doi : 10.17596/0003268

Natsushima Cruise Report
NT08-25

Deep-sea research 2008 “Hyper-dolphin” Research cruise

Sagami Bay

December 16 to 24, 2008

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

1. Cruise Information

- Cruise ID NT08-25
- Name of vessel Natsushima
- Title of the cruise

  Deep-sea research 2008 "Hyper-dolphin" Research cruise
- Title of proposal

  Tetsuya MIWA［JAMSTEC］

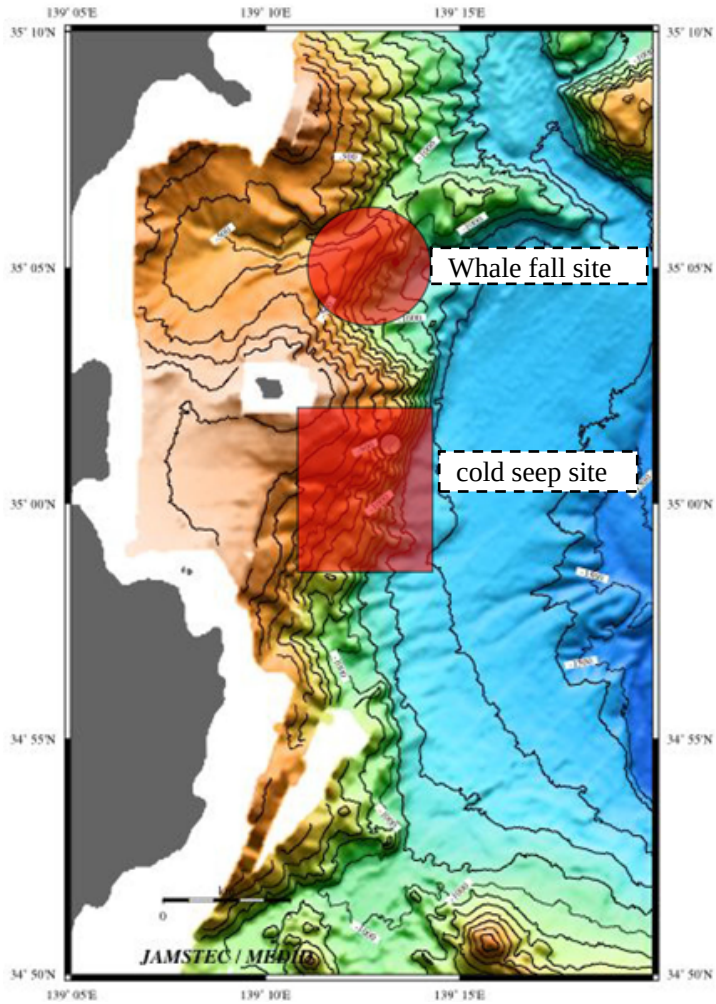
  "Development of pressure control method and pressure response of *Calyptogena* in the Sagami Bay"

  Florence PRADILLON［JAMSTEC］

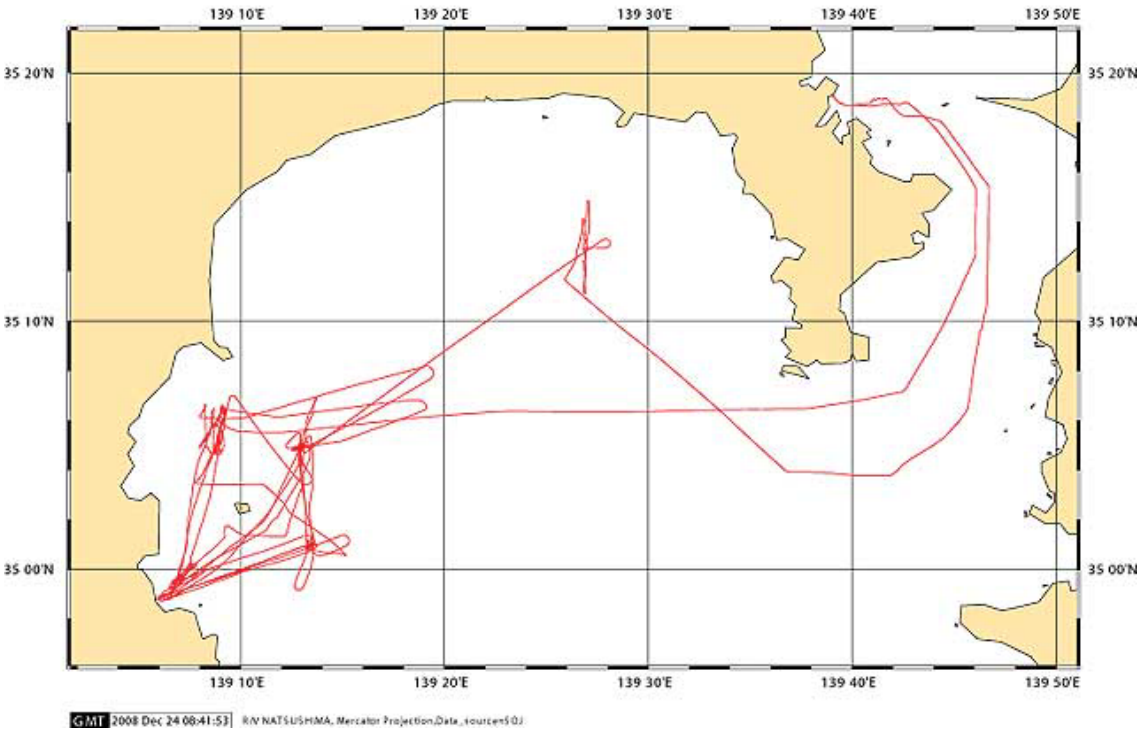
  "Development and dispersal strategy of *Siboglinid polychaetes* from whale fall and cold seep ecosystems in the Sagami Bay"

- Cruise period December 16, 2008 to December 24, 2008
- Ports of departure / call / arrival JAMSTEC Yokosuka / JAMSTEC Yokosuka
- Research area Sagami Bay, off Hatsushima cold seep site / Sagami bay, Whale fall site
- Research Map

Research area

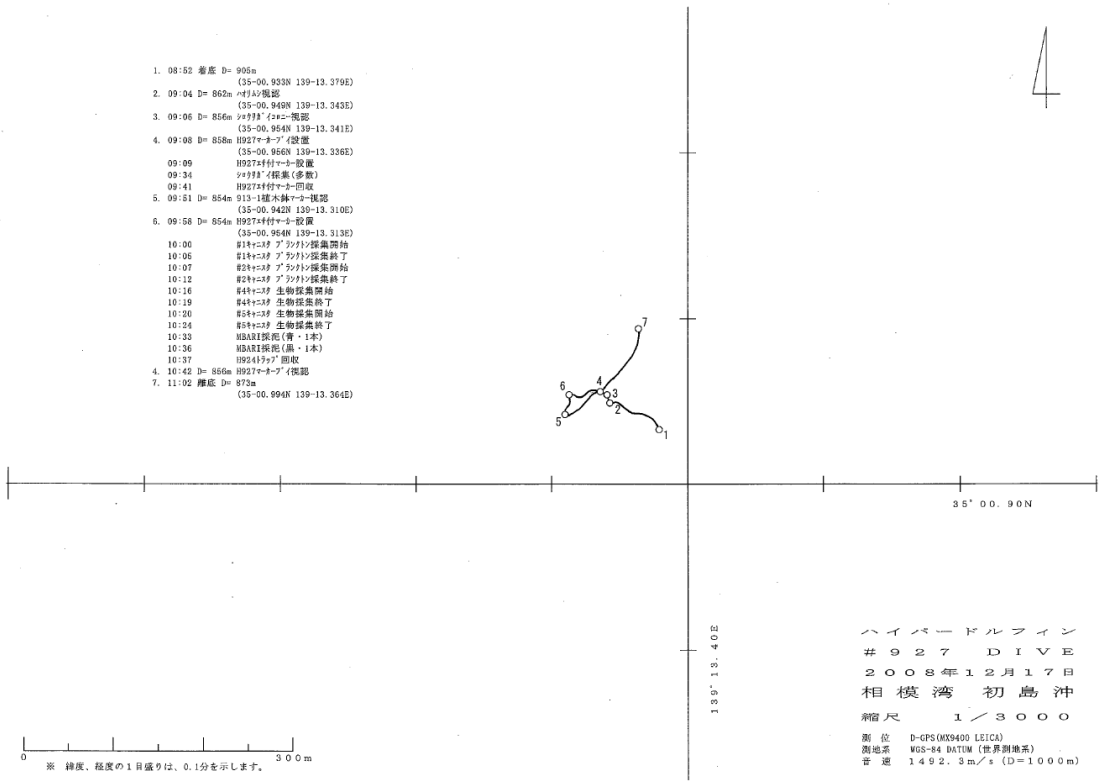


Cruise Track

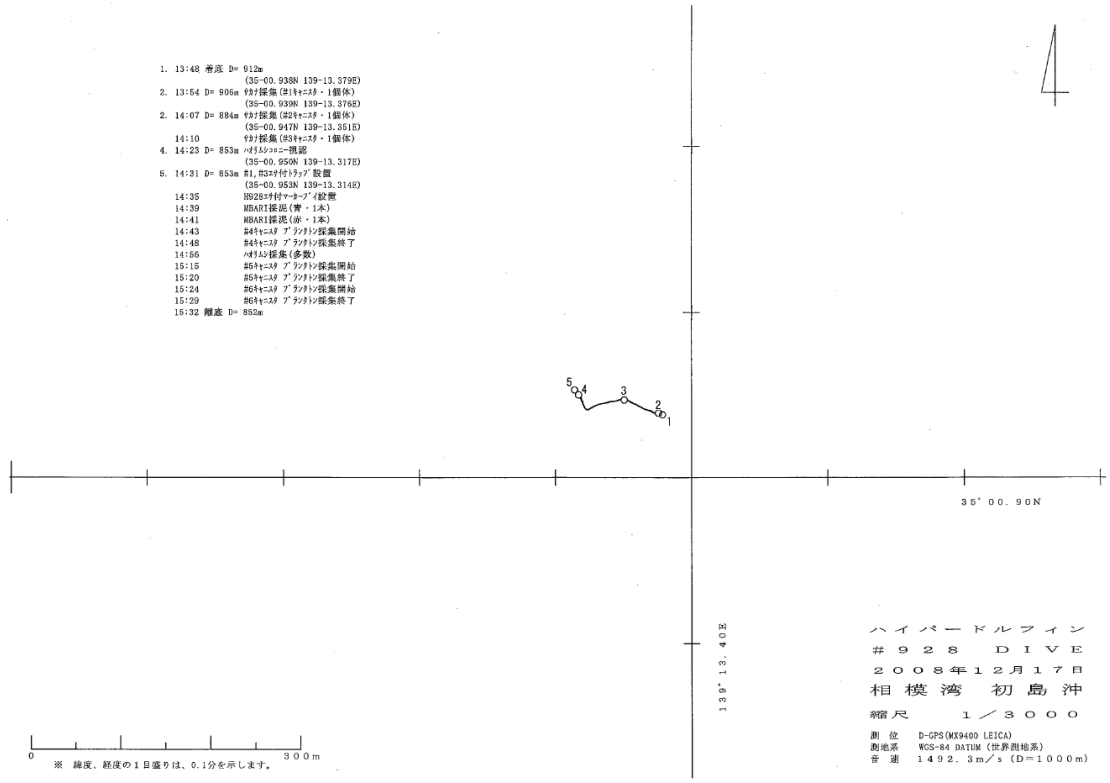


Dive map

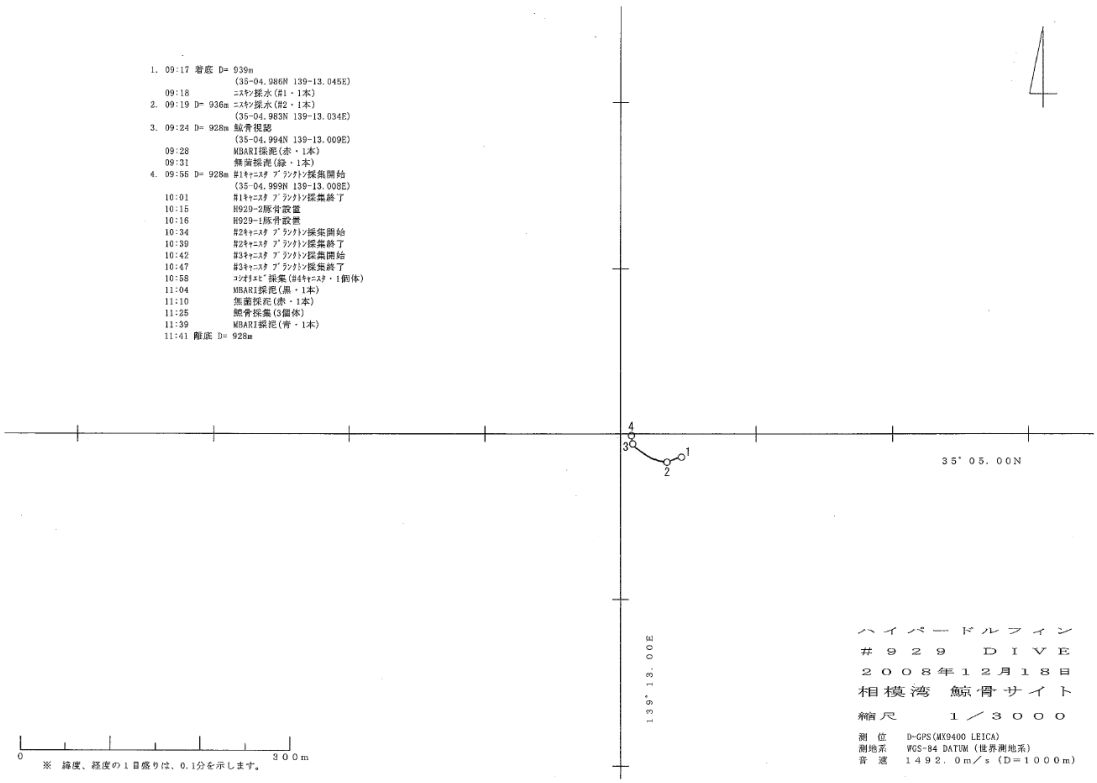
Hyper-dolphin #927



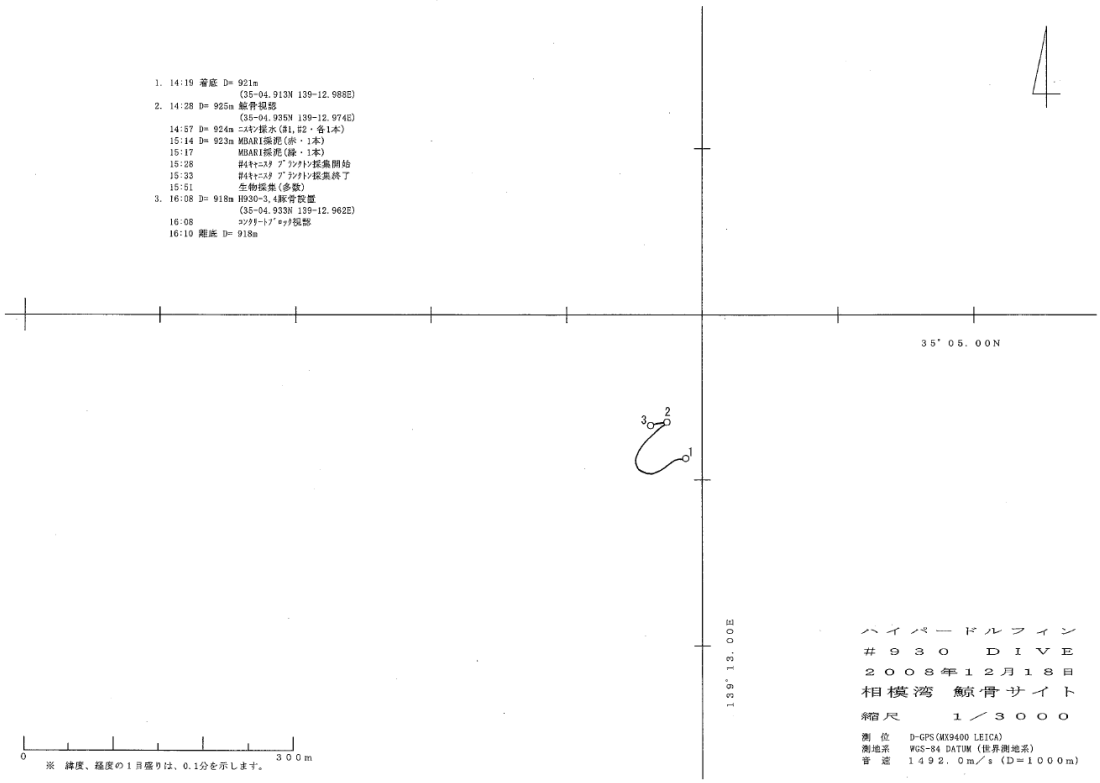
Hyper-dolphin #928



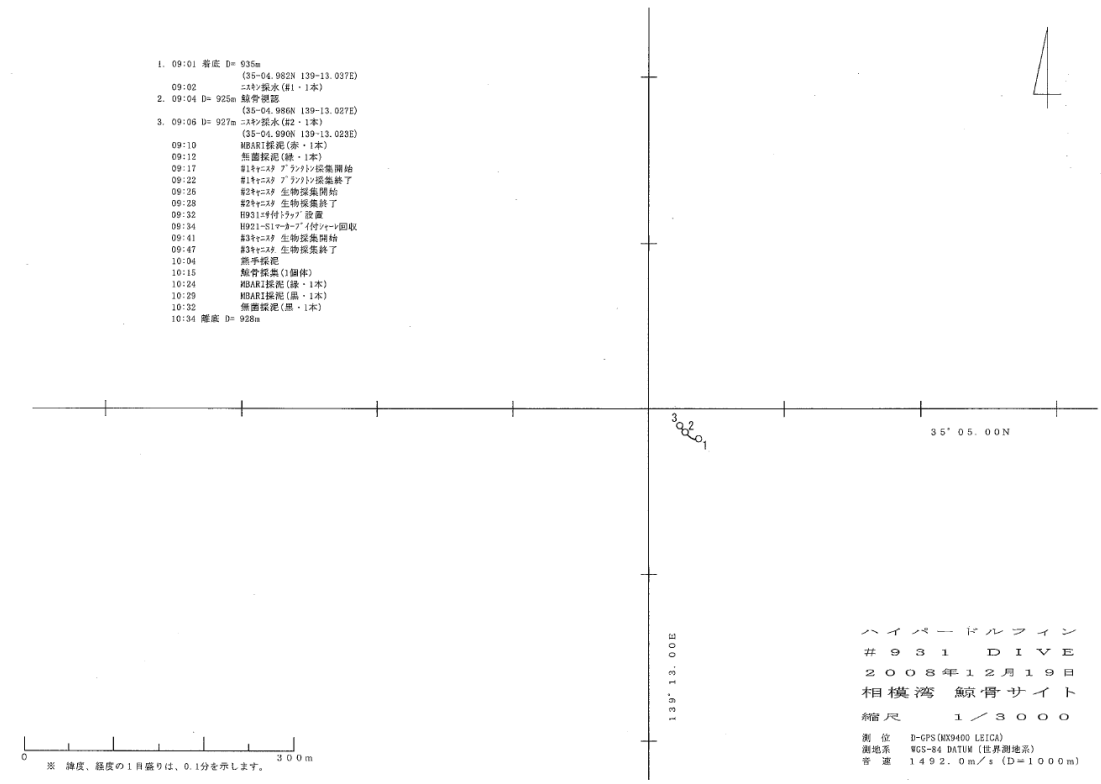
Hyper-dolphin #929



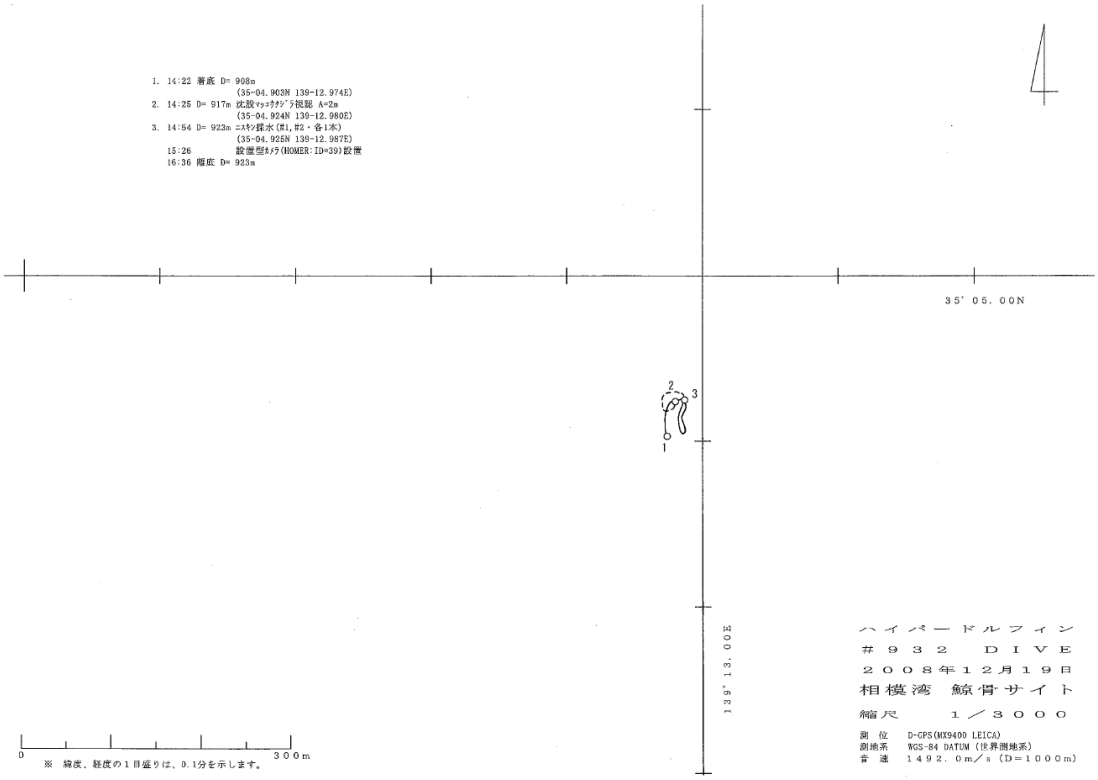
Hyper-dolphin #930



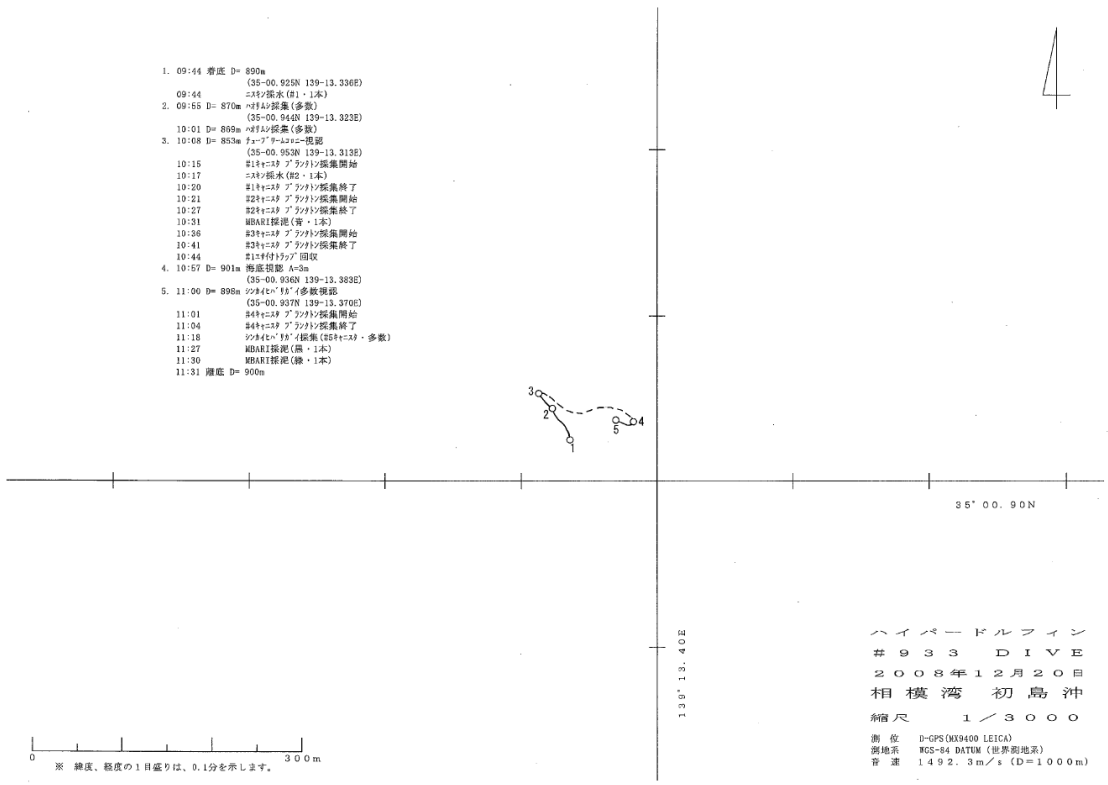
Hyper-dolphin #931



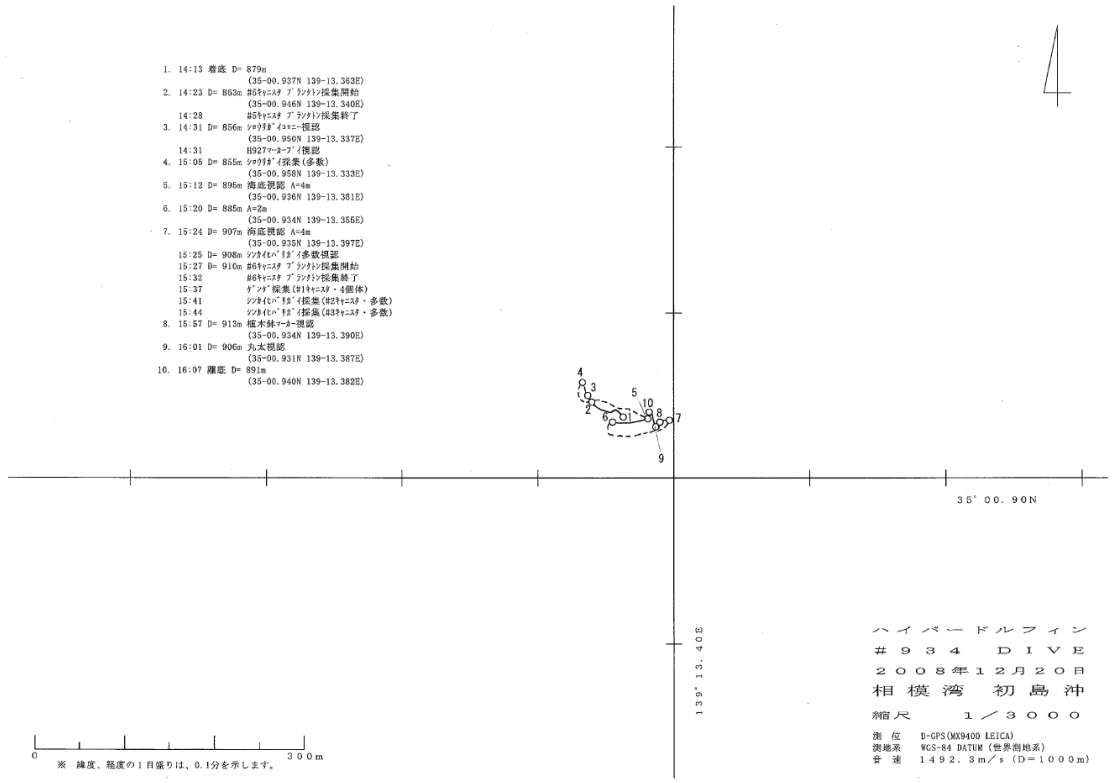
Hyper-dolphin #932



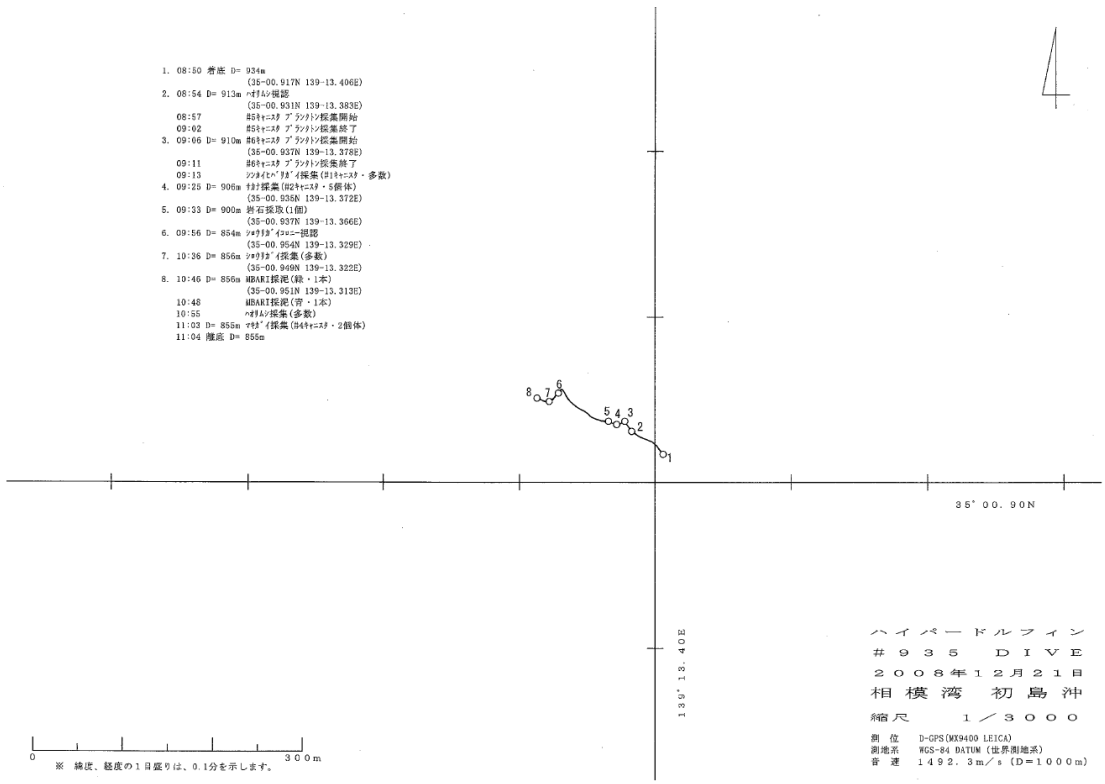
Hyper-dolphin #933



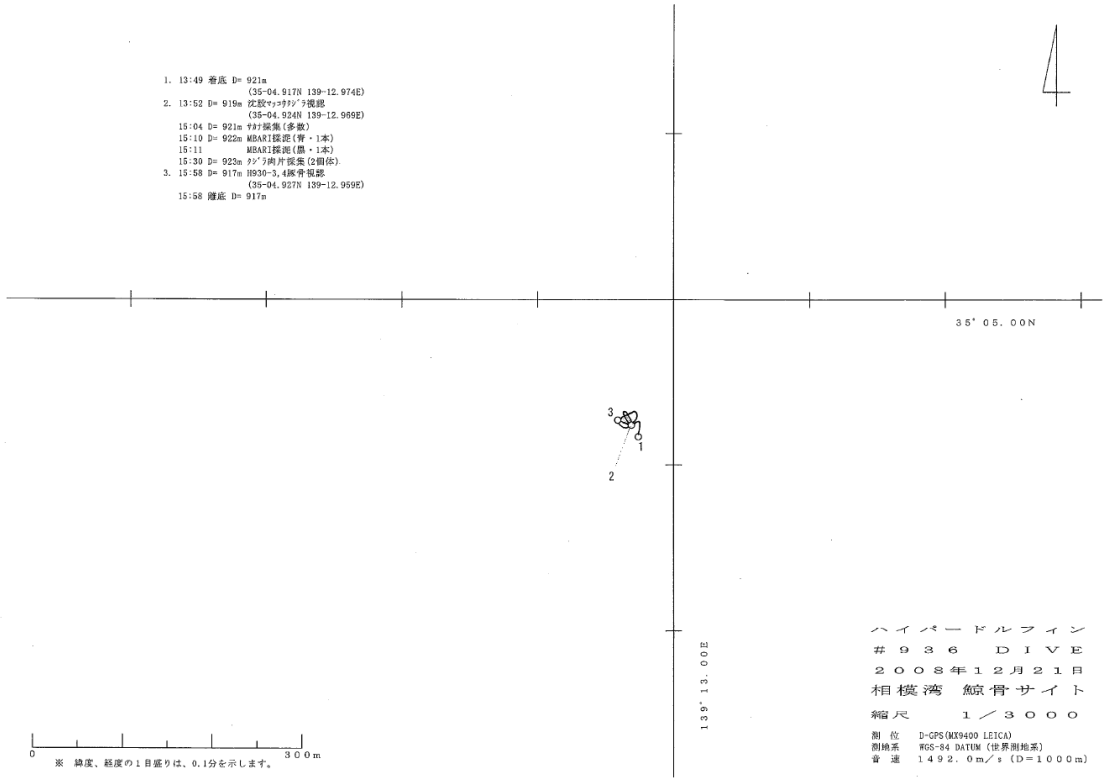
Hyper-dolphin #934



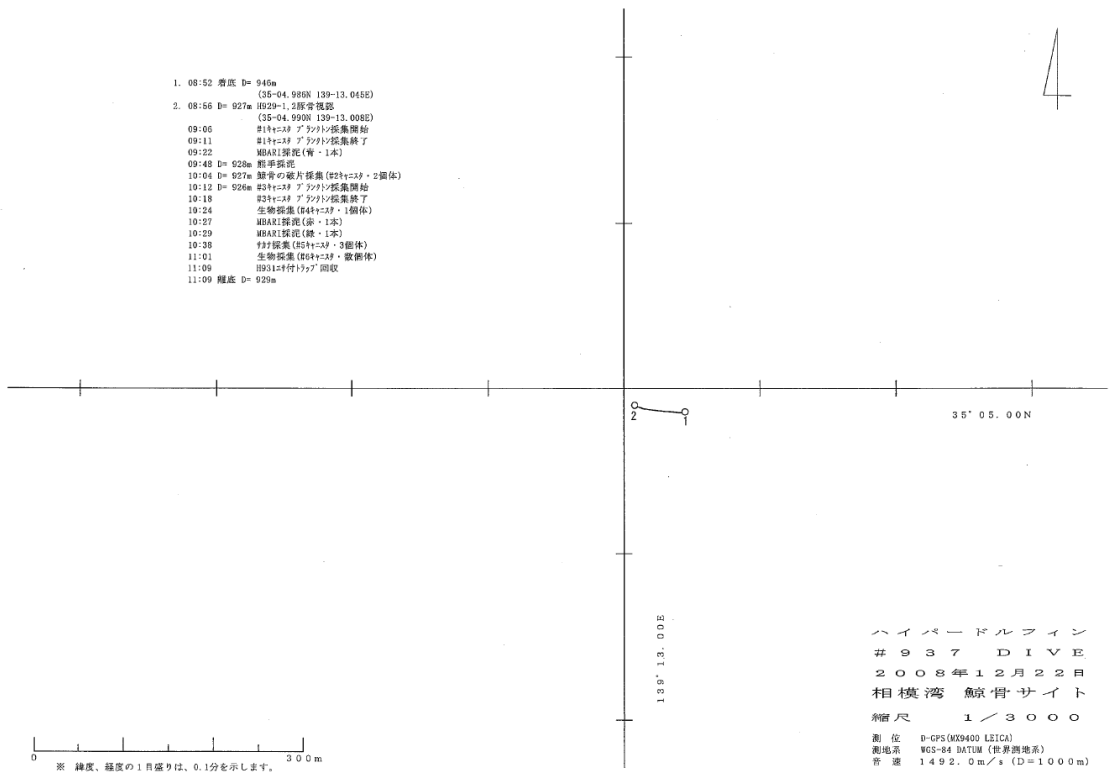
Hyper-dolphin #935



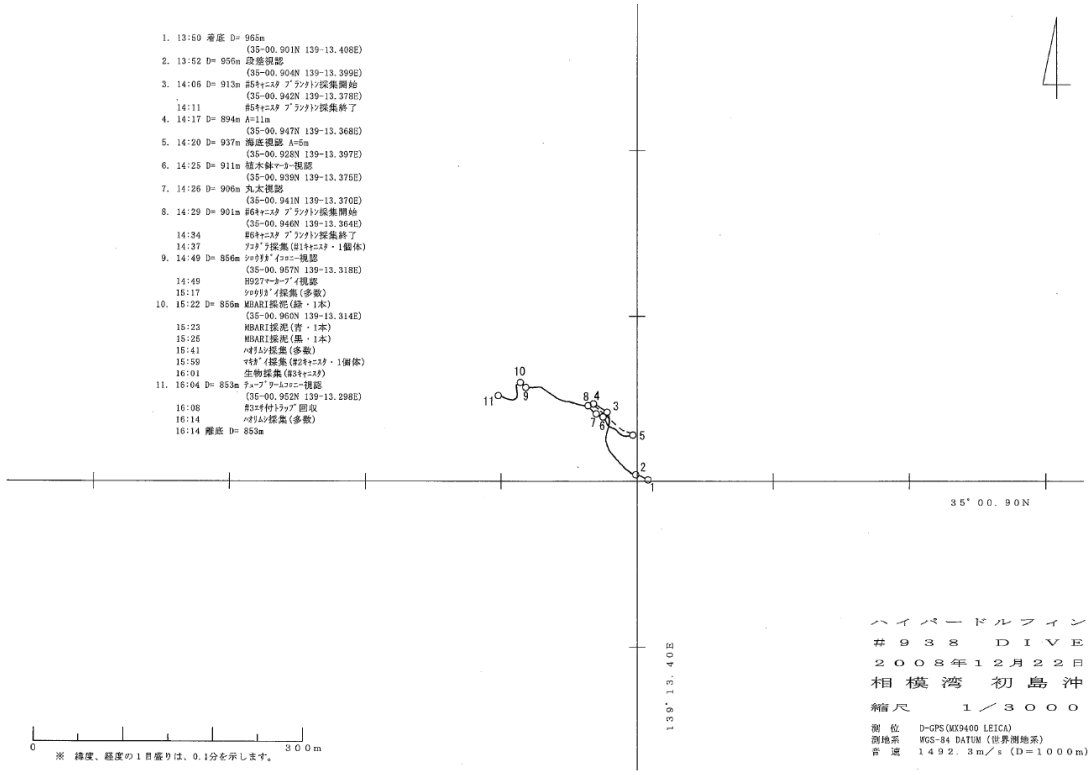
Hyper-dolphin #936



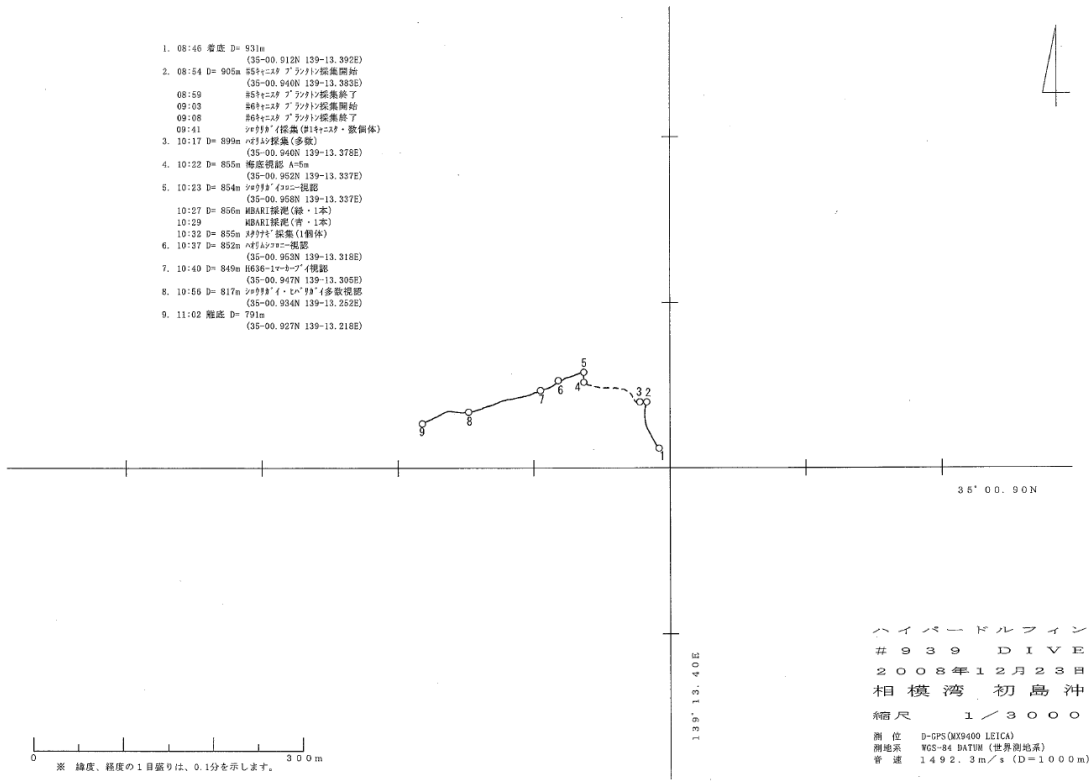
Hyper-dolphin #937



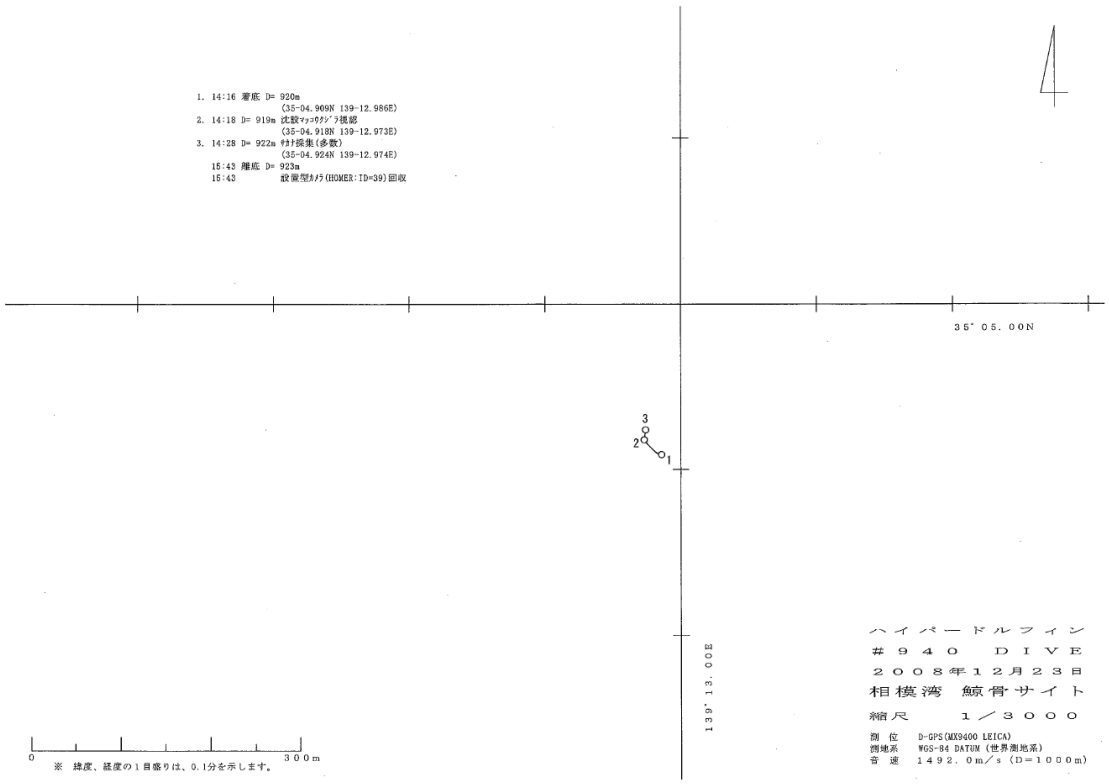
Hyper-dolphin #938



Hyper-dolphin #939



Hyper-dolphin #940



2. Research party

● Chief Scientist and Representative of the science party:

MIWA Tetsuya	JAMSTEC

● Science party

PRADILLON Florence	JAMSTEC
FUJIWARA Yoshihiro	JAMSTEC
KOYAMA Sumihiro	JAMSTEC
YOSHIDA Takao	JAMSTEC
KAWATO Masaru	JAMSTEC
TSURUWAKA Yusuke	JAMSTEC
NAGAHORI Atsushi	JAMSTEC
SHINOZAKI Ayuta	JAMSTEC
MIYAZAKI Masayuki	JAMSTEC
HONGO Yuki	JAMSTEC
TAME Akihiro	JAMSTEC
ASAI Takeshi	JAMSTEC
NAGAMA Rena	JAMSTEC
SEO Eriko	JAMSTEC
TANAKA Katsuhiko	JAMSTEC
OKOSHI Kenji	Ishinomaki Senshu University
ITO Nozomi	Ishinomaki Senshu University
YAMAMOTO Tomoko	Kagoshima University
SHIMAMURA Syo	Okayama University
TANDOU Yukiko	University of Tokyo, ORI
TADA Satoshi	Tokyo Sea Life Park
IDA Hitoshi	Kitasato University
WATANABE Tomoaki	Meiji University
HAYASHI Akiko	Meiji University
ITO Toshishige	Enoshima Aquarium
TOYOTA Yoko	Enoshima Aquarium
HATANAKA Sachiko	Keikyu Aburatsubo Marine Park
HIRAKAWA Yuji	Suma Aqualife Park KOBE
SMITH Craig	Hawaii University
MIYAZAKI Jyunichi	Yamanashi University
MORITA Takami	NRIFS

●Marine Technician

Research Engineer	IWAMOTO Hisanori

3. Research/Development Activities

● Research overview

This cruise was carried out for two projects that were selected for environmental analysis of deep-sea creatures.

“Development of pressure control method and pressure response of *Calyptogena* in the Sagami Bay”

The purpose of this study was to examine the release conditions of sperm when using a deep-sea bivalve “*Calyptogena* sp.” to reach a high-pressure environment from an atmospheric pressure environment. Ecological behavior observation survey was conducted. Using a "DEEP AQUARIUM" pressure-reserved water tank, we directly observed the environmental response of organisms under artificial pressure and pressure reduction.

“Development and dispersal strategy of *Siboglinid polychaetes* from whale fall and cold seep ecosystems in the Sagami Bay”

The purpose of this study was to infer growth and dispersal strategies by looking at the temperature tolerance and pressure tolerance of tubeworms and Osedax japonicus larvae. The following were examined in that, (1) Is pressure tolerance associated with growth related to bathymetric distribution of adults? (2) Where is the pressure limit actually allowed in the early days of occurrence? Does it coincide with the ontogeny stage? (3) Can larvae be found in the sea around adults? Is pressure tolerance found in an artificial environment related to larval growth?

In addition, the sperm whale “SATOMI” newly deposited off the northeastern coast of Hatsushima, Sagami Bay was also observed, and the initial state of the cetacean community transition was observed.

・Preliminary Results of the ROV Hyper Dolphin Dive #927

Date: December 17, 2008
Site: Off Hatsushima, 905m deep
Landing: 35-00.936N, 139-13.381E
Leaving:
Chief observer: Tetsuya Miwa（JAMSTEC, MARITEC）
Purpose: Sampling of Cariptogena, mud, and observation
Payload equipments: NISKIN bottle×2、MBARI core sampler×2、Slurp gun（normal×3, with net ×3）、Flowmeter、rake、Incubation Sample Box, Maker#927_1, #927_2
Dive summary
The biological collection and bottom sampler centered on *Calyptogena* were submerged as the main purpose. The landing was aimed at around 905m north of Hatsushima offshore station north side. While observing the organism, HPD was moved toward the *Calyptogena* colony # 17. At # 17 colony site, marker # 927_1 was installed and *Calyptogena* was collected. HPD also moved to the # 16 Alaysia site. To observe the fish, such as the middle Narrownose Chimaera. Larvae were collected at the Alaysia site.
Using a slurp gun with a plankton net, suction was applied to # 1 and # 2 pots for 5 minutes. Slurp gun tried to suck the organisms in Alaysia and stored them in # 4 and # 5 pots. The MBARI core sampler was tried, and finally the shrimp trap installed in NT08-24 was collected.

Dive report
During work at the Alaysia site, some light sources disappeared (11:05). The second half of the work

was carried out in a slightly dark situation, but the goal was achieved. The requested shrimp trap did not contain any living creatures. Caryptogena colonies were able to collect Caryptogena and Conchocele.
It will be used for genetic analysis, breeding and specimen preparation.
Sampling & Marker point
Maker#927_1 (#17 Point, 35-00.955N, 139-13.338E, 856m deep)
Video Highlights Non

・**Preliminary Results of the ROV Hyper Dolphin Dive #928**
Date: December 17, 2008
Site: Off Hatsushima, Sagami Bay; sea area north of station
Landing:
Leaving:
Chief observer: Sumihiro KOYAMA (JAMSTEC)
Purpose: Sampling and observation of organisms and mud
Payload equipments: NISKIN bottle×１、MBARI core sampler×2、Slurp gun、rake、Blue container、Feeding marker、Fish trap net×2
Dive summary
Dive with the aim of near Hatsushima off the coast Calyptogena site east side of 905m. Capture 3 fish with a 6-unit slurp gun while observing the seabed. Two fish traps and one feeding marker are installed at tubeworm site. After sampling mud with the MBARI sampler, observe the whale bones that were previously installed. Finally, tube worms and tube worm larvae were sampled.

Dive report
After arriving at tube worm site, two fish traps and one feeding marker were installed. *Paralomis multispina* was visible that has been approached. These two traps will be collected at a later ROV survey. In the vicinity of the tube worm colony, observe the whale bones that were previously set up after two MBARI samples.
This time, I had a NISKIN water sampler, but because there was no particular request, sampling of seawater surfaced without trying.
Sampling & Marker point Non
Video Highlights Non

Preliminary Results of the ROV Hyper Dolphin Dive #929
Date: December 18, 2008
Site: Whale fall off Hatsushima
Landing: Time: 09:17, Lat: 35˚04.986'N, Long: 139˚13.045'E, Depth: 939 m (WGS84)
Leaving: Time: 11:41, Lat: 35˚04.999'N, Long: 139˚13.008'E, Depth: 928 m (WGS84)
Chief observer: Florence PRADILLON (JAMSTEC)
Purpose: collect bones, sediments, organisms around the 44 months old whale carcass, deploy pig bones.
Payload equipments:

1. Suction sampler	1
2. Multiple canister	1
3. Sample box (syntactic foam)	1
4. MBARI corer	3
5. Sterile corer	2
6. Niskin bottle	2
7. Pig bone parcels (H929-1, H929-2)	2

Dive summary
A vertebra, 2 epiphysis bones, 3MBARI cores, 2 sterile cores, 3 plankton samples and 2 water samples were collected. 2 pig bone parcels were deployed at about 9 m away from the carcass.

Dive report

・ Collection of whale bones

After a video survey (Fig. 929-1) of the whole carcass in search of well-colonized bones, a vertebrae and 2 epiphysis were collected, close the posterior end of the whale carcass.

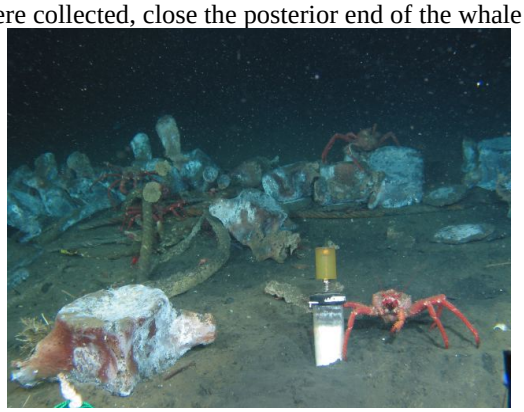


Fig. 929-1: 44 months old whale carcass

・ Larval collection

Water filtration was conducted using the suction sampler with three canisters that were designed for small plankton collection (50 µm mesh-size). Canister 1 was collected about 20 cm above a vertebrae (flowmeter : 84384-93606). Canister 2 and 3 were collected at 10-20 cm from the bones, 30-40 cm above the bottom, with the inlet facing the current flow (flowmeter canister 2: 93606-00802, canister 3: 00802-09656). A preliminary analysis of these samples was conducted: copepods, mysiid shrimps, juvenile bivalves, juvenile polychaetes (Dorvilleidae), chaetognaths were found.

・ Pig Bone deployment

2 pig bone parcels (nets containing 3.5 kg of pig bones each) were deployed on the sediment, about 9 meters away from the head part of the carcass (Fig. 929-2). These parcels will be recovered within a few months to a year, and the colonizing species will be compared to those found on whale bones.

Fig. 929-2: Pig bone parcels

・ Sediment sampling

Sediment coring was conducted using three MBARI type corers. One core (red) was collected in background sediments, before arriving at the whale fall area. The second core (black) was collected just next to the place where the vertebra and epiphysis were collected during this dive, in black sediments. The third core (blue) was collected at about 20-25 cm from the skull in sediment with gray surface.

Sterile core were also taken: one next to the red MBARI core, one next to the black MBARI core.

MBARI cores will be used for microbiology and geochemistry analysis, as well as for diversity analysis.

・ Water sampling

Water samples were collected using two Niskin bottles at the beginning of the dive, 1.5 m above the bottom and away from the whale carcass. These samples will be used or geochemistry

analysis.

・ Biological sampling

A galatheid crab sitting on the bones was collected in the slurp gun canister 4.

Sampling & marker points

(1) Niskin #1 35°04.986'N, 139°13.045'E, Depth: 939 m, Alt: 1.5 m
(2) Niskin #2 35°04.983'N, 139°13.034'E, Depth: 936 m, Alt: 1.5 m
(3) MBARI core Red, Sterile core 35°04.994'N, 139°13.009'E, Depth: 936 m
(4) MBARI core Blue and Black, Sterile core, plankton sampling, bone sampling, pig bone deployment 35°04.999'N, 139°13.008'E, Depth: 928 m

Video highlights

Time	*Descriptions*
09:42:30-09:43:00	Overview of the whole carcass.
09:57:15-09:57:25	Close up on Miyazaki San colonization experiment.
10:15:00-10:19:00	Pig bones deployment.
10:43:00-10:43:25	Small Paralomis feeding on sediments.

・Preliminary Results of the ROV Hyper Dolphin Dive #931

Date**:** December 19, 2008
Site**:** Off Hatsushima,Whale-fall 927m deep
Landing**:** 35-04.982N, 139-13.073E
Leaving**:** 35-04.990N, 139-13.023E
Chief observer**:** Tomoko Yamamoto（Kagoshima University）
Purpose:
Sampling of benthic animals, plankton, bacteria, whale bone, water and sediment
Observation of whale bone and animals
Recovery of the petri dish and setting of hagfish trap

Payload equipments: Suction sampler × 1, Multiple canister (Plankton × 3, Masroanimal × 3), Sample box (syntactic foam) ×1, MBARI corer × 3, Sterile corer × 2, Niskin bottle × 2, Kumade sampler × 1, Hagfish trap × 1

Dive summary

Purpose of the dove was to sample and observe whale fall community (including bacteria) and collect samples of their environment condition. beagle settled near from whale fall and took the route for whale fall. After beagle settled near from whale bone, we sampled plankton, whale rib bone and sediment (including bacteria).

Dive report

After NISKIN water sampling at landing point and near from whale-fall, beagle settled in front of top of the cranial bone. Core sampling or MBARI core (Red) and sterile core (Green) were conducted at black sediment (anaerobic) area. Plankton sampling using suction sampler was conducted twice here. At first, the mouth of hose pipe located 10 cm above the bottom surface (canister No. 1). In the second, water filtered with scraping the surface of the cranial bone by the mouse of hose pipe (canister No. 2). A hagfish trap was set apart from the cranial bone, and the petri dish (921-S-1) was recovered at almost the same place. After beagle moved to side of rib bone, water filtration was conducted with scraping the surface of the rib bone by the mouse of hose pipe (canister No. 3). Beagle backed to side of the cranial bone and sampled in the sample box by using Kumade sampler. Then, we backed to side of rib bone and sampled one of rib bones after breaking it at the side of sample box. Since an elephant fish was found at the far side of whale, we observed and photographed it. Finely, beagle moved to the side of vertebrate and sediment near the bone and under the bone was sampled by MBARI core (Green and Black) and sterile core (Black). It was 1.5 hour operation.

Sampling & Marker point

Sampling of benthic animals, plankton, whale bone, water and sediment　(#2 Point, 35-04.990N, 139-13.023E, 927m deep)

Video Highlights
9:23:17 – 9:35:00 Sampling of rib bone
10:16:55 – 10:17:08 Observation of an elephant fish

・Preliminary Results of the ROV Hyper Dolphin Dive #932
Date**:** *December 19, 2008*
Site**:** Off Hatsushima, Sagami Bay; whale bone site
Landing**:** 14:22
Leaving**:** 16:36
Chief observer**:** Kenji OKOSHI（Ishinomaki Senshu University, Faculty of Science and Engineering）
Purpose: Observation of input sperm whale and installation of video camera
Payload equipments:ニスキン採水器×２、設置型耐圧ビデオカメラ
Dive summary
初島沖に２００８年１２月９日に沈子をつけて投入したマッコウクジラの遺骸（１１．２ｍ）近傍にビデオカメラを設置した。（カメラは２３日に回収予定）
Dive report
１４時２２分に着底（35-04.903N 139-12.974E,D=908m）に着底し、沈設したマッコウクジラを目指して移動。コンゴウアナゴ多数視認。同５４分ニスキン採水（35-04.925N 139-12.987,D=923m）。同５７分マッコウクジラ前方頭部の南側にクジラ本体から約２．５ｍ離れた場所にビデオカメラ設置した。直後にハイパードルフィンが浮上（スラスターにコンゴウアナゴが絡んだ可能性がある）し１５時００分に９０６ｍまで達するがその後下降し現場にもどる。１５時３０分にビデオ用ライトの点灯を確認後上昇。同３４分イトアナゴの仲間視認（北里大井田教授）。３６分再着底。ヌタウナギ視認。同３７分ビデオカメラが転倒しているのを確認。再浮上、再下降後、同４４分にビデオ脇に着底。５０分再浮上。１６時４分再着底（９２３．８ｍ）１４分からビデオの傾きを修正し、同３６分離底した。

Sampling & Marker point
なし

Video Highlights
コンゴウアナゴの沈設したクジラへのい集。イトアナゴ。

Video log

・Preliminary Results of the ROV Hyper Dolphin Dive #933
Date: December 20, 2008
Site: Cold seep site off Hatsushima
Landing*:* Time: 09:44, Lat: 35˚00.925'N, Long: 139˚13.336'E, Depth: 890 m (WGS84)
Leaving*:* Time: 11:31, Lat: 35˚00.937'N, Long: 139˚13.370'E, Depth: 90 m (WGS84)
Chief observer: Florence PRADILLON (JAMSTEC)
Purpose: collect vestimentifran tubeworms, Bathymodiolus mussels, sediments, plankton.
Payload equipments:
8. Suction sampler 1
9. Multiple canister (4 plankton canister, 2 macrofauna canister)s 1
10. Sample box (syntactic foam) 1
11. MBARI corer 3
12. Niskin bottle 2

Dive summary
Lamellibrachia sp. tubeworms, *Bathymodiolus* mussels, plankton samples and MBari cores were

collected. A hagfish was also collected within a fish trap deployed earlier.

Dive report

・ Collection of tubeworms

About 25 *Lamellibrachia* sp. individuals were collected from small patches scattered among a background of *Calyptogena* clams (Fig. 933-1). These *Lamellibrachia* will be used to carry out development studies regarding pressure and temperature tolerances of embryos

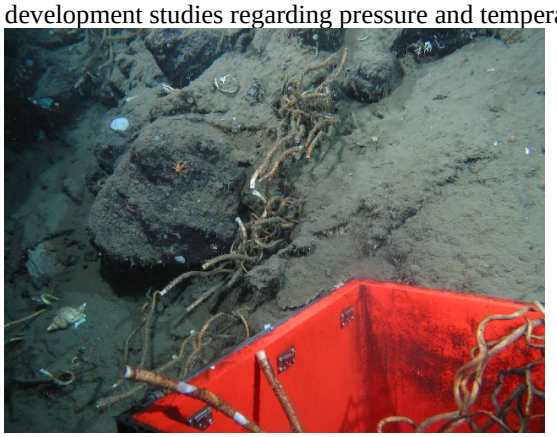


Fig. 933-1: Lamellibrachia sp. patch.

・ Larval collection

Water filtration was conducted using the suction sampler with four canisters that were designed for small plankton collection (50 µm mesh-size). Canister 1 was collected about 10 cm above a clump of *Alaysia*-like sp. and *Lamellibrachia* sp. tubeworms (flowmeter : 26817-36526) (Fig. 933-2). Canister 2 was collected within the clump of tubeworm (flowmeter: 36526-44682). Canister 3 was collected slightly away from the clump of tubeworm (about 2 m) with the inlet of the slurp gun's hose positioned close to the bottom and facing the main current (flowmeter: 44682-52820). Canister 4 was collected at the surface of a patch of *Bathymodiolus* mussels (flowmeter : 52820-55195) (Fig. 933-3). A preliminary analysis of the contents of canister 1, 2, 3 showed no polychaete larvae but copepods, amphipods, chaetognaths were found.

Fig. 933-2: Alaysia-like sp. and Lamellibrachia sp.

・ Mussel collection

Bathymodiolus mussels were collected at a flange structure within the mussel field, using the suction sampler within canister 5 (Fig. 933-3).

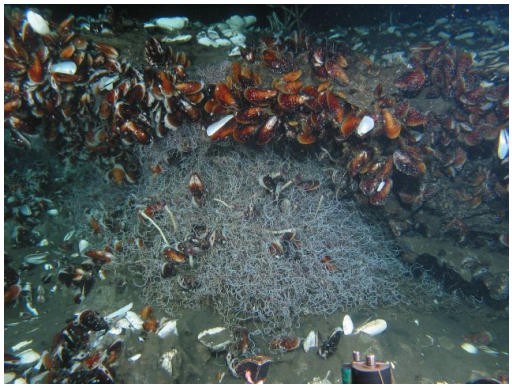


Fig. 933-3: Bathymodiolus mussel flange.

・ Sediment sampling

Sediment coring was conducted using three MBARI type corers. One core (blue) was collected between *Calyptogena* clams at about 20 cm from the *Alaysia* patch where larval canister 1 and 2 were used. The core was relatively short (hard susbtrate encountred). It was composed of gray mud at the surface, with a black layer at about 5 cm below the surface. The second core (black) was collected among mussels and clams at about 70 cm from an *Alaysia* patch located below the flange with Bathymodiolus mussels. The third core (green) was collected just next to the Alaysia patch located below the mussel flange. This core did not go deep (hard substrate encountered).
MBARI cores will be used for diversity analysis of the infauna, and comparison with that of cores taken at whale fall sites.

・ Water sampling

Water samples were collected using two Niskin bottles at the beginning of the dive. The first bottle was collected outside of the seep site, and the second bottle was collected while sampling plankton at the *Alaysia* patch.

・ Others

A fish trap containing a hagfish was recovered (Fig. 933-4).


Fig. 933-4: Fish trap with hagfish.

Yoshida San (Jamstec)'s tubeworm explants experiments were repositioned more within the *Alaysia* patch where they had been deployed.

Sampling & marker points

(5) Niskin #1 35°00.925'N, 139°13.336'E, Depth: 890 m, Alt: 1.5 m

(6) Niskin #2, plankton sampling (canister #1-3), MBARI core Blue, Fish trap recovery
35°00.953'N, 139°13.313'E, Depth: 853 m

(7) *Lamellibrachia* sp. collection 35°00.944'N, 139°13.323'E, Depth: 869-70 m

(8) *Bathymodiolus* sp. collection, plankton sampling (canister #4), MBARI core black and green
35°00.937'N, 139°13.370'E, Depth: 898 m

Video highlights

Time	*Descriptions*
10:34:30-10:35:00	Hagfish caught in the fish trap.
11:07:22-11:09:00	Close up view of the *Bathymodiolus* mussels.
11:22:55-11:23:30	Mussel flange and *Alaysia*-like sp. underneath it.

・Preliminary Results of the ROV Hyper Dolphin Dive 934

***Date*:** December 20, 2008
***Site*:** Off Hatsushima, 905m deep
***Landing*:** 35-00.936N, 139-13.381E
***Leaving*:**
***Chief observer*:** Tetsuya Miwa（JAMSTEC, MARITEC）
Purpose: Sampling of Cariptogena, Bathymodiolus, mud, and observation
Payload equipments:NISKIN bottle×2、MBARI core ×2、Slurp gun（nomal×4, with net×2）、Flowmeter、rake、Sample Box (syntactic foam)

Dive summary

The biological collection and bottom sampler centered on *Calyptogena* were submerged as the main purpose. The landing was aimed at around 905m north of Hatsushima offshore station north side. While observing the organism, the HPD moved toward *Calyptogena* colony # 17. Caryptogena was collected at # 17 colony site. Aiming at a depth of 900m again, we attempted to collect tubeworm and laver larvae. Using a slurp gun with a plankton net, suction was applied to # 5 and # 6 pots for 5 minutes. Five *Andriashevia* sp. were captured. It was collected horse mussel to complete the investigation.

Dive report

The sampling location of the Calyptgena colony, unlike # 927, was attempted on the northwest side of the colony. At this point, only Calyptgena could be collected.

Sampling & Marker point
Calyptgena 35-00.958N, 139-13.337E
Bathymodiolus 35-00.935N, 139-13.397E

Video Highlights
Non

・Preliminary Results of the ROV Hyper Dolphin Dive #935

***Date*:** December 21st, 2008
***Site*:** Off Hatsushima, 934～854m deep
***Landing*:** 35-00.900N, 139-13.400E
***Leaving*:**
***Chief observer*:**Hitsoshi Ida（Kitasato University, School of Marine Biological Sciences）
Purpose: Sampling of *Cariptogena*, *Bathymodiolus*, gastropod, fish, mud, and observation on benthic fauna.
Payload equipments: MBARI 採泥器×2、スラープガン（ノーマルボトル×3, プランクトンネットつき×3）、流量計、熊手,(NISKIN 採水器×2)

Dive summary

シロウリガイ類を中心とする生物採集と採泥を主目的として潜航を行った。初島沖海底ステーション南東側の 930m付近に着底を目指し、潜航を行った。生物を観察しながら、HPD はシロウリガイおならびにシンカイヒバリガイのコロニーに向けて移動した。はじめに、ハオリムシ *Alaysia* 群集で#5 ポットに 5 分間の吸引を行い、引き続きヒバリガイ群集で#6 ポットに 5 分間の吸引を行った。吸引後、#2 ポットにゲンゲ類 7 尾を吸引採集した。さらに、周辺で海底の岩を採集。その後 870 m 付近の砂泥底に発達したシロウリガイの大きなコロニーに移動。その途上でホラアナゴ、オオサガなどの魚類を観察。

Dive report
初島沖南東側の 930m付近をめざして潜航した。*Calyptogena* コロニーのサンプリング場所からは、シロウリガイ *Calyptogena* のほか、オウナガイ *Conchocele*、多毛類、クモヒトデ類などが採集できた。遺伝子解析、ならびに飼育、標本作製のために用いる予定である。

Sampling & Marker point
着底点　(35-00.917N, 139-13.383E, 934m deep)
離底点　(35-00.951N, 139-13.313E, 855m deep)

Video Highlights
特記事項なし

Preliminary Results of the ROV Hyper Dolphin Dive #937
Date: December 22, 2008
Site: Whale fall off Hatsushima
Landing*:* Time: 08:52, Lat: 35˚04.986'N, Long: 139˚13.045'E, Depth: 946 m (WGS84)
Leaving*:* Time: 11:09, Lat: 35˚04.990'N, Long: 139˚13.008'E, Depth: 929 m (WGS84)
Chief observer: Florence PRADILLON (JAMSTEC)
Purpose: collect sediments, plankton and organisms at the 44 months old whale carcass.
Payload equipments:
13. Suction sampler 1
14. Multiple canister (3 larval canister, 3 macrofauna canister) 1
15. Sample box (syntactic foam) 1
16. MBARI corer 3
17. Niskin bottle 2
18. "Kumade" small sampler 2

Dive summary
Sediments and plankton sample were collected besides the bones. Small pieces of the upper jaw bone below which large *Osedax* were observed hanging were collected. Mobile macrofauna (scale worms, *Paralomis* crabs and eel fishes) were also collected from the surface of the bones. A fish trap with *Paralomis* crabs was retrieved.

Dive report
・ Collection of whale bones
Osedax specimens that appeared to be larger than other individuals already collected on the ribs (NT08-34 HD921, NT08-25 HD931) where observed hanging underneath the upper jaw bone (Fig. 937-1).

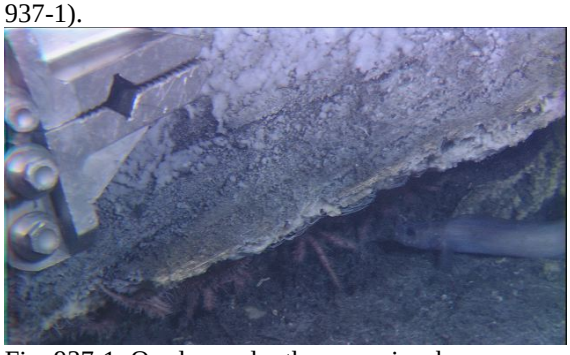


Fig. 937-1: Osedax under the upper jaw bone

Small pieces of the rim of that jaw bone where cut, and the pieces were collected with the suction sampler within canister 2. Some pieces were also added to the collection box after sediment collection.

・ Larval collection
Water filtration was conducted using the suction sampler with 2 canisters designed for small

plankton collection (50 µm mesh-size). Canister 1 was collected about 20 cm above the upper jaw bone of the carcass (flowmeter: 307285-315606). Canister 3 was collected on the rib bones, scratching the surface to detach small organisms (flowmeter: 316455-319913, canister 3: 00802-09656).

・ Sediment sampling

Sediment coring was conducted using three MBARI type corers. One core (blue) was collected next to the upper jaw bone in black sediments. This core was short because harder substratum was hit while coring. The second core (red) was collected a few centimeters from ribs and vertebrae in gray sediments. The third core (green) was collected next to the red one but was shorter because harder substratum was hit. MBARI cores will be used for microbiology and geochemistry analyses, as well as for diversity analysis of the infauna.
In addition to the MBARI cores, sediment from the area adjacent to the head bones was collected with the kumade sampler in the collection box.

・ Biological sampling

A large scale worm (polynoid polychaeta) was collected from the surface of a vertebrae within canister 4 (Fig. 937-2).

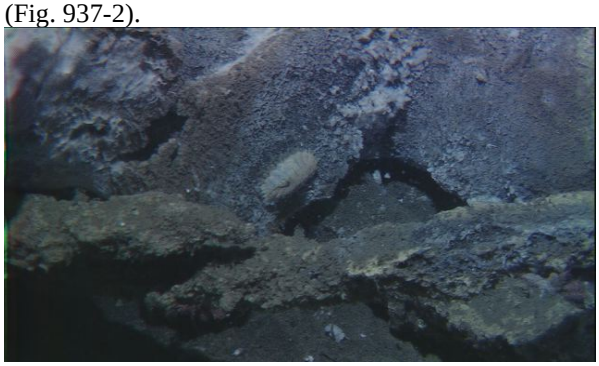


Fig. 937-2: Scale worm on a sperm whale vertebrae.

A small *Paralomis* crab and three fishes were also caught with the slurp gun around the vertebrae. A fish trap deployed about 1 meter from the head part was full with *Paralomis* crabs and shrimps and was recovered.

・ Others

The pig bone parcels deployed during dive HD#929 were observed.

Sampling & marker points

(9) Plankton sampling, MBARI Cores, sediment sampling, bone sampling

35°04.990'N, 139°13.008'E, Depth: 926-8 m

Video highlights

Time	*Descriptions*
09:07:32-09:07:48	Osedax hanging underneath the upper jaw bone.
09:09:18-09:10:30	Long legged spider isopode on jaw bone.
09:10:40-09:10:46	Osedax hanging underneath the upper jaw bone, and Paralomis.
09:11:12-09:11:20	Osedax hanging underneath the upper jaw bone, and Paralomis.
09:13:05-09:13:45	Osedax hanging underneath the upper jaw bone.
09:19:19-09:19:52	Close view on a large fish.
09:51:18-09:51:39	Osedax hanging underneath the upper jaw bone.
10:19:23-10:20:00	Large scale worm on a vertebrae.
11:06:55-11:07:30	Giant isopode next to the pig bone parcels

・Preliminary Results of the ROV Hyper Dolphin Dive #938

***Date*:** December 22, 2008

***Site*:** Off Hatsushima,Cold-seep site, off Hatsushima 850 m deep
***Landing*:** 35-00.903N, 139-13.412E
***Leaving*:** 35-00.951N, 139-13.298E
***Chief observer*:** Toshishige Itoh（Enoshima Aquarium）
Purpose:
Sampling of *Bathymodiolus*, *Calyptogena* with sediment, Two tube worms, the other benthic animals, plankton.
Recovery of fish trap

Payload equipments: Suction sampler × 1, Multiple canister (Plankton × 2, Masroanimal × 4), Sample box (syntactic foam) × 1, MBARI corer × 3, Niskin bottle × 2, Kumade sampler × 1

Dive summary
Purpose of the dove was to sample and observe Cold-seep site community (including plankton, bacteria) and collect samples of their environment condition. beagle settled near from *Calyptogena* colony. we sampled plankton and *Calyptogena*, tube worms.

Dive report
Plankton sampling using suction sampler was conducted for five minutes above *Bathymodiolus* colony (canister No. 5). In the second, plankton sampling using suction sampler was conducted for five minutes into *Alaysia* sp. colony (canister No. 6). Fish sampling using suction sampler was conducted, A small fish was collected (canister No. 1). Then *Calyptogena* sampling with sediments using kumade sampler were conducted on the colony. Then core sampling using 3 MBARI cores were conducted at sediment area around *Calyptogena* colony. Then tube worm sampling using manipulators by the worms, *Lamellibrachia* sp. Then snale sampling using suction sampler was conducted, A small snale, Buccinum soyomaruae was collected (canister No. 2). Then sampling using suction sampler was conducted into tube worm colony, three small shrimps were collected (canister No. 3). Then the beagle conduct recovery of fish trap. For the last place, tube worm sampling using manipulators by the worms, *Alaysia* sp. It was about 2.5 hour operation.

Sampling & Marker point
Sampling of *Calyptogena* (35-00.958N, 139-13.318E)

Video Highlights
14:05 - 14:10 Plankton sampling above *Bathymodiolus* colony
14:20 –14:30 Plankton sampling into *Alaysia* colony
14:50 –15:17 Sampling of *Calyptogena* with sediment
15:20 –15:25 Core sampling (MBARI × 3)
15:30 –16:11 Sampling of tube worms, *Lamellibrachia* sp, *Alaysia* sp. and the other benthic animals, recovery of fish trap

- ***Preliminary Results of the ROV Hyper Dolphin Dive 939***

***Date*:** December 23, 2008
***Site*:** Off Hatsushima, 905m deep
***Landing*:** 35-00.936N, 139-13.381E
***Leaving*:**
***Chief observer*:** Tetsuya Miwa（JAMSTEC, MARITEC）
Purpose: Sampling of Cariptogena, Tubeworm, and observation
Payload equipments: NISKIN bottle×2、MBARI core ×2、Slurp gun（nomal×4, with net×2）、Flowmeter、rake、Sample Box (syntactic foam)

Dive summary
The biological collection and bottom sampler centered on *Calyptogena* were submerged as the main purpose. The landing was aimed at around 905m north of Hatsushima offshore station north side. HPD observed at 905 m and attempted to collect larvae around the mussel and Alecia. In addition,

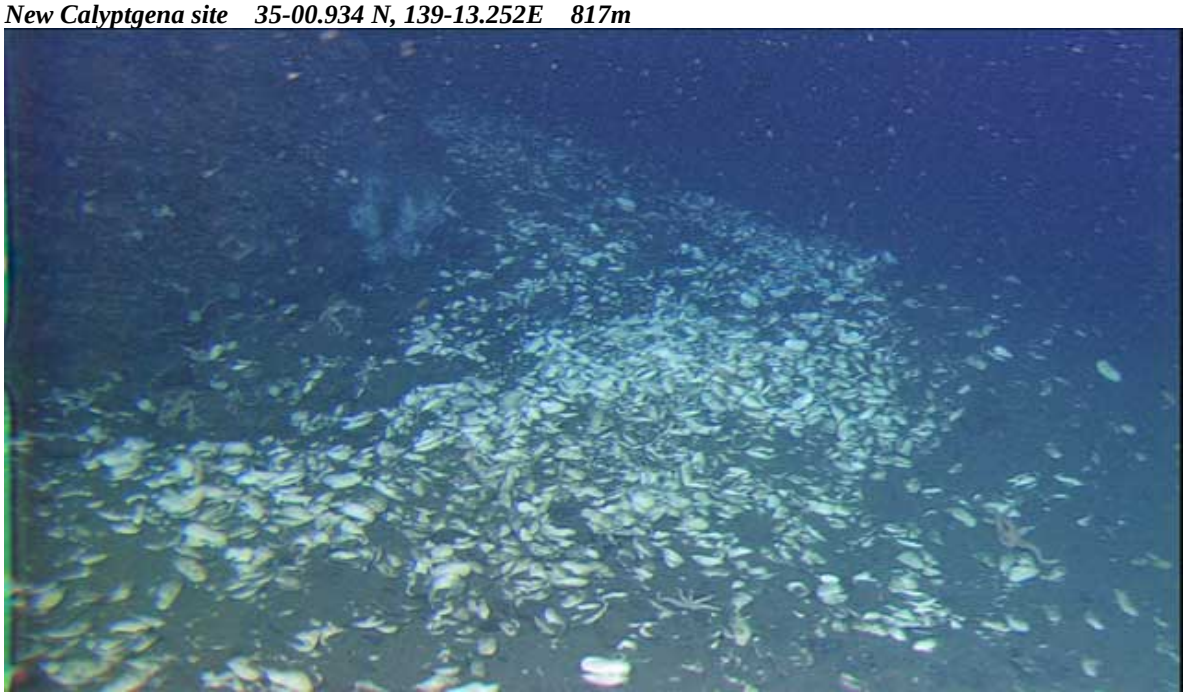
Calyptgena was collected. Tube worms were collected at a depth of 900m. Moved around the # 17 Calyptgena colony and collected MBARI core. The marker was confirmed by moving the upper part of # 16 Alesia colony. The HPD sailed west-southwest and observed organisms. Near the depth of 817m, we found a large new colony of *Calyptogena*. These colonies were elongated in the east and west, and several colonies of *Calyptogena* were observed in several places, and they were continuously elongated.

Dive report

The tube worm at 905m was a mixture of Alesia and tube worm. Calyptgena colonies at a depth of 817m is the first to find the place this time. Because it is larger than the previous one and its depth is shallow, it seems to be suitable for research in a living state. In several places, Calyptgena formed colonies, which spread continuously from east to west. Shinkai Hibarigai was also confirmed at several locations. Near the end point, there were many *Lamellibrachia* distributed. The newly discovered colony site has great potential for future sampling.

Marker point

New Calyptgena site 35-00.934 N, 139-13.252E 817m



Video Highlights

Non

4. Cruise Log

2008/12/16

13:30	Onboard the R/V NATSUSHIMA
15:00	Departure from JAMSTEC
15:30-16:05	Briefing about ship's life and safety
16:30-16:50	Scientists and HPD team meeting
18:00-19:00	Scientists meeting

2008/12/17

Weather: rain/ Wind direction: North/ Wind force: 5/ Wave: 4 m/ Swell: 4 m/ Visibility: 4 nautical mile (12:00 JST)

08:21	Launching HPD (HPD#927 dive)
08:52	HPD landing (905m)

11:02	HPD leave the bottom (873m)
11:26	HPD come up to surface
13:17	Launching HPD (HPD#928 dive)
13:48	HPD landing (912m)
15:32	HPD leave the bottom (852m)
15:56	HPD come up to surface
19:00-20:20	Scientists meeting

2008/12/18
Weather: fine but cloudy/ Wind direction: WSW/ Wind force: 4/ Wave: 3 m/ Swell: 2 m/ Visibility: 7 nautical mile (12:00 JST)

06:30-07:20	Disembarkation and embarkation by boat
08:45	Launching HPD (HPD#929 dive)
09:17	HPD landing (939m)
11:41	HPD leave the bottom (928m)
12:07	HPD come up to surface
13:46	Launching HPD (HPD#930 dive)
14:19	HPD landing (921m)
16:10	HPD leave the bottom (918m)
16:37	HPD come up to surface
18:00-18:50	Scientists meeting

2008/12/19
Weather: fine but cloudy/ Wind direction: NNE/ Wind force: 3/ Wave: 2 m/ Swell: 2 m/ Visibility: 7 nautical mile (12:00 JST)

06:40-07:00	Disembarkation and embarkation by boat
08:15	Launching HPD (HPD#931 dive)
09:01	HPD landing (935m)
10:34	HPD leave the bottom (928m)
11:12	HPD come up to surface
13:41	Launching HPD (HPD#932 dive)
14:22	HPD landing (908m)
16:36	HPD leave the bottom (923m)
17:02	HPD come up to surface
18:00-18:50	Scientists meeting

2008/12/20
Weather: fine but cloudy/ Wind direction: calm/ Wind force: 0/ Wave: 1 m/ Swell: 2 m/ Visibility: 7 nautical mile (12:00 JST)

06:35-07:20	Disembarkation and embarkation by boat
09:12	Launching HPD (HPD#933 dive)
09:44	HPD landing (890m)
11:31	HPD leave the bottom (900m)
11:57	HPD come up to surface
13:43	Launching HPD (HPD#934 dive)
14:13	HPD landing (879m)
16:07	HPD leave the bottom (891m)
16:33	HPD come up to surface
18:30-19:20	Scientists meeting

2008/12/21
Weather: fine but cloudy/ Wind direction: SSW/ Wind force: 4/ Wave: 3 m/ Swell: 2 m/ Visibility: 7 nautical mile (12:00 JST)

06:40-06:50	Embarkation by boat
08:15	Launching HPD (HPD#935 dive)
08:50	HPD landing (934m)
11:04	HPD leave the bottom (855m)
11:28	HPD come up to surface

13:15	Launching HPD (HPD#936 dive)
13:49	HPD landing (923m)
15:58	HPD leave the bottom (917m)
16:24	HPD come up to surface
18:00-20:00	Scientists meeting

2008/12/22
Weather: cloudy/ Wind direction: SW/ Wind force: 6/ Wave: 4 m/ Swell: 4 m/ Visibility: 7 nautical mile (12:00 JST)

08:09	Launching HPD (HPD#937 dive)
08:50	HPD landing (946m)
11:09	HPD leave the bottom (929m)
11:36	HPD come up to surface
13:16	Launching HPD (HPD#938 dive)
13:50	HPD landing (965m)
16:14	HPD leave the bottom (835m)
16:39	HPD come up to surface
18:30-19:30	Scientists meeting

2008/12/23
Weather: fine but cloudy/ Wind direction: North/ Wind force: 3/ Wave: 3 m/ Swell: 2 m/ Visibility: 7 nautical mile (12:00 JST)

08:13	Launching HPD (HPD#939 dive)
08:46	HPD landing (931m)
11:02	HPD leave the bottom (791m)
11:24	HPD come up to surface
13:45	Launching HPD (HPD#940 dive)
14:16	HPD landing (923m)
15:43	HPD leave the bottom (923m)
16:11	HPD come up to surface
18:00-19:00	Scientists meeting

2008/12/24

08:30	Arrival in JAMSTEC
09:00	Leave the R/V NATSUSHIMA

Wind force criteria
0 = 0 - 0.2 m/sec.
1 = 0.3 - 1.5
2 = 1.6 - 3.3
3 = 3.4 - 5.4
4 = 5.5 - 7.9
5 = 8.0 - 10.7
6 = 10.8 - 13.8
7 = 13.9 - 17.1
8 = 17.2 - 20.7
9 = 20.8 - 24.4
10 = 24.5 - 28.4
11 = 28.5 - 32.6
12 = 32.7 -

5. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.
Users of information on this report are requested to submit Publication Report to JAMSTEC.

http://www.godac.jamstec.go.jp/darwin/explain/1/e#report
E-mail: submit-rv-cruise@jamstec.go.jp