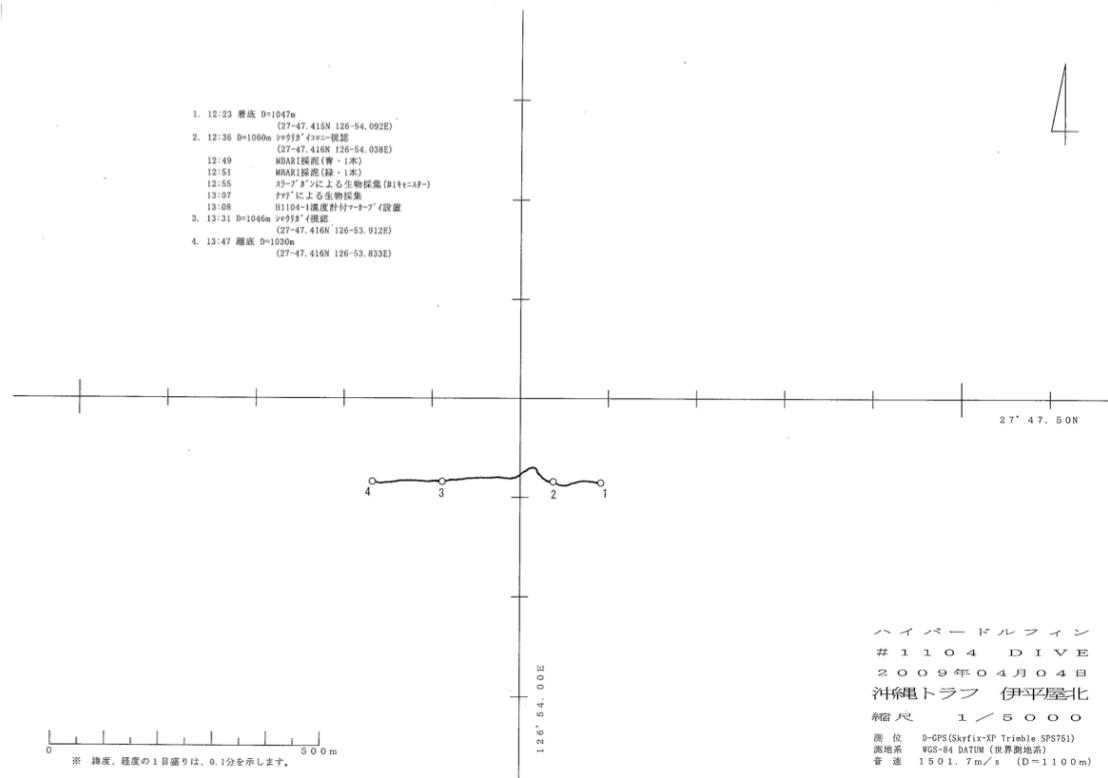
bacterial mat

12:55 27-47.416N, 126-54.038E, 1060m Sampling *Calyptogena* clams by suction and scoop samplers

12:31 27-47.416N, 126-54.912E, 1046m Found a novel? *Calyptogena* clam colony in the vicinity of *Bathmodiolus* colonies.

12:47 27-47.416N, 126-54.912E, 1030m Leaving

Dive Track



4. Sample List

On board No.	Species Name	Japanese Name	Locality Site	Locality Area	Depth		N or S	E o f	W	Date	No. of Inds.	Dive No./ Collecting Methods	Fixation	Remarks		
1104-BC01-1		キヤニスタ残渣	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	200mL	HD#1104	10% Formalin	Imm以上の生物
1104-BC01-2	Ophiuroidea sp.	クモヒトデ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	2	HD#1104	99.5% Ethanol	
1104-BC01-3	Isopoda sp.	等脚類	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BC01-4	Decapod larvae	エビの幼生	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BC01-5	Amphipod sp.A	ヨコエビA	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	5	HD#1104	99.5% Ethanol	
1104-BC01-6	Amphipod sp.B	ヨコエビB	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	10	HD#1104	99.5% Ethanol	
1104-BC01-7	Terebellidae sp.	イトエラゴカイ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BC01-8	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	2	HD#1104	frozen	
1104-BC01-9	Polychaete spp.	多毛類(未同定)	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	3	HD#1104	frozen	
1104-BC01-10	Tanaidea sp.	タナイス	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BC01-12	Isopoda sp.	等脚類	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BB01-1		ボックス残渣	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1L	HD#1104	10% Formalin	Imm以上の生物
1104-BB01-2	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-3	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-4	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-5	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-6	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-7	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-8	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-9	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-10	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-11	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-12	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-13	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-14	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-15	Eucinidae? sp.	イソメ?	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-16	Margarites sp.		Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	2	HD#1104	99.5% Ethanol	
1104-BB01-17	limpet sp.	カサガイ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BB01-18	polychaete sp.Y	ヤドリゴカイ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	2	HD#1104	frozen	
1104-BB01-19	polychaete sp.A	多毛類 sp.A	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	3	HD#1104	frozen	
1104-BB01-20	polychaete sp.T	多毛類 sp.とんがり	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-21	polychaete sp.G	多毛類 sp.ガリガリ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	frozen	
1104-BB01-22	polychaetes spp.	多毛類 spp.	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	7	HD#1104	frozen	
1104-BB01-23	Tanaidea	タナイス	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	1	HD#1104	99.5% Ethanol	
1104-BB01-24	tubeworm???	チューブ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	2	HD#1104	99.5% Ethanol	
1104BB01-25	<i>Calyptogena okunani</i>	シマシロウリガイ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	10	HD#1104	冷凍	3個体破損 外套膜の一部は1104-BB01-27
1104BB01-26	parasitic polychaetes	寄生性多毛類	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	22	HD#1104	冷凍	1104BB01-25のシロウリガイより採集。DNA抽出用は1104-BB01-28頭部・尾部は1104BB01-29。
1104BB01-27	<i>Calyptogena okunani</i>	シマシロウリガイ	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	10	HD#1104	99.5% Ethanol	1104BB01-25のシロウリガイと同一個体。外套膜のみ
1104BB01-28	parasitic polychaetes	寄生性多毛類	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	22	HD#1104	99.5% Ethanol	1104BB01-26の多毛類より体節一部
1104BB01-29	parasitic polychaetes	寄生性多毛類	Iheya North	Okinawa Trough	1060	27	47.416	N	126	54.038	E	2010.4.4	22	HD#1104	2.5%グルタル	1104BB01-25のシロウリガイより頭部・尾部グルタル

IV. Notice on Using

This cruise report is a preliminary documentation as of the end of the cruise. This report may not be corrected even if changes on contents (i.e. taxonomic classifications) may be found after its publication. This report may also be changed without notice. Data on this cruise report may be raw or unprocessed. If you are going to use or refer to the data written on this report, please ask the Chief Scientist for latest information. Users of data or results on this cruise report are requested to submit their results to the Data Integration and Analysis Group (DIAG) of JAMSTEC.