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NT08–17

R/V Natsushima– ROV Hyper-Dolphin

Kagoshima

Projects:
Evolution of chordates: Studies on physiological mechanisms of the chordates in hydrogen sulfide-rich environment
&
Study on the hydrothermal and fumarolic activities occurred in Wakamiko crater: their distribution and evolution

Preliminary cruise report

August 4, 2008 – August 15, 2008

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

Contents

1. Introduction

The present project was carried out during a cruise undertaken in Kagoshima Bay, Japan. At the Wakamiko crater in Kagoshima Bay, the geochemistry group (Yamanaka group) selected for research proposal S08-55 studied a hydrothermal vent field during five ROV Hyper-Dolphin dives. Off Noma-Misaki, Kagoshima, the biology group (Kubokawa group) selected for research proposal S08-60 studied the succession of the whale-fall community during nine such dives. Finally, at a location to the east of the Wakamiko crater, the biological group collected tube worms during a single dive.

The main purpose of the Yamanaka group project was to describe the detailed distribution of fumaroles and hydrothermal sites in the crater, and the chemical species derived from fumarolic and hydrothermal activities in the water column. In addition, they investigated the distribution of altered minerals influenced by acidic volcanic gases and hot hydrothermal fluids in the crater-fill sediments. The instruments used were general samplers for the water and core, and SHAF, ROCS, DAI-PACK, and GAMOS. They obtained many samples from the hydrothermal vents and chimneys.

The Kubokawa group observed the whale-fall ecosystem using five sperm whale carcasses at depths of 219–253 m off Noma-Misaki from 2003 to 2008 except 2006. Based on repeated observations made by Hyper-Dolphin, the composition and diversity of whale-fall fauna were analyzed. As the whale bones began to weather and become buried in the sediment, these unique animals have gradually disappeared. This project demonstrated the importance of repeated observations for the study of whale-fall fauna succession, right from the beginning till the end. Some new whale-fall fauna species have been identified, and ecological, physiological, and phylogenetic studies are continuously being conducted on them and other species of interest in the laboratory. Furthermore, tunicate communities at the bottom, and particularly in the hydrothermal vents of the Wakamiko crater, were quantitatively collected and observed to study how they adapt to the extreme environment. These observations might explain the evolution of ecosystems and reveal the adaptation mechanisms contributing to dealing with extreme environments.

We hope that these studies contribute in improving the general understanding of the extreme environment conditions encountered in oceanic sciences.

Kaoru Kubokawa
NT08-17 Chief scientist
Ocean Research Institute
University of Tokyo

2. Cruise Information

Cruise number: NT08-17 Leg1, 2

Ship name: R/V Natsushima, ROV Hyper-Dorphin

Title of the cruise: ROV Hyper Dolphin research dive, deep sea research, FY2008

Chief Scientist: Kaoru Kubokawa
[Ocean Research Institute, University of Tokyo]

Proposal number/ Title of the proposals/ Representative of the proposals:

(1)S08-60 /
Evolution of chordates: Studies on physiological mechanisms of the chordates in hydrogen sulfide-rich environment/
Kaoru Kubokawa [ORI, Univ. of Tokyo]

(2)S08-57/
Study of the hydrothermal and fumarolic activities occurred in Wakamiko crater: their distribution and evolution/
Toshio Yamanaka [Okayama University]

Cruise period : August 4, 2008 – August 15, 2008

Port call:

August 4	Departure	Kagoshima
August15	Arrival	Kagoshima

Research Area:

Off Noma-Misaki, Kagoshima
Whale-falls off Noma-Misaki（Depth：200～350m）
The area surrounded with the following points
31°15.0'N 129°55.0'E
31°30.0'N 130°06.0'E

Kagoshima Bay
Wakamiko Crater (Depth：50～220m)
The area surrounded with the following points,
31°37.8'N 130°37.5'E , 31°42.0'N 130°37.5'E
31°42.0'N 130°46.5'E , 31°40.4'N 130°48.8'E
31°39.0'N 130°48.8'E , 31°37.8'N 130°47.5'E

Cruise Schedule:

4 August	Departure from Kagoshima port
5 August	HPD#882 Wakamiko
6 August	HPD#883 & #884 Wakamiko
7 August	HPD#885 & #886 Noma-Misaki
8 August	Transit
9 August	HPD#887& HPD#888 Noma-Misaki
10 August	HPD#889 Noma-Misaki
11 August	HPD#890 & #891 Noma-Misaki
12 August	Transit
13 August	Free fall & transit
14 August	HPD#892 Satsuma Haorimushi site & #893 Wakamiko
15 August	Arrival at Kagoshima port

Research map

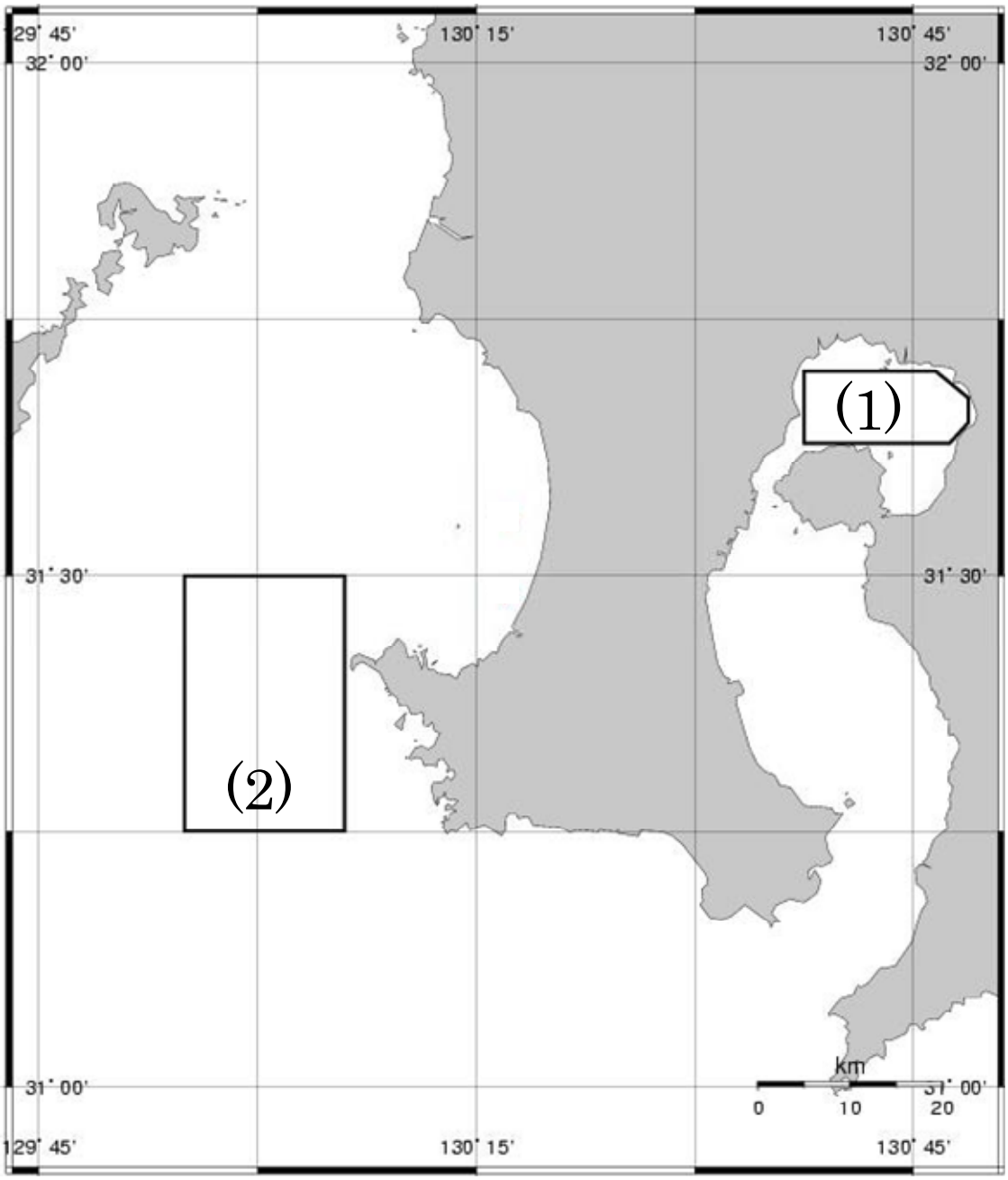

Fig. 1 Bathymetric map with proposed research area; (1) West off Noma-Misaki, Whale-fall area. (2) Kagoshima Bay, Wakamiko Crater, Tagiri and Haorimushi Site.

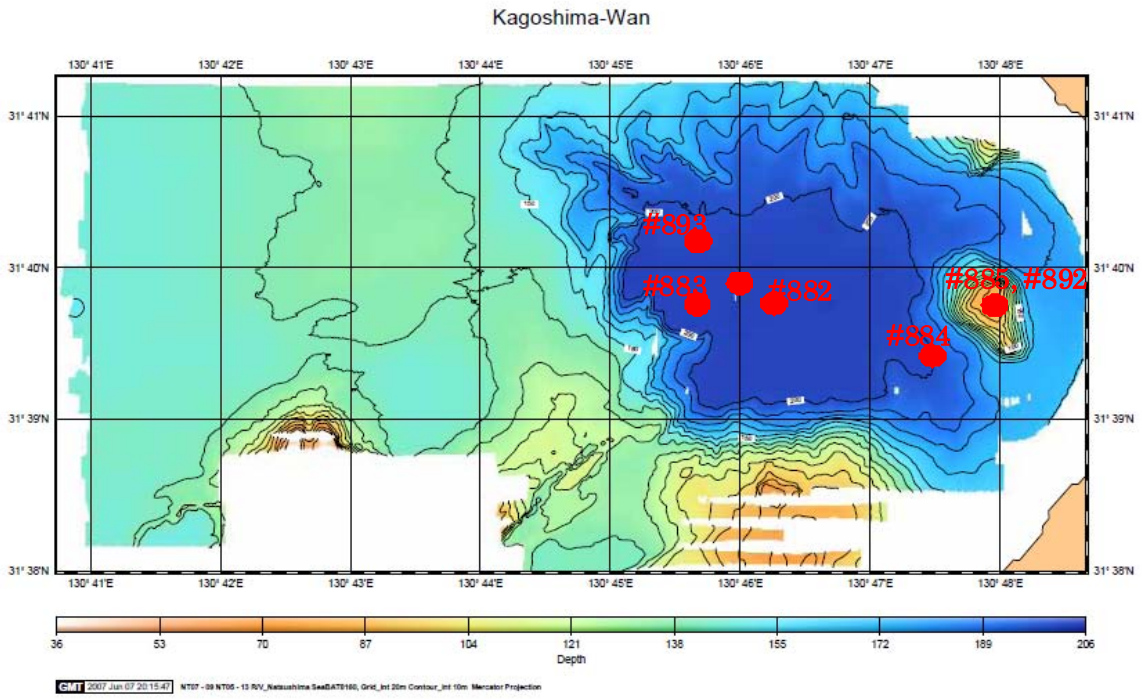

Fig. 2. Detailed map of the off Noma-Misaki with dive points. The map is contained in (1) of Fig. 1. Each point also shows the whale carcass whose number is 2, 6, 7, and 11 from North to South.

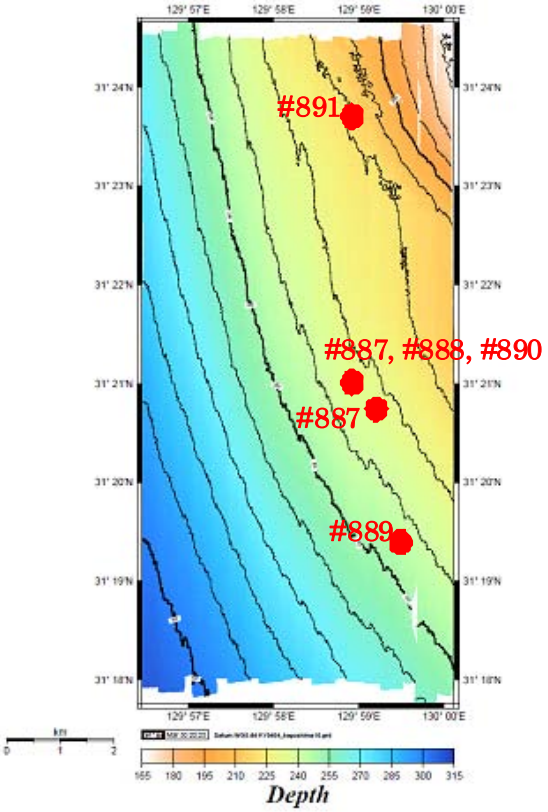

Fig.3. Detailed map of the Wakamiko crater and Haorimushi-site with dive points. The map locates in East part in (2) of Fig. 1. The map was constructed by SEABAT operation in NT07-19.

3. Researhers

Name	Affiliation
Chief scientist	
Kaoru KUBOKAWA	Ocean Research Institute, The University of Tokyo
Co-chief scientist	
Toshiro YAMANAKA	Okayama University
Scientists	
Akiko OMURA	Ocean Research Institute, The University of Tokyo
Yukiko TANDOU	Ocean Research Institute, The University of Tokyo
Sonali ROY	Ocean Research Institute, The University of Tokyo
Hisayuki IWATA	Ocean Research Institute, The University of Tokyo
Yoshihiro FUJIWARA	Japan Agency for Marine-Earth Science and Technology
Atsushi NAGAHORI	Japan Agency for Marine-Earth Science and Technology
Florence PRADILLON	Japan Agency for Marine-Earth Science and Technology
Gin KINOSHITA	Japan Agency for Marine-Earth Science and Technology
Masayuki MIYAZAKI	Japan Agency for Marine-Earth Science and Technology
Ayuta SHINOZAKI	Japan Agency for Marine-Earth Science and Technology
Hironori AKASHI	Okayama University
Koutarou MAETOU	Okayama University
Kei OKAYMURA	Kohchi University
Taku SUGIYAMA	Kohchi University
Shingo HIRAO	Kyushu University
Kenji OKOSHI	Ishinomaki-Senshu University
Nozomi ITOH	Ishinomaki-Senshu University
Youko MIYOSHI	Kyushu University
Tomoko YAMAMOTO	Kagoshima University
Masafumi KATO	Kagoshima University
Akiko TANATKA	Advanced Industrial Science and Technology
Msato JOSHIMA	Advanced Industrial Science and Technology
Aya ADACHI	Enoshima Aquarium

4. Research Summary

4.1 Study on physiological mechanisms of the chordates in hydrogen sulfide-rich environment

Kaoru KUBOKAWA (ORI, Univ. Tokyo)
Yoshihiro FUJIWARA (JAMSTEC)
Tomoko YAMAMOTO (Kagoshima Univ.)

Purpose and Background

The sperm whale-fall ecosystems were observed off the Cape Noma-Misaki, Kagoshima, Japan at depths of 219-254 m by the Hyper-Dolphin. Whale-fall ecosystems are clarified to be based on a chemosynthetic ecosystem. The succession of this unique ecosystem, which rapidly progressed from 2003 to 2008 has been studied from the beginning to the end. The purpose of this cruise is the study on the composition and diversity of the whale-fall fauna from an adaptation and evolution perspective. Furthermore, we concentrate on the ecology, development and evolution of two unique animals, *Osedax japonicus* (a bone-eating worm) and *Asymmetron inferum* (a whale-fall lancelet) that are exclusively present in the whale-fall ecosystem. The whale-fall lancelet is a new species of the subphylum Cephalochordata. It is included in primitive chordates and is the only chordate found in the sulphophilic community in the anaerobic sand sediment under the whale-fall bones. Phylum Chordata consists of subphyla Vertebrata, Urochordata, and Cephalochordata. Urochordates including tunicates have been found on the sea floor in the Wakamiko crater in Kagoshima Bay, especially around the hydrothermal vent. We hypothesize that they have physiologically and/or ecologically adapted to these extreme sulphophilic and anaerobic environments. In this study, we discuss the process of evolution in extreme environments including whale-fall ecosystems and hydrothermal vents.

Methods

Biological and geochemical samples were collected using manipulators, a scoop-sampler, a suction sampler and sediment corers installed on the ROV. Whale bones were collected using manipulators. Biological sorting was conducted using three sieves with different mesh sizes in the lab. Water temperature was measured using the SBE 19 CTD profiler.

Research results

In 2008, the whale bones began to appear weathered and became buried in the sediments and the whale-fall animal community including lancelets showed a decrease in abundance. In 887, 889, 890, 891 and 893 dives, we observed the condition of four wale-falls and collected the animals from among the whale bone fauna. At least hundred species including lancelets (Fig. 1), ctenophores, arthropods, mollusks, annelids, cnidarians and two unique cnidarians, *Osedax japonicus* and *Lyrocteis imperatoris* found in the whale bone fauna were collected. A sample of whale bones was also collected to observe the spawning and development of *O japonicus* in the laboratory. Tunicates (Fig. 2, 3), annelids and arthropods were also collected from the Wakamiko crater. Additionally, in #893 dive, we observed the distribution of tunicates from the center to the west edge of the crater.

Fig. 1 Whale-fall lancelet, *Asymmetron inferum*

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Fig. 2. Colony of tunicates at Wakamiko crater.

Fig. 3 Tunicates, *Ciona* sp.

4.2. Bathymetric study of Wakamiko crater

Toshiro YAMANAKA (Okayama Univ.)

Objective

Based on the previous geochemical and geophysical studies about the Aira caldera and its active crater, Wakamiko, we hypothesized that the fumarolic and hydrothermal discharges observed on the crater floor were reflect the activities of different volcanoes, because there are two active volcanos, Aira and Sakurajima, are laid back to back. Accordingly, the main purpose of this study is to clarify the detailed distribution of the fumaroles and hydrothermal sites in the crater and of the chemical species derived from the fumarolic and hydrothermal activities in the water column. In addition, we investigate the distribution of the altered minerals influenced of the acidic volcanic gases and hot hydrothermal fluids through the crater-fill sediments. Those results will be contributed to confirm the hypothesis. Furthermore, for understanding the time series changes of the volcanisms, we will compare the results with the previous data obtained from the crater. It will be contributed to predict the eruption of the volcanoes.

Methods and Instruments

For accomplish the purpose, we sampled seawater (Niskin bottle), hydrothermal fluids (ROCS with temperature probe), fumarolic gases (vacuum water sampler), sediments (push corer) and hydrothermal precipitations (by manipulator). In addition, some equipments were installed for geochemical and geophysical measurements; GAMOS for *in site* H_2S concentration mapping, CTD-DO for water column chemistry, Medusa for hydrothermal fluid velocity measurement, SAHF for geothermal heat flow measurement, DAI-PACK as side-scan sonar and sub-bottom profiler, SEABAT for detailed bathymetry imaging.

Observation of seafloor morphology with SEABAT and quantitative echo sounder were performed at the following area in Kagoshima Bay at night.

Wakamiko crater and the around area surrounding the following points:

Depth 50-200 m

31°37.8'N	130°37.5'E	,	31°42.0'N	130°37.5'E
31°42.0'N	130°46.5'E	,	31°40.4'N	130°48.8'E
31°39.0'N	130°48.8'E	,	31°37.8'N	130°47.5'E

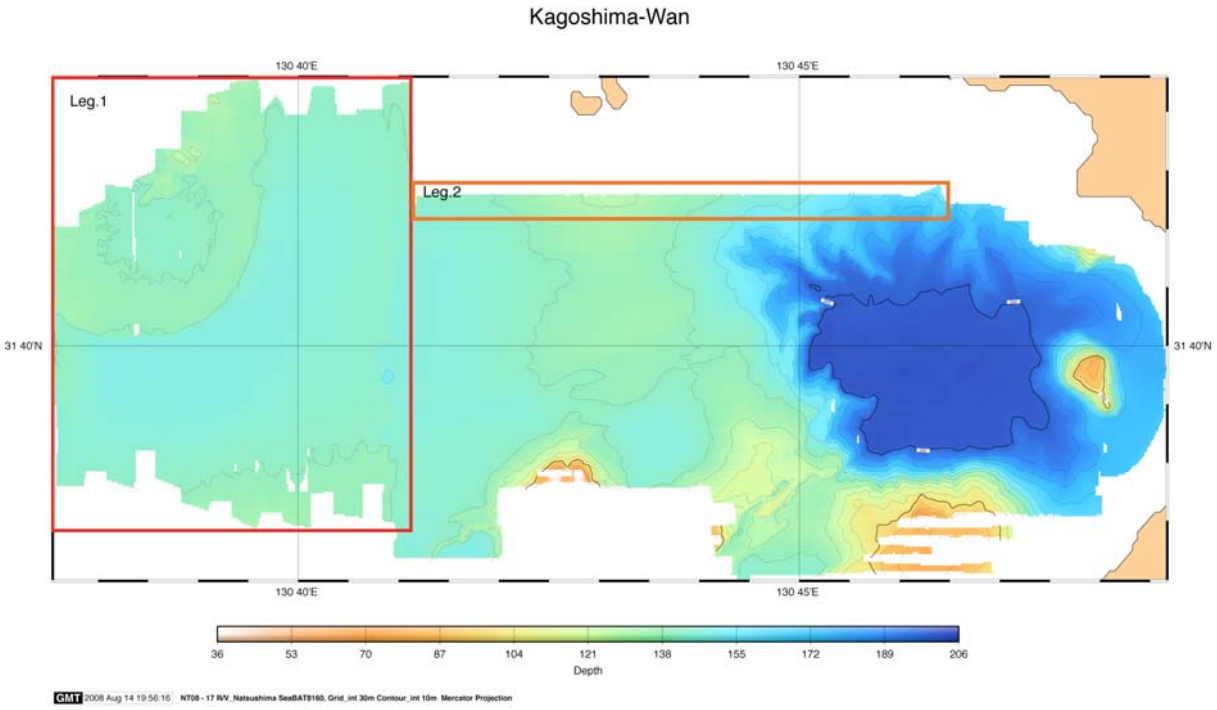


Fig. 4　Detailed map of the Wakamiko crater of Kagoshima Bay

Preliminary results

During the cruise, we successfully obtained many samples such as the hydrothermal fluid samples (Tmax = 111˚C) from three vents, hydrothermal precipitations mainly composed of sulfide and carbonate minerals from two chimneys, and fumarolic gases from three sites (Dives H#883, 886, 893). And we carried out the DAI-PACK measurement along the ca. 7km survey line (Dive H#882), GAMOS measurement at every dive in the Kagoshima Bay (Dives H#882 ~ 886), SAHF measurement at points, and Medusa measurement of eight days.

Future study

Hydrothermal fluid samples: After return to the offshore laboratories we plan to analyze the chemistry as follow; major anion and cation, heavy metal, dissolved gas (hydrocarbon and volatile fatty acids), ^{34}S of hydrogen sulfide, D and ^{18}O of water, and dissolved organic carbon.

Fumarolic gas samples: We plan to measure the gas composition and the isotopic composition of hydrocarbon, carbon dioxide, hydrogen, and helium.

Hydrothermal precipitation samples: We plan to measure the mineral assemblage, chemical composition and isotopic composition (carbon, oxygen, sulfur, strontium, and so on) of each mineral.

Seawater samples: We plan to measure the dissolved gas composition, major anion and cation, heavy metal, and dissolved organic matter.

Sediment core samples: We plan to measure the mineral assemblage, chemical composition and isotopic composition (carbon, oxygen, sulfur, strontium, and so on) of each mineral. In addition, squeezed pore water chemistry will be measured (detailed items for measurement are same with the hydrothermal fluid samples).

GAMOS and CTD-DO data: The obtained data will be analyzed and it uses to make a chemical distribution map of the crater area.

Geophysical observation data:

SAHF: The obtained data will be analyzed and the data will be compared with the previous data for confirm of heat flux changing during the recent three years.

DAI-PACK: The obtained data will be analyzed and we want to clarify how the hydrothermal fluids and fumarolic gas penetrate the bottom sediments.

Medusa: The obtained data will be analyzed and it use to estimate chemical flux of hydrothermal activity in the crater.

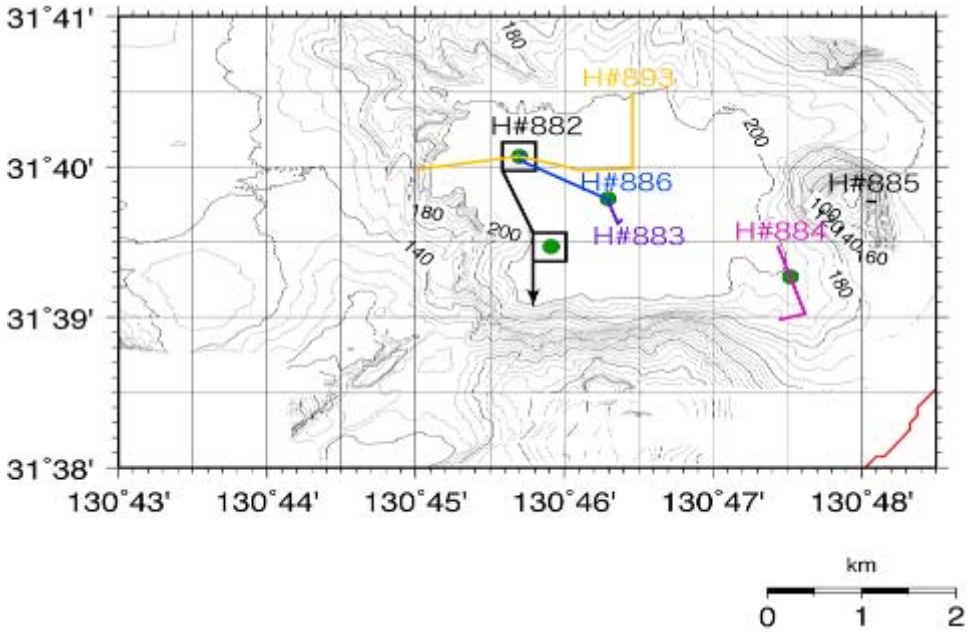


Fig. 5-1 DAI-PACK measurement: Map of side scan in Dive #882

North area (Dive #882)

South area (Dive #882)

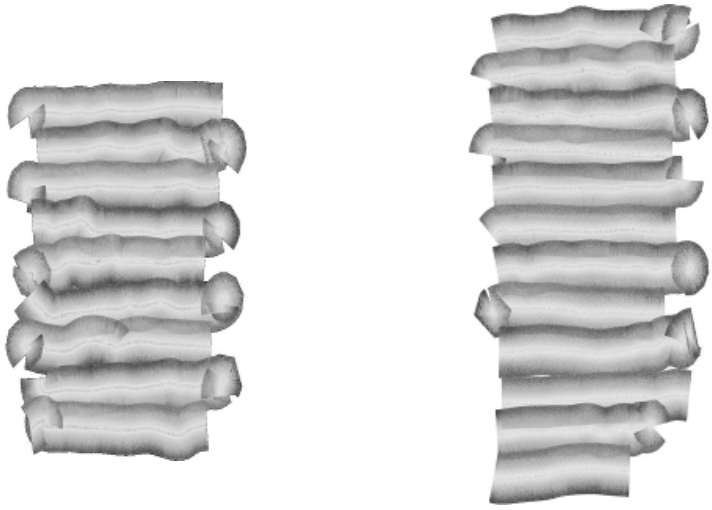


Fig. 5-2 DAI-PACK measurement: Side scan sonar Images

North area (Dive #882)

South area (Dive #882)

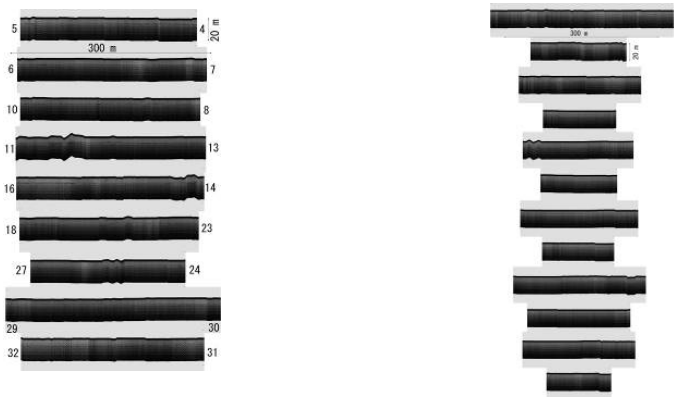


Fig. 5-3 DAI-PACK measurement: Sub-bottom profiler Images

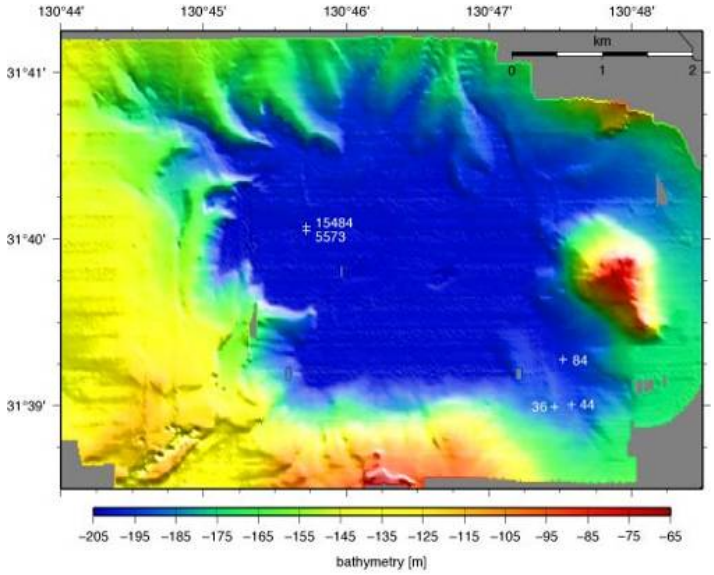


Fig.6 SAHF measurement: Thermal gradient (K/m)

4.3. Measurement of temperature using with SAHF (Stand-Alone Heat Flow meter)

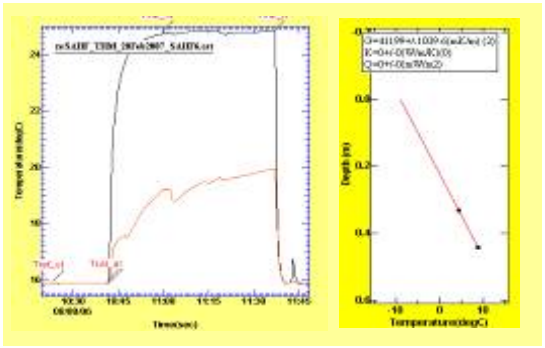
Toshiro YAMANAKA (Okayama Univ.)
Akiko TANAKA (Geological Survey of Japan, AIST)

We obtained geothermal gradient determination using SAHF probe through research cruise with Remotely Operated Vehicles (ROVs) "Hyper Dolphin" (Table 1). Temperatures against depth profiles (Fig. 7) are mostly linear. Figure 7-1 uses two thermisters. However, geothermal gradient values vary by 3 orders of magnitude. In addition, we found some non-linear temperature against depth profiles. This may indicate for a local hydrothermal circulation. This will be discussed more in detail later.

Table 1. Geothermal gradient during NT08-17.

#	Instrument	Dive #	Date	Duration	Location
S1	SAHF#6	883	08/08/06	10:41-11:37	31°39.746'N 130°47.388'E
S2	SAHF#6	884	08/08/06	14:54-15:10	31°39.275'N 130°47.497'E
S3	SAHF#6	884	08/08/06	15:48-16:03	31°39.008'N 130°47.605'E
S4	SAHF#6	884	08/08/06	16:24-16:40	31°38.995'N 130°47.460'E
S5	SAHF#6	886	08/08/07	14:06-14:26	31°46.871'N 130°45.689'E
S6	SAHF#6	886	08/08/07	15:31-15:49	31°48.049'N 130°45.695'E

7-1



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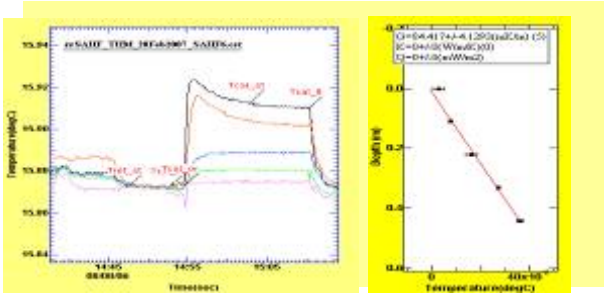

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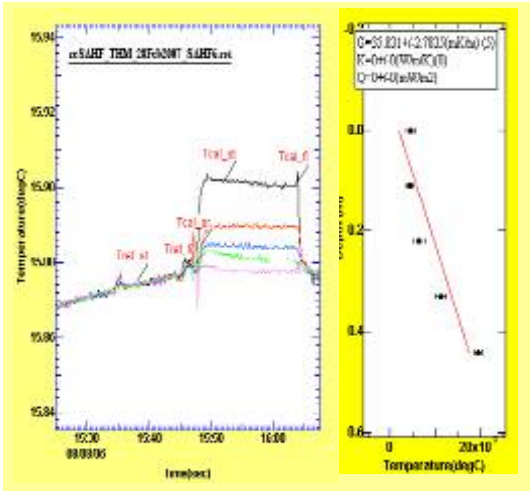

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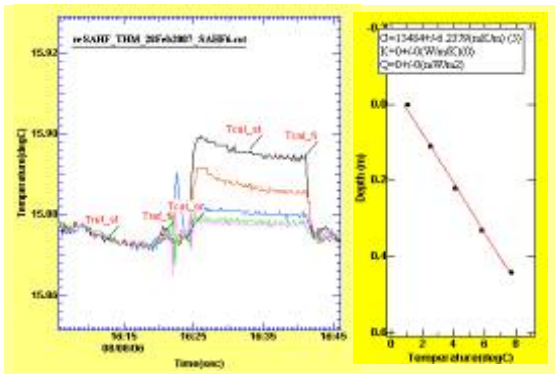

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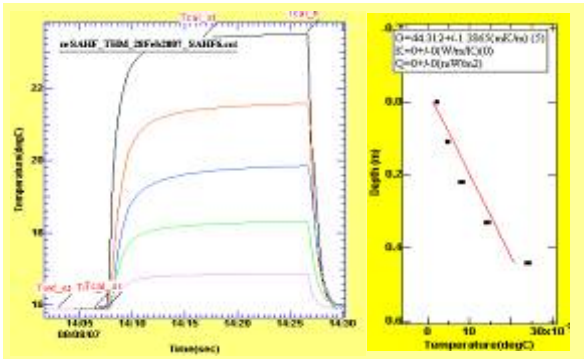


7-6

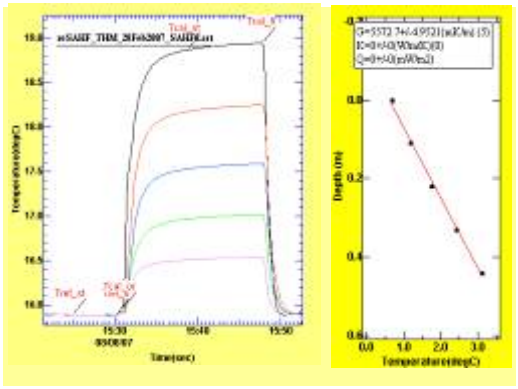


Fig. 7 Profiles of temperature changes measured with two thermisters (7-1) and five thermisters (7-2 to 7-6). Right figures show the correlation of temperature against depth. The number of each two graphs corresponds to the point number of measurement.

4.4. Temperature and flow measurements at the hydrothermal vent by Mini-Medusa

Akiko TAKANA (Geological Survey of Japan, AIST)
Toshiro YAMANAKA (Okayama Univ.)

We deployed two Mini-Medusas (MM) at "Hairy Chimney site" (Table 2). Time-series of effluent velocity and temperature and temperature of ambient seawater will be obtained.

Table 2. Measurements of temperature and flow by Mini-Medusa

Item	Mini-Medusa #1	Mini-Medusa #2
Deployment		
First Deployment	2008/08/05	2008/08/07
Dive No.	HD#882	HD#886
Location	Hairy Chimney site (T=49 °C)	Beside Hairy Chimney site (T=17 °C)
Latitude	31°48.071'N	31°48.876'N
Longitude	130°45.698'E	130°45.684'E
Depth	~200 m	~200 m
Second Deployment	2008/08/07	
Dive No.	HD#886	
Latitude	31°48.049'N	
Longitude	130°45.695'E	
Depth	~200 m	
Recovery		
Date of recovery	2008/08/14	2008/08/14
Dive No.	HD#893	HD#893

4.5 Observation of hydrothermal precipitations

Toshiro YAMANAKA (Okayama Univ.)

We obtained precipitations from the hydrothermal vent (Fig. 8). Those are mainly composed of sulfide and carbonate minerals.

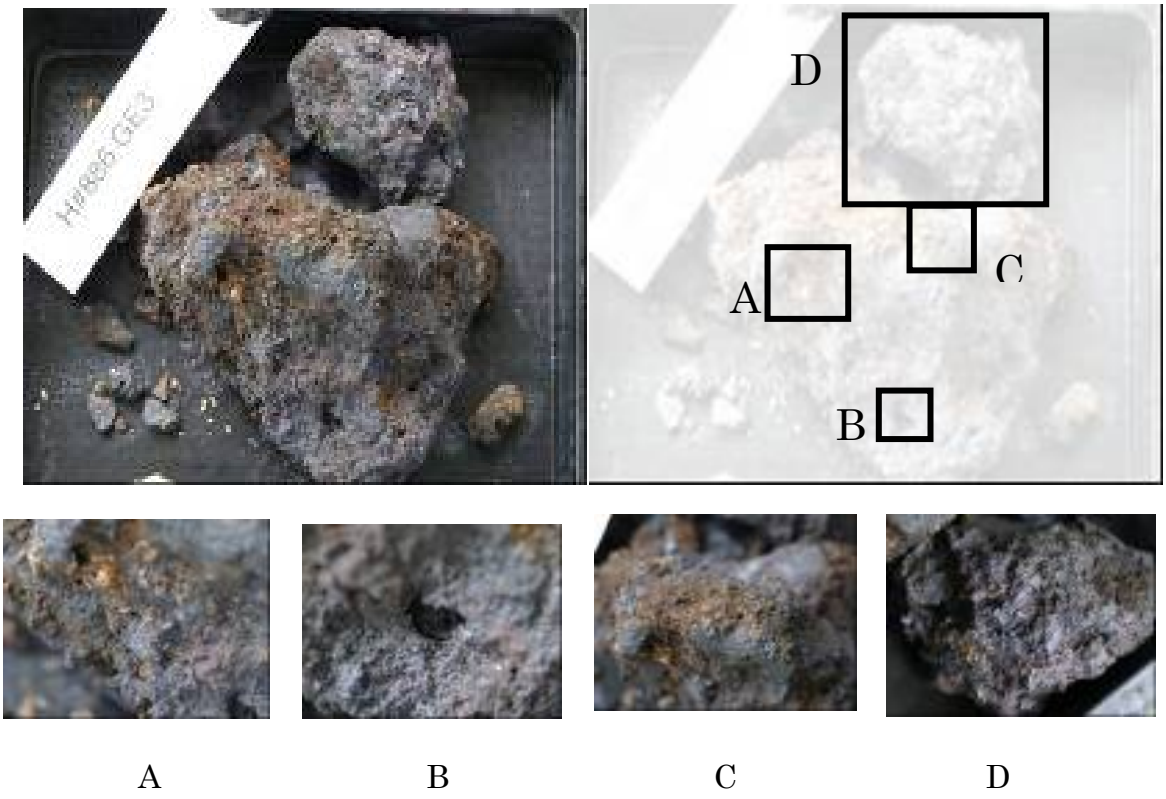


Fig. 8 Precipitations from the hydrothermal vent.

4.6 Whale-fall observations

Yoshihiro FUJIWARA (JAMSTEC),
Tomoko YAMAMOTO (Kagoshima Univ.),

Three whale bodies (#6, #7 & #12) were repeatedly observed during all diving cruises at this location, and two (#2 & #11) occasionally (Table 3). Most bones were buried in sediments and already exhausted (Fig. 9-11). Several pieces of bones were collected during this cruise and were easily crashed during sampling using an ROV's manipulator (Fig. 12). Most bones sampled were more fragile and spongier than that collected during the previous cruises and no endemic faunae inhabited such bones except maxillae of #6 whale (Fig.13), on which a dense aggregation of *Adipicola pacifica*, *Idasola* spp., and *Osedax japonicus* located.

Table3 List of whale bodies

Whale #	Total length (m)	Estimated weight (t)	Depth (m)	Latitude (N)	Longitude (E)	Dive # / year					Observation year
						Jul 2003	Jul 2004	Jul 2005	Jun 2007	Aug 2008	
2	13.20	23.0	219	31°23.865'	129°58.766'	198	-	462	-	891	2003, 2005, 2008
6	16.00	39.0	228	31°20.998'	129°59.158'	191, 196	329, 331, 332	452, 456	689	887, 888, 890	2003, 2004, 2005, 2007, 2008
7	12.95	21.9	229	31°20.720'	129°59.285'	189, 190, 192 193, 197	328, 329 331, 332	453, 457 464, 465	682, 689	887	2003, 2004, 2005, 2007, 2008
11	13.05	22.3	245	31°18.844'	129°59.520'	-	333	458	-	889	2004, 2005, 2008
12	13.50	24.5	254	31°18.515'	129°59.374'	194, 195	330	459, 463, 466	688	889	2003, 2004, 2005, 2007, 2008

Fig. 9. Succession of #12 whale

Fig. 10. Buried bones of #6 whale

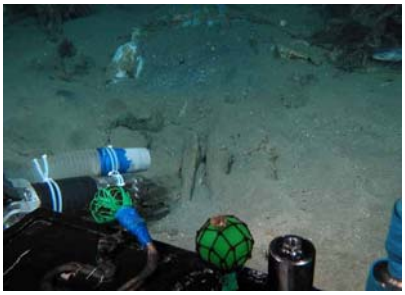


Fig. 11. Buried bones of #11 whale

Fig. 12. Sampled bone B891-1

Fig. 13. Maxillae of #6 whale

4.7 Succession of whale-fall community

Yoshihiro FUJIWARA (JAMSTEC)
Tomoko YAMAMOTO (Kagoshima University)

Endemic epifaunae on whale bones were remarkably decreased. A dense aggregation of *Adipicola pacifica* was observed on maxillae of #6 whale only (Fig. 14). Single specimen of *Adipicola crypta* and many Idasola spp. were collected with *A. pacifica* from #6 whale. Small clusters of *Osedax japonicus* were observed at #6 & #11 whales. A new species of gnathia isopod, which had been discovered in 2007, inhabited the bone surfaces and small holes on the bones, and the total number was increased in 2008. Numerous protodrilid polychaetes appeared from bones in aquaria onboard (Fig. 15).

By comparison with endemic epifaunae, a total number of suspension feeders such as crinoids (Fig. 16), cirripeds and anthozoans was increased, which implies the bones exposed to seawater to be exhausted. The number of *Lyrocteis imperatoris* was slightly decreased (Fig. 17). In addition, a number of predatory fish species such as eels, *Niphon spinosus* (ARA) (Fig. 18), *Cephaloscyllium umbratile* (NANUKAZAME), and *Squatina japonica* (KASUZAME) (Fig. 19) was increased but no *Stereolepis doederleini* (OOKUCHIISHINAGI), which was recorded in 2007, was observed.

Diversity of whale-fall endemic infaunae was similar to that from previous researches. *Asymmetron inferum*, solemyid clams, lucinid clams and many species of polychaetes were dominant. No *Kelliella* clam was collected but a new morphotype of solemyid clams was appeared in addition to *Solemya pervernicosa*. Total number of *A. inferum* was decreased but the size was much larger than before.

Fig. 14. *Adipicola pacifica* on maxillae of #6 whale

Fig. 15. Protodrilid in an *Adipicola* aggregations

Fig. 16 Crinoids on bones of #12 whale

Fig. 17 *Lyrocteis imperatoris*

Fig. 18 Eel and *Niphon spinosus* around #12 whale

Fig. 19 *Squatina japonica* around #7 whale

4.8 Collection of lancelet

Sonali ROY, Yukiko TANDO, Hisayuki IWATA, Kaoru KUBOKAWA (ORI, Univ of Tokyo)

Whale-fall lancelet (*Asymmetron inferum*) was collected from the dive 887 (8 from #6 and 2 from #7), 888 (41 from #6), 889 (140 from #11), 890 (30 from #6) and 891 (50 from #2). Total 271 lancelets were collected, 3 of them was severely injured, and gonads was not checked in 14 of them from dive 889 (#11). Rest 254 animals were analyzed for the current report. Only 2 samples were collected from the #7, so the result is not significant for #7.

The average length of the animals was 25.7 mm. From the analysis of the body length the animals can be differentiate in 2 groups. First group have the body length from 9 to 20 mm and the second group have the body length from 20 to 37 mm (Fig.20). Gonads were found in some animals of the second group. Frequency of the presence of gonads increased with the increased body length. Some animals have small gonads, possibly the animals already spawned.

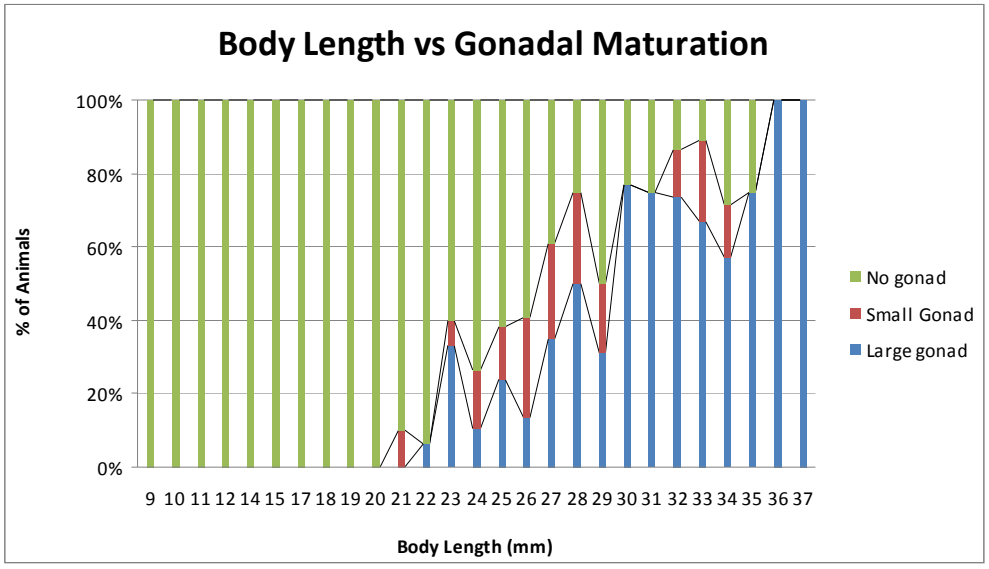


Fig. 20. Relation between body length and gonadal maturation in whale-fall lancelets

Interestingly the presence of gonads was also varying with the collection sites. More than 60% of the animals have gonads in #6, 50% of the animals are with gonads in #11, but only 4% of the animals have under developed gonads in #2. Body lengths of the animals also differ with the collection site. The average length of the animals are more in #6 (26.35), where as the length of the animals are less in #11 (25.5) and #2 (25.22).

When we calculate the percentage of the animals with body length according to the location the same pattern, we get. 68.35% of the animals have the body length

between 25 to 36 mm in #6, 81.3% animals between 19 to 27 mm in #2. have body length between 22 to 32 mm in #11, and 72% of the animals (Fig. 21). The places of collection of lancelets are shown in Fig. 22.

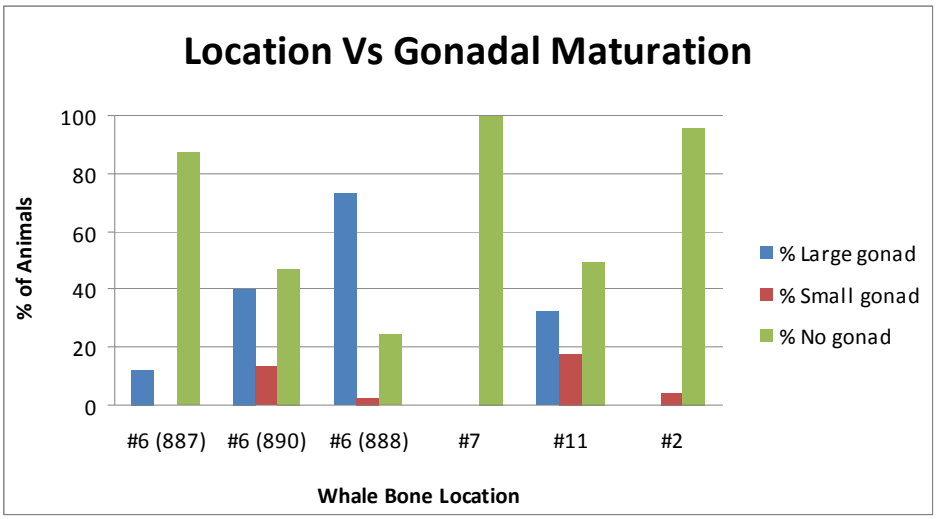


Fig. 21. The gonadal development of wale-fall lancelets collected from the whale carcass

Fig. 22. Collection of sediment by spoor sampler

4.9. Dissection of Tube worm

Sonali ROY (ORI, Univ. of Tokyo)

Cut the tube superficially with a blade 8-10 cm below the mouth, separate the 2 part slowly, the body of the worm will appear. Pull the tail part with forceps slowly, so that the tail will come out from the tube without tear or damage. Push air from the mouth/opening with empty syringe, head part will come out of the tube. Check the gill of the worm under microscope, inside of the gill will be flat in case on female, but there will be 2 longitudinal grooves in male. In mature female there will be eggs on the body part, just below the gill. Cut the worm just below the gill. Fix the animal in 2 separate part in Bouin's or PFA (in PBS) or LN_2.

Fig.23 The dissection of tube worm

4.10 Microbial diverse and taxonomic studies at whale-fall community

Masayuki MIYAZAKI (JAMSTEC)

Sediment sample were collected by sterilized sediment sampler from the dive #887 #6 whale and #7 whale, the dive #888 #6 whale, the dive #889 #11 whale and #12 whale, the dive #890 #6 whale, and the dive #890 #2 whale (Fig. 24). Nine sediment samples in total were collected. We researched a transition of the microorganism in the #6 whale. Result of the microorganism transition in the whale-fall community from 2003 to 2006 and these samples research is compared. In addition, we try to cultivate sulfur reducing bacteria of specific whale fall site.

Fig. 24. Collection of sediment adjacent to whale fall by sterilized sediment sampler

4-11 Sampling of the benthic ctenophore

Aya ADACHI (Enoshima Aquarium)

The benthic ctenophores (comb jelly) *Lyrocteris imperatoris* were found on Gorgonacea in #889 and glass sponges in #889 and #890 (Fig. 25). They were transferred to Enoshima Aquarium and then fixed for the morphological observation.

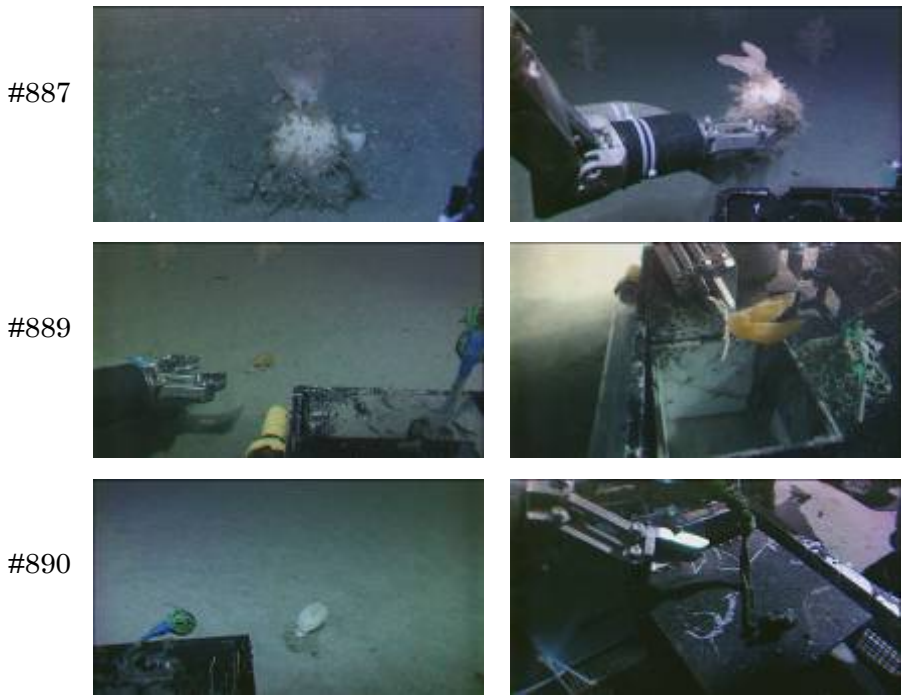


Fig. 25 Collection of *Lylocteis imperatoris*

4.12 Quantitative measurement of tunicates

Tomoko YAMAMOTO (Kagoshima University)

Tunicates of *Ciona* were distributed at high density on the sea floor in the Wakamiko crater (Fig. 26-28). It is supposed that their biomass has drastic seasonal change according to previous investigations in this area. Their density and distribution area thought to increase and expand from spring to autumn and decrease and diminish in the winter. Since there is few quantitative study of the tunicate population, we tried to estimate the biomass of this population in this study.

We put a quadrate (30cm×30cm) on the sea floor at three times and took pictures of tunicates inside the quadrate (Fig. 29). This photographing was repeated at three different points. We also tried quantitative sampling with a tunicate net (30cm×30cm). Tunicates were sampled by scooping the sediment of bottom surface with the net (Fig. 30). We will estimate square measure of scooped area from the photograph.

Fig.26. Population of *Ciona* sp. on the sea floor in the Wakamiko crater

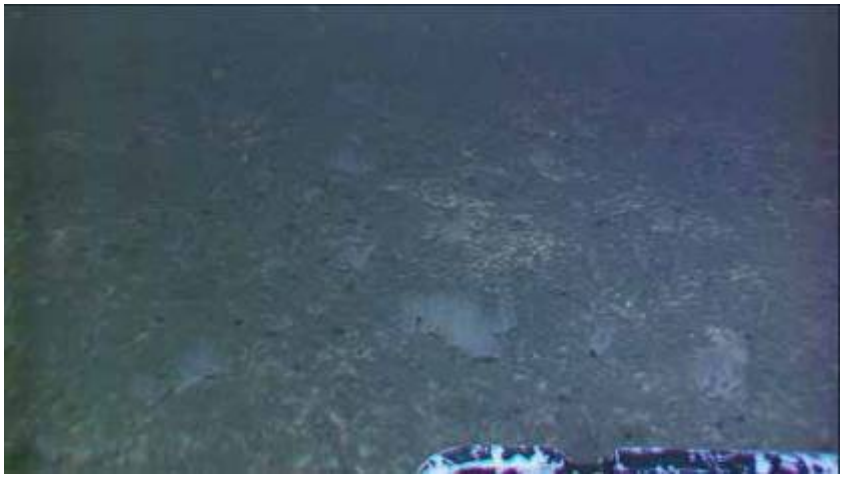


Fig. 27. Aggregation of *Ciona* sp. on the sea floor in the Wakamiko crater

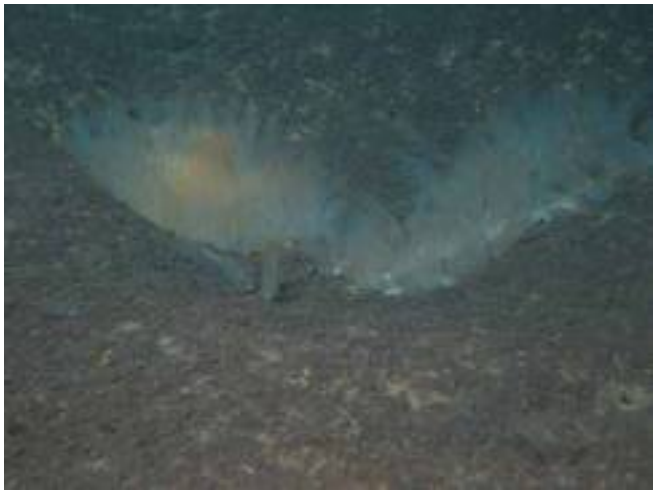


Fig. 28. Aggregation of *Ciona* sp.

Fig. 29. Density estimation of *Ciona* sp.

Fig. 30. Quantitative sampling of *Ciona* sp.

5 List of observation instruments

5.1. Suction sampler (Slurp gun)

The suction sampler was used to collect benthos and planktons. In order to collect different animals, 6 bottles were used in the canister.

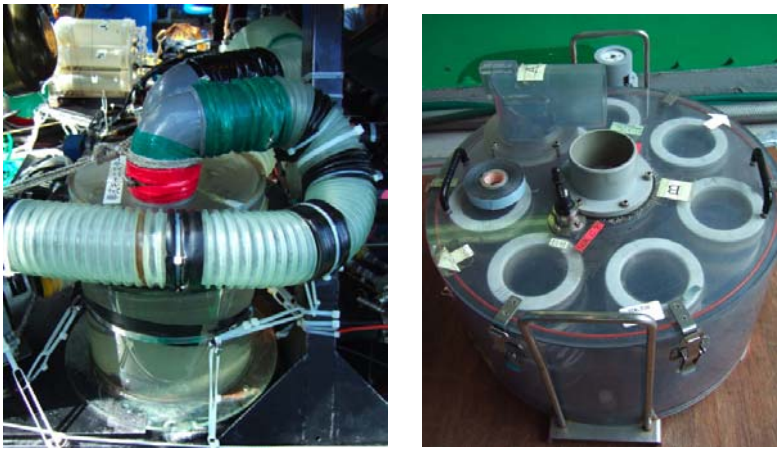


Fig.1 Suction sampler (Left) with bottles (Right)

5.2. SAHF (Stand-Alone Heat Flow meter)

SAHF (Stand-Alone Heat Flow meter, Fig.2) is designed to measure heat flow by HOVs or ROVs [Kinoshita et al., 2005]. Five thermistors are mounted within the probe at 11–12 cm intervals. To determine vertical geothermal gradient, temperatures are measured for 10–15 min after penetration, then the effect of frictional heating or of adjustment to in situ temperatures is corrected. SAHF probe generally penetrated vertically, but where necessary temperature gradients were corrected for tilt by estimating tilt angles from video images. Although tilt angles can only be resolved within 20°, it affects the temperature gradient by 6%. Measured difference in temperature gradient is much larger than this [Kinoshita et al., 2006].

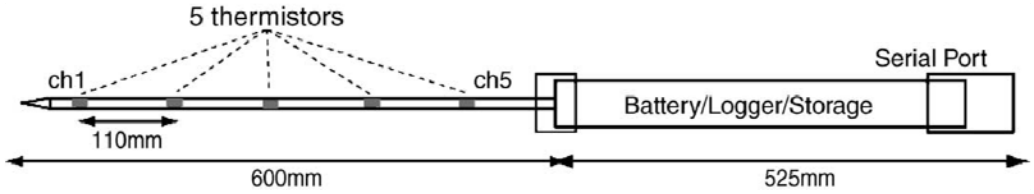


Fig 2. SAHF. Resolution of temperature is about 1 mK [Kinoshita et al., 2006]. Total weight in water is 3 kg, made made of titanium alloy.

5.3 ROCS (Rotary collector)

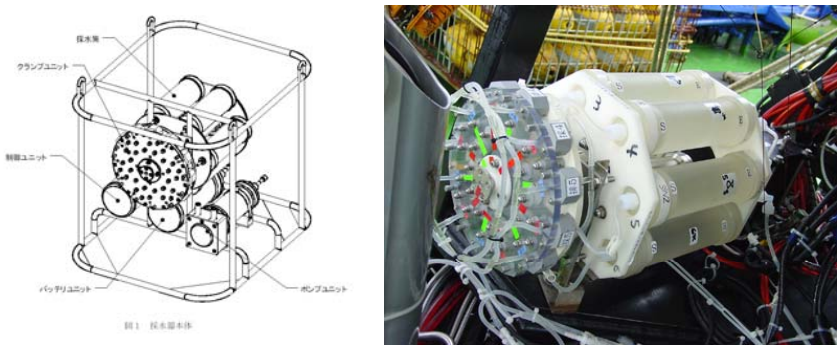


Fig. 3 Illustration of a ROCKS (left) and the picture of sampling bottles with sampler (right).

5.4 Vacuum water sampler

Fig. 4 Vacuum water sampler

5.5 MBARI-type core sediment sampler

Fig. 5 MBARI cores prepared on payload (left). Put the core on the slicer bed (middle) and collect a thin sediment disk (right).

5.6 Medusa

Medusa is used to measure the temperature and velocity of hydrothermal effluent flowing out of seafloor hydrothermal systems. This system was designed by a team lead by Dr. A. Schultz, Cardiff University (now NSF). Deployment of Medusa 1a systems at Broken Spur and TAG vent fields, MAR, in 1994, provided great advances in our knowledge of the properties of hydrothermal effluents (Schultz et al., 1996). The present version, mini-Medusa [Fig.3], was modified and have been designed for installation at areas of warm diffusive flow. These instruments have been optimized to permit installation by remotely operated vehicle or manned submersible.

Fig.6 Mini Mdeusa

5.7 Sterilized sediment sampler

Sterilized sediment sampler collected from deep-sea sediment (Ikemoto, E. & Kyo, M., 1993). This sampler prevents mixing of the microorganism from the outside during going and returning to the sampling point. The black color box of the outside has the effect which prevents the rise in temperature while ROV's are taken up.

Fig. 7 Sterilized core sampler

Ikemoto, E. & Kyo, M. (1993). Development of microbiological compact mud sampler. Jpn Mar Sci Technol Res 30, 1–16.

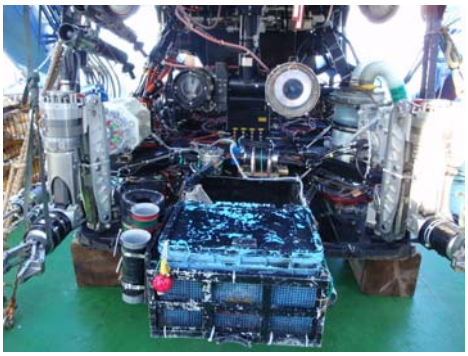
5.8 Quadrate frame

Fig. 8　Square bar (30cm x 30cm) to use the quantitative measurement.

5.9 Tunicate sampling net

Fig. 9　Square wire (30cm x 30cm) with a net is useful in the collection of benthos.　The net can be attached to the quadrate frame shown in Fig.9.

5.10 Sample box



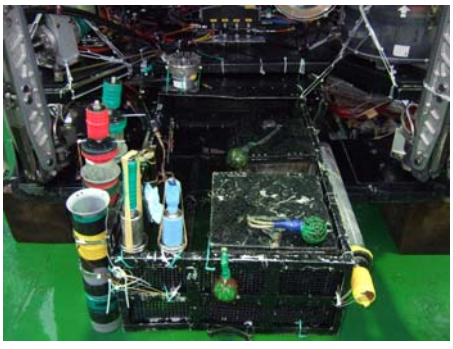


Fig. 10　Sample boxes of large (left), middle (right) and small (right) sizes

6. Dive log

2008/8/5 HPD Dive #882 in Wakamiko crater

Time	Depth(m)	Description
8:22	0	Start the dive
8:32	196	Landed.
8:42	199	Mini-medusa settlement
9:47		Observation of hydrothermal vent
9:50		NISKIN water sampling
9:51	195	DAI-PAC
9:58		Observation point 1
10:10		Observation point 2
10;12		Observation point 3
10:22		Observation point 4
10:24		Observation point5
10:34		Observation point 6
10:37		Observation point 7
10:47		Observation point 8
10:50		Observation point 9
10:55		Observation of hydrothermal vent
11:00		Observation point 10
11:04		Observation point 11
11:14		Observation point12
11:17		Observation point 13
11:26		Observation point 14
11:29		Observation point 15
11:41		Observation point 16
11:43		Observation point 17
11:54		Observation point 18
11:55		Move to South
12:20	195	Observation point 1
12:33		Observation point 2
12:36		Observation point 3
12:41		NISKIN water sampling
12:43		Observation point 4
12:45		Observation point5
12:53		Observation point 6
12;55		Observation point 7
13:00		Observation point 8

13:02		Observation point 9
13:10		Observation point 10
13:12		Observation point 11
13:17		Observation point12
13:20		Observation point 13
13:27		Observation point 14
13:29		Observation point 15
13:34		Observation point 16
13:36		Observation point 17
13:43		Observation point 18
13:46		Move to South
13:53		Observation point 3
		Observation point 4
14:05		Observation point 4
14:07		Observation point5
14:21		Observation point 8
14:46		Leave the bottom

2008/8/6 HPD Dive #883 in Wakamiko crater

Time	Depth(m)	Description
8:22		Start of dive
8:35		Landed
9;24		Tunicate sampling with using Slurp gun
9:41	200.5	Landed near large hole
10:01		Measurement of temperature in seep
10:07	200.5	Sediment sampling with MBARI core
10:09		Settlement of Marker H883-1
10:25		Marker H685 and H258
10:41		SHAF at the site of H258
10:48		Sampling of gas at the site of H258
11:23		Sediment sampling with MBARI core
11:29		Settlement of the video camera
11:34		Settlement of Homer
11:36		Water sampling with NISKIN
11:37		Recovery of SHAF
11:49		Water sampling with NISKIN
11:55		Left the bottom

2008/8/6 HPD Dive #884 in Wakamiko Crater

Time	Depth(m)	Description
13:50	0	Start of dive
14:05	194	Landed
14:30	195	Landed
14:32	195	Water sampling with NISKIN
14:54	194	Measurement of SHAF reference
14:56	194	Sediment sampling with MBARI core
15:45	188	Landed
15:48	188	Temperature measurement with SHAF
16:19	185.4	Landed
		Sediment sampling with MBARI core
16:48		Collection of tunicates
16:56		Landed

2008/8/7 HPD Dive #885 in Wakamiko Crater

Time	Depth(m)	Description
8:23	0	Start of dive
8:31	117	Landed
8;46	102	Tube worm
8:51	101	Landed near whale bone
8:57	101	MBARI Red
9:04		MBARI Yellow
9:12		Slurp gun at the surface of whale bone
9:19		Settlement of whale bone
9:28	102	Landed
9:29		MBARI Blue
9:36		Sediment collection by Scoop
10:05	102	Collection of tube worm
10:15	102	NISKIN Red
10:26	103	Landed
10:29	103	Water sampling with Vacuum Water sampler
10:39	103	NISKIN Green
10:41		Left the bottom

2008/8/7 HPD Dive#886 in Wakamiko Crater

Time	Depth(m)	Description
13:14	0	Start the dive
13:25	195.6	Landed
13:32		Settlement of Medusa
13:44		Recovery of Medusa
13:51		Settlement of Medusa
13:53		Collection of tunicates
13:58		Landed
14:06		Measurement of SAHF reference
14:10		MBARI Green
14:13		Sampling of gas
14:26		Recovery of SAHF
14:38		Collection of a block of chimney
14:39		Temperature measurement
14:41		Water sampling with using ROCKS
14:54		NISKIN
14:59		Collection of a block of chimney
15:08		Collection of a block of chimney
15:16		Collection of tunicates with using slurp gun
15:20		Marker（H886-1）
15:26	197.9	Landed
15:31		Start SAHF
15:55		MBARI Red
15:57		Marker (H886-2)
16:03		Temperature measurement
16:05		Water sampling with ROCKS
16:11		NISKIN No.2
17:09		MBARI Yellow
17:14		Recovery of Video Camera
17:16		Recovery of Homer
17:21		Left the bottom

2008/8/9 HPD Dive #887 in Noma-Misaki

Time	Depth(m)	Description
8:16		Start the dive
8:33	221	Landed
9:07		No.7 Whale
9:11	226	Marker No.682-1
9:13		NISKIN No.1
9:39	227	Landed
9:44		Slurp gun No.1bottle
9:53		Landed
9:54	227	MBARI core Red
9:57	227	Sterilized sediment sampling
10:06	227	Marker No.682-1
10:23		Collection of Jelly fish
11:13	226	No.6 Whale
		NISKIN No.2
11:24		Slurp gun No.2 bottle
11:33		Slurp gun No.3 bottle
12:00	228	Collection of whale bone
12:31		Landed
12:34		Wood x 2 (452－1、331－1)
12:45		Recovery of Homer
12:54		Slurp gun No.4 bottle
13:02	227	MABARI Green
13:05		Sterilized sediment sampling
1307		Left the bottom

2008/8/9 HPD Dive #888 in Noma-Misaki

Time	Depth(m)	Description
14:45		Start the dive
14:59	223	Landed
15:14	226	Landed beside No.11 whale
15:24		MBARI Blue
15:37		Sterilized sediment sampling
15:41		NISKIN No.1
15:42		Sediment sampling by Scoop
15:48		Sediment sampling by Scoop
16:03		Collection a whale bone
16:16	227	Slurp gun No.3 bottle
16:39		Sediment sampling by Scoop
16:54		Slurp gun No4 bottle
16:57		Slurp gun No.5 bottle
16:58		Slurp gun without bottles
17:05	226	Left the bottom

2008/8/10 HPD Dive #889 in Noma-Misaki

Time	Depth(m)	Description
8:10		Start the dive
9:01	249	Landed by No.12 whale
		NISKIN No.1
9:19		Photograph of No.12 whale
9:44		MBARI コア Green
9:49		Sterilized sediment sampling
9:53		Slurp gun No.1 bottle
10:47		Collection a wood
		Collection a jerry fish
11:43	243	Marker 333-1
11:46	245	Landed
		NISKIN No2
11:50		Slurp gun No.3
11:56		Slurp gun No.2
12:59		MBARI Blue
12:01		Sterilized sediment sampling
12:05		Slurp gun No.5
12:15	246	Slurp gun No.4
12:30	245	Sediment sampling
12:50		Landed

2008/8/11 HPD Dive #890 in Noma-Misaki

Time	Depth(m)	Description
8:20		Start the dive
8:34	222	Landed
9:30	225	Collection of jerry fish
		Landed at No.6 wale
		NISKIN No.1 and No.2
9:57		MBARI green
10:00		Sterilized sediment sampling
10:04		Slurp gun No.3
10:11		Sediment sampling
10:47		Sediment sampling
11:14		MBARI blue
11:17		Landed
11:18	226	MBARI Red
11:21		Sterilized sediment sampling
11:29		Slurp gun No.3 for plankton sampling
11:35		Slurp gun No.4 for plankton sampling
11:42		Slurp gun No.6 for plankton sampling
12:08		Slurp gun No.1 for benthos
12:23		Collection of whale bone
12:30		Left the bottom

2008/8/11 HPD Dive #891 in Noma-Misaki

Time	Depth(m)	Description
14:43		Start the dive
15:01	218	Landed
15:46		Landed at No.2 whale
15:55		NISKIN
15:58		MBARI Green
16:00		MBARI Red
16:02		Sterilized sediment sampling
:16:07		Sterilized sediment sampling
16:12		Slurp gun No.1
16:26		Collection of whale bone
16:45		Sediment sampling
17:02		Sediment sampling
17:36		Marker written the names of scientists
		Left the bottom

HPD Dive #892

2008/8/14 in Tube worm colony site

Time	Depth (m)	Description
8:20		Start of dive
8:32	100	Landed
8:34	101	Observation of tube worms
8:43	103	Sampling Tube worm larvi by slurp gun
8:58		Sampling Tube worms by manipulator
9:02		Leave bottom

2008/8/14 HPD Dive #893 in Noma-Misaki

Time	Depth (m)	Descriptions
10:44	0	Start of dive
10:57	191	Landed
11:00	193	Observation of tunicates
10:12	195	Landed
11:17		Quantitative measurement of tunicate (1)
11:19		Quantitative measurement of tunicate (2)
11:21		Quantitative measurement of tunicate (3)
11:28		Landed
11:29		Observation of tunicates
11:43	196	Landed
12:04	197	Find 2KMarker
12:06		Landed. Observation of bacteria mat
12:12	197	Landed. Observation of tunicates
12:16	197	Landed. Observation of bacteria mat
12:26		Landed. Observation of bacteria mat
12:35	196	Observation of gas
12:39	197	Sediment sampling by MBARI core
12:44		Settle H893-1 Marker
13:23		Landed. Observation of tunicates
13:24		Collect tunicates by slurp gun
13:27		Quantitative measurement of tunicates(4)
13:31		Quantitative measurement of tunicates(5)
13:33		Quantitative measurement of tunicates(6)
13:51		Landed
13:52		Quantitative measurement of tunicates(7)
13:58		Quantitative measurement of tunicates(8)
14:05		Quantitative measurement of tunicates(9)
14:12		Collect tunicates by sampling net
14:38		Settle H893-2 marker
14:47		Sediment sampling by manipulator
14:50		Moving
15:37	197	Seep
15:48	198	Landed at hairy chimney
15:50		Settle H893 homer
15:55		Recovered first MEDUSA
16:01		Recovered homer ID43
16:07		Recovered second MDUSA

16:12		Sediment sampling by manipulator
16:25		Water sampling by NISKIN(№1)
16:40		Temperature measurement 42℃
16:42		Start of water sample by ROCS №1
		Temperature measurement 46℃
		Start of water sample by ROCS No.2
16:57		Move to West
		Water sampling by NISKIN (No.2)
17:41		Left the bottom

7. Dive Information

Dive Number: 882

Dive Date: 2008/08/05

Dive Start Time: 08:23 Leave bottom Time: 15:02

Reporter: T. Yamanaka (Okayama Univ.)

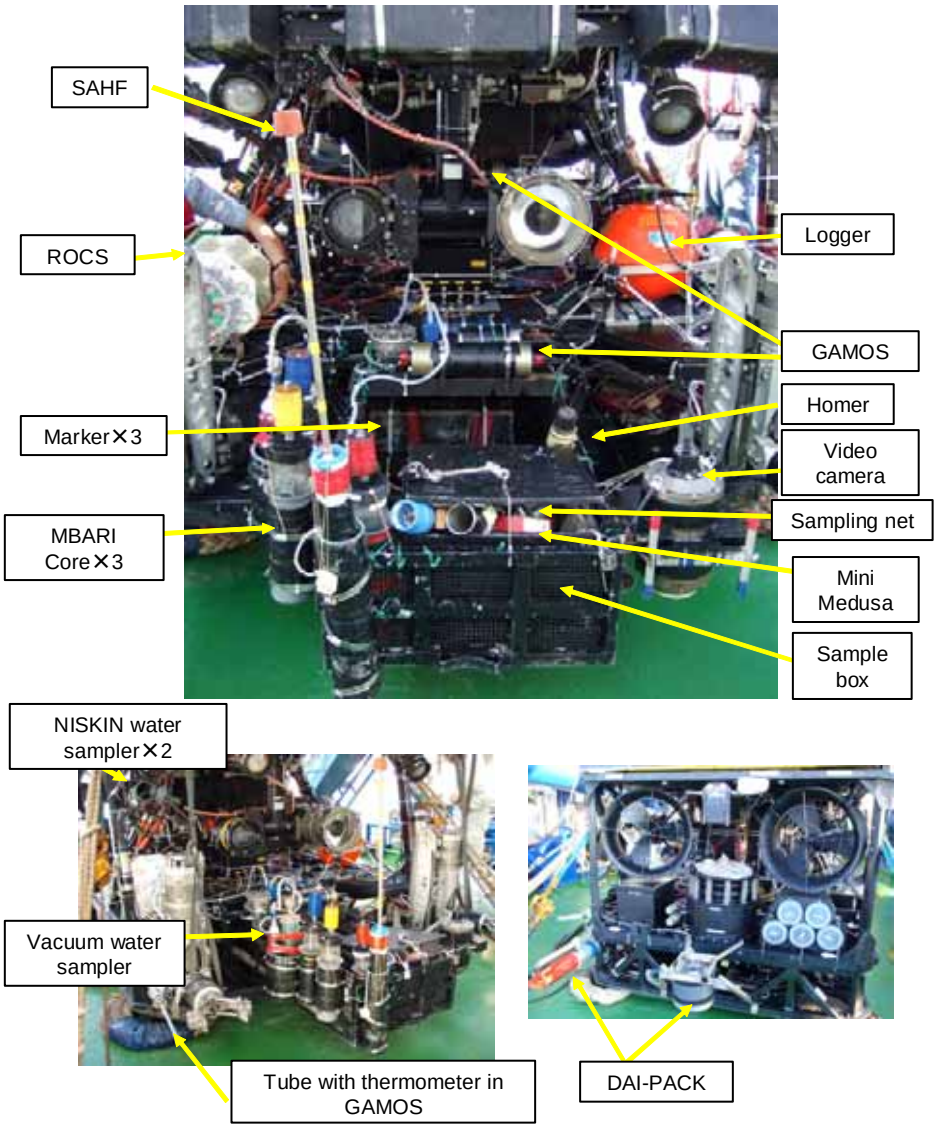
Dive Point Information

Area: Wakamiko Crater, Northern part of Kagoshima Bay, South Kyushu, Japan

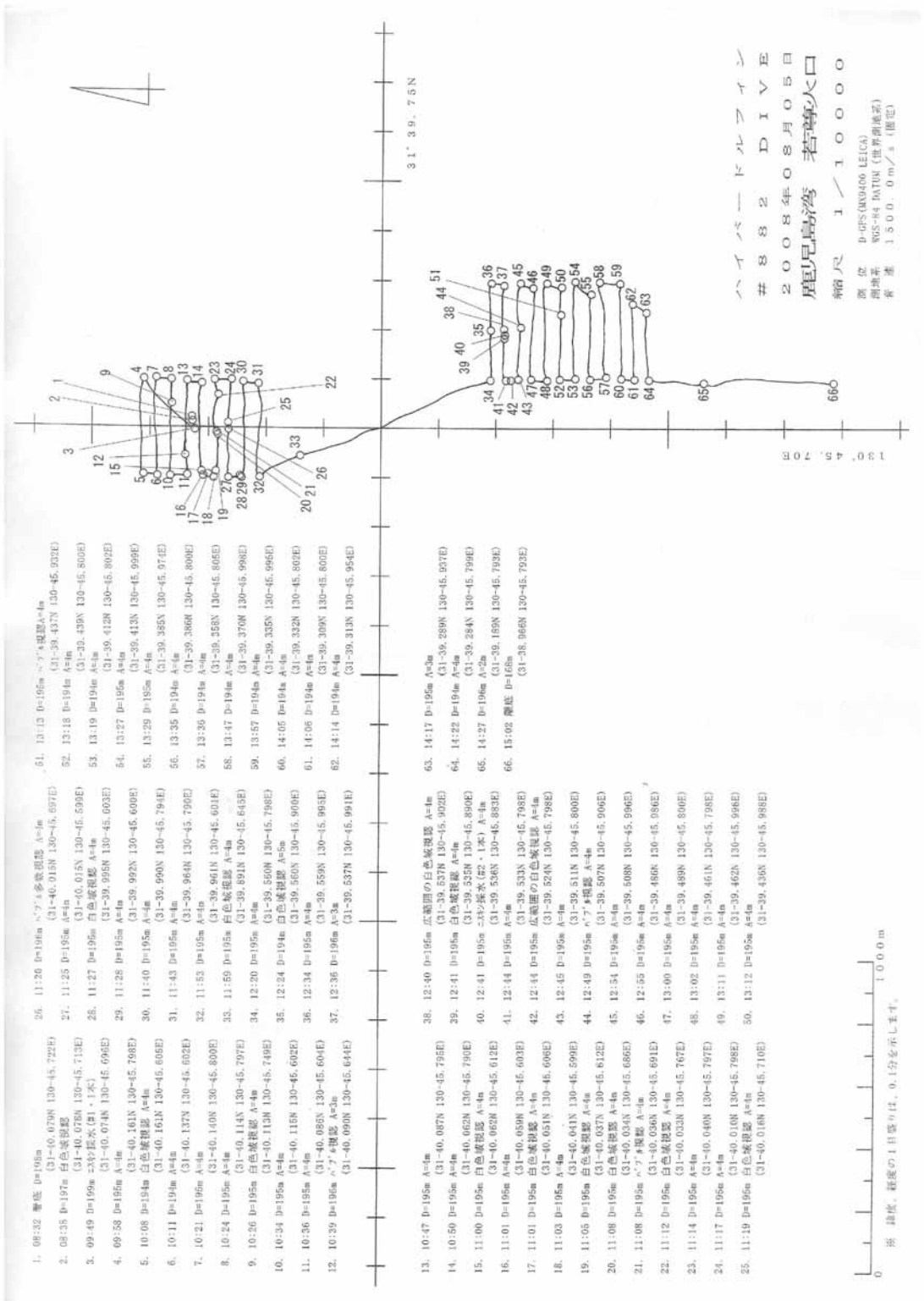
Long: 130˚45.7'E Lat: 31˚39.8'N

Sample Information: See attached "Sample List" file

Payload information:



Dive Track:


31° 39. 75N
130° 45. 70E
ハイパードルフィン
#883 2008年08月05日
鹿児島湾 若尊火口
縮尺 1／10000
測位 D-GPS(MX9406 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音速 1500.0m/s (固定)
0
1000m

Dive Number: 883

Dive Date: 2008/08/06

Dive Start Time: 08:23 Leave bottom Time: 11:47

Reporter: T. Yamanaka (Okayama Univ.)

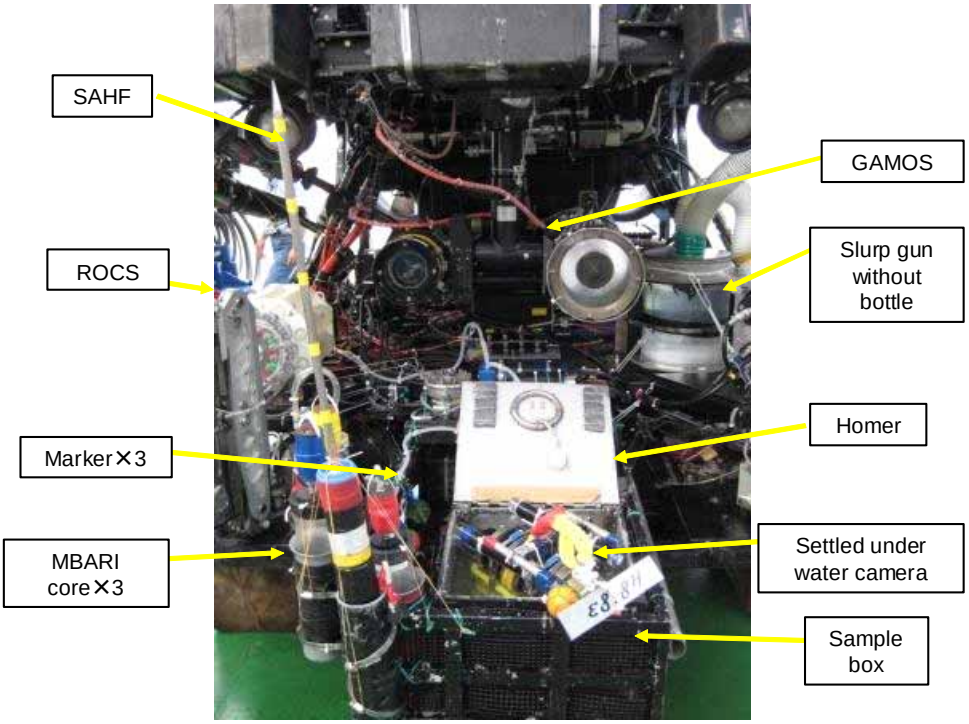
Dive Point Information

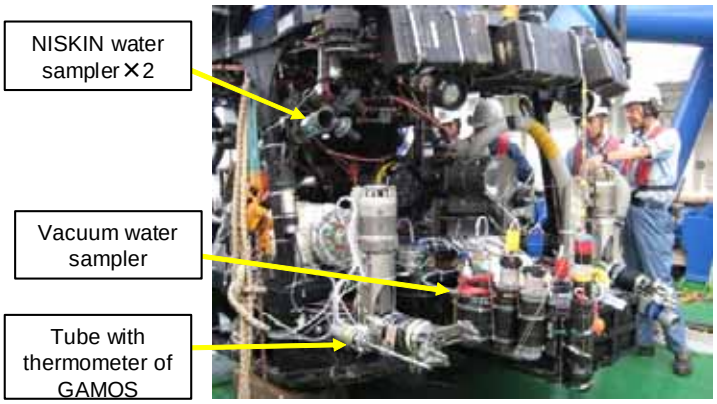
Area: Wakamiko Crater, Northern part of Kagoshima Bay, South Kyushu, Japan

Long: 130˚46.3'E Lat: 31˚39.7'N

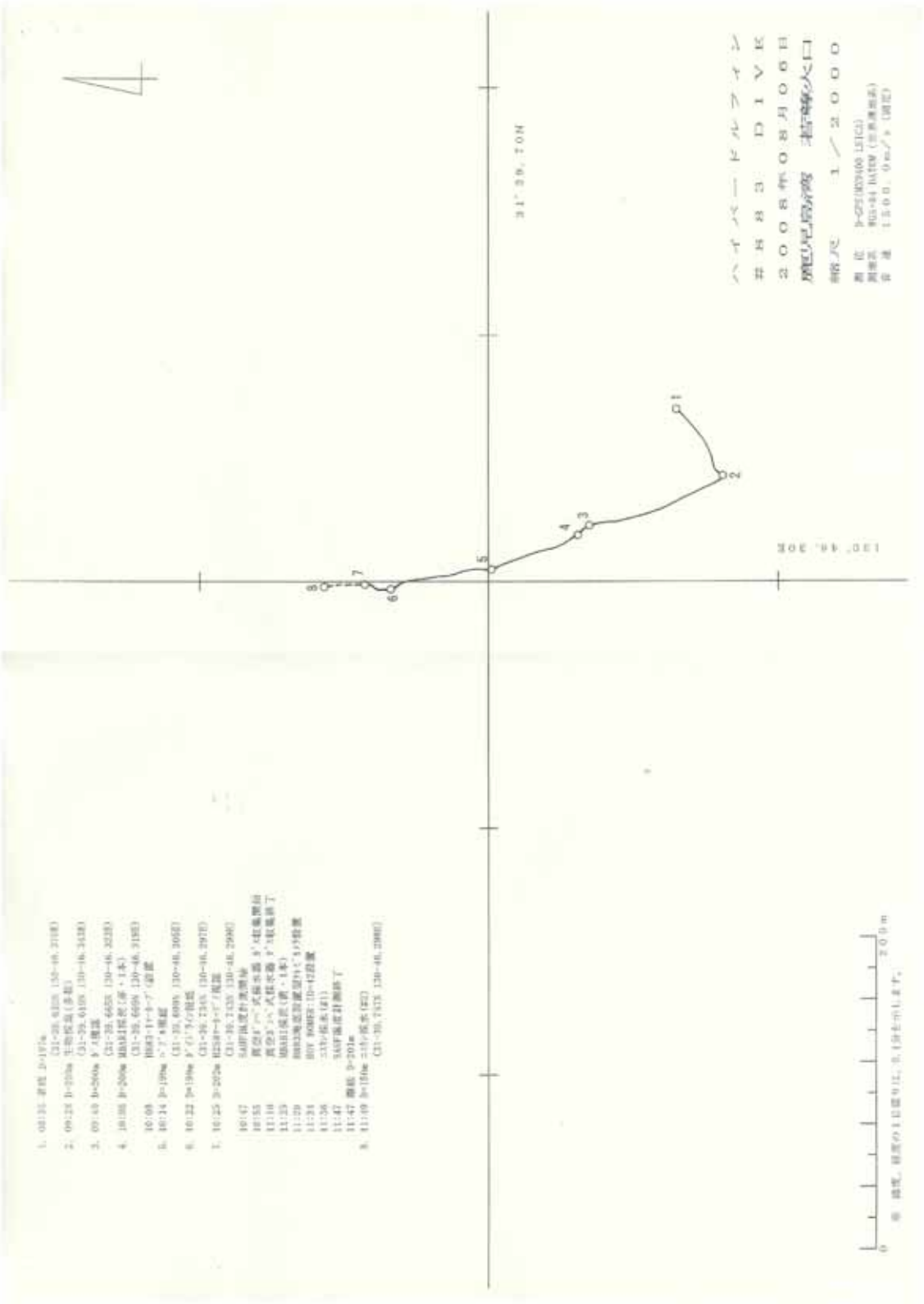
Sample Information: See attached "Sample List" file

Payload:





Dive Track:



Dive Number: 884

Dive Date: 2008/08/06

Dive Start Time: 13:50 Leave bottom Time: 16:56

Reporter: T. Yamanaka (Okayama Univ.)

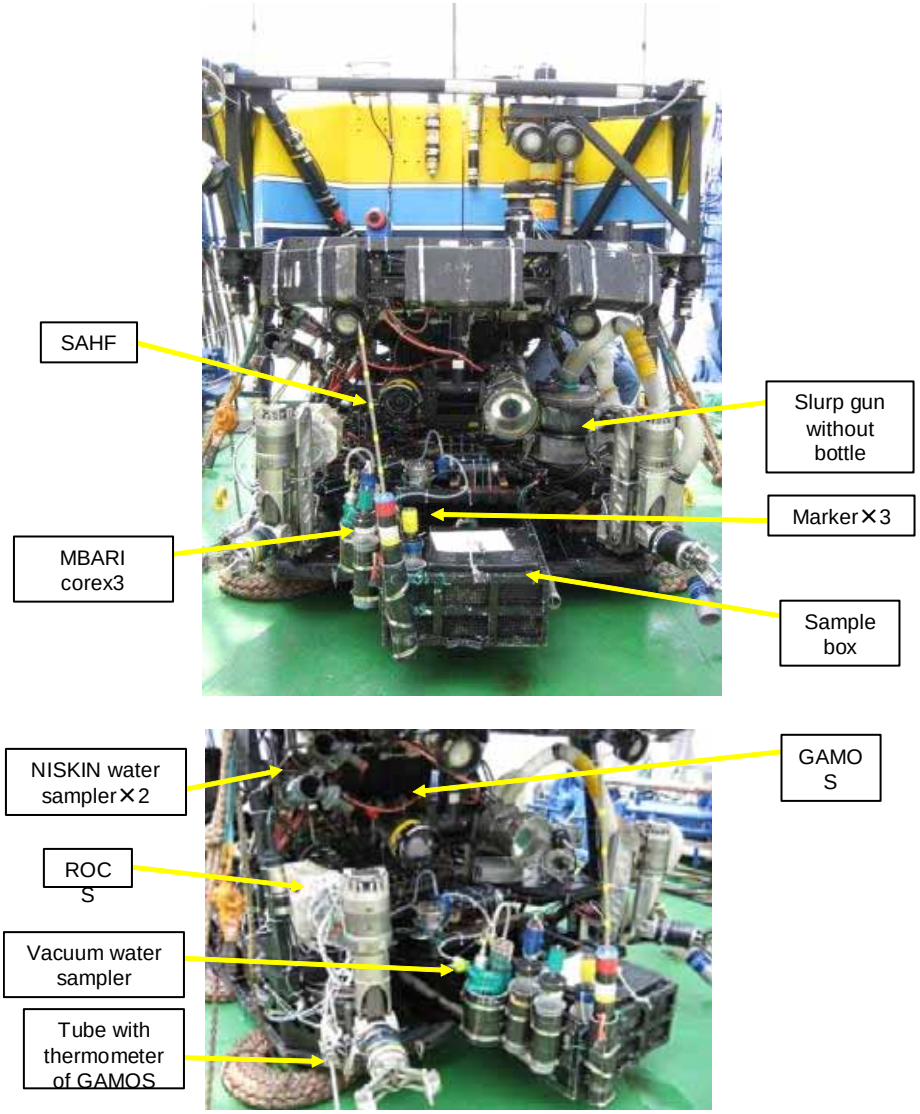
Dive Point Information

Area: Wakamiko Crater, Northern part of Kagoshima Bay, South Kyushu, Japan

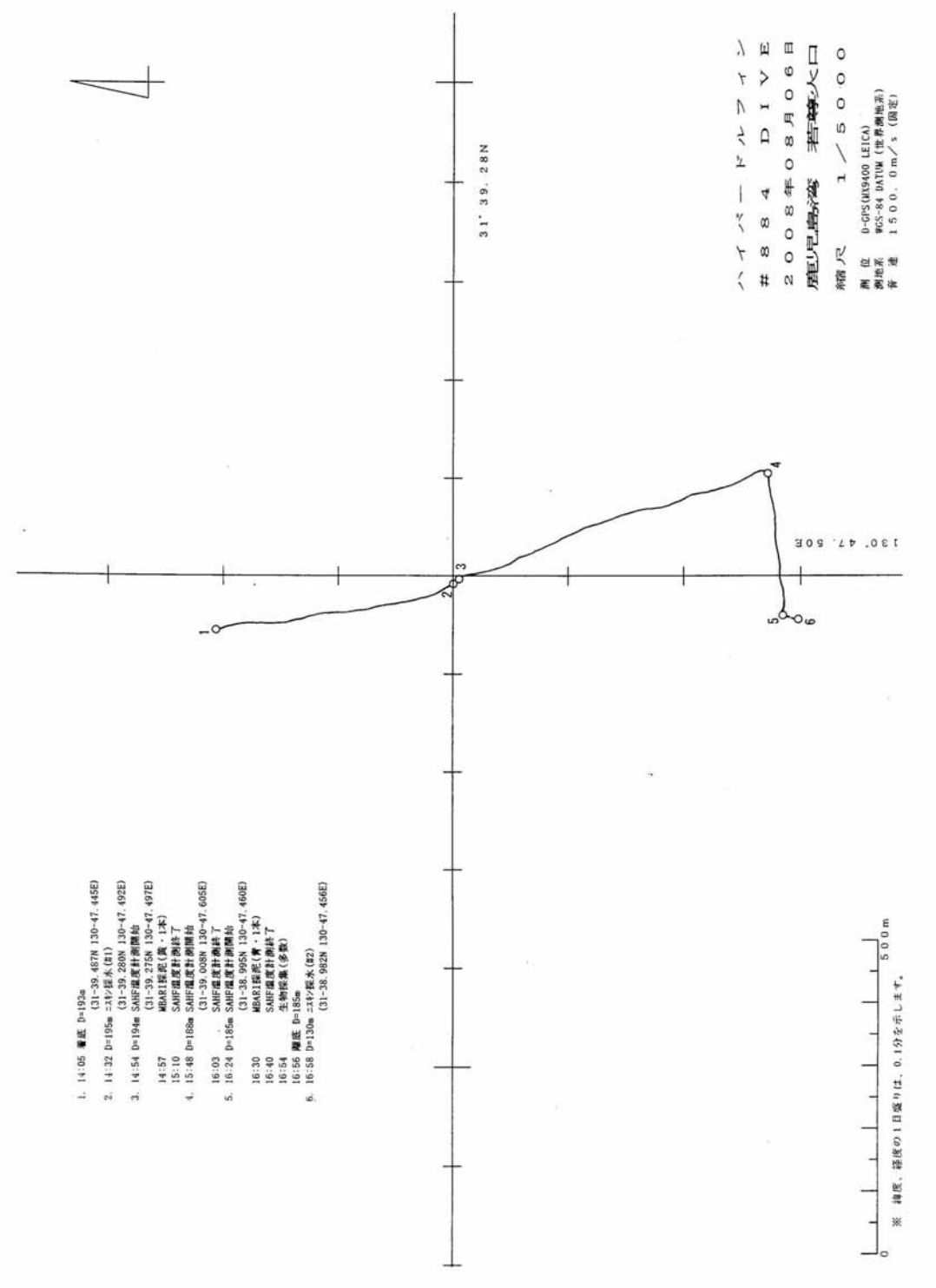
Long: 130˚47.5'E Lat: 31˚39.3'N

Sample Information: See attached "Sample List" file

Payload:



Dive Track:


ハイパードルフィン
#884 DIVE
2008年08月06日
鹿児島湾 若尊火口
縮尺 1／5000
測 位 D-GPS(MX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 1500.0m／s (固定)
31° 39. 28N
130° 47. 50E
1. 14:05 着底 D=193m
(31-39.487N 130-47.445E)
2. 14:32 D=195m ニスキン採水(#1)
(31-39.280N 130-47.492E)
3. 14:54 D=194m SAHF温度計測開始
(31-39.275N 130-47.497E)
14:57 MBARI採泥(黒・1本)
15:10 SAHF温度計測終了
4. 15:48 D=188m SAHF温度計測開始
(31-39.008N 130-47.605E)
16:03 SAHF温度計測終了
5. 16:24 D=185m SAHF温度計測開始
(31-38.995N 130-47.460E)
16:30 MBARI採泥(青・1本)
16:40 SAHF温度計測終了
16:54 生物採集(多数)
16:55 離底 D=185m
6. 16:58 D=130m ニスキン採水(#2)
(31-38.992N 130-47.456E)
0
500m
※ 緯度、経度の1目盛りは、0.1分を示します。

Dive Number: 885

Dive Date: 2008/08/07

Dive Start Time: 08:23 Leave bottom Time: 10:40

Reporter: T. Yamanaka (Okayama Univ.)

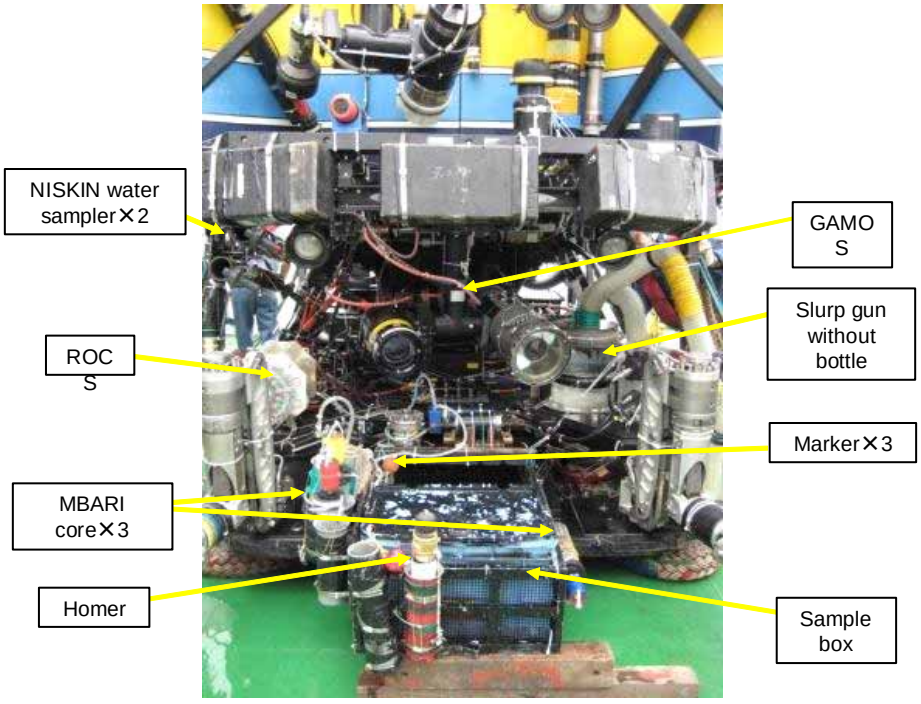
Dive Point Information

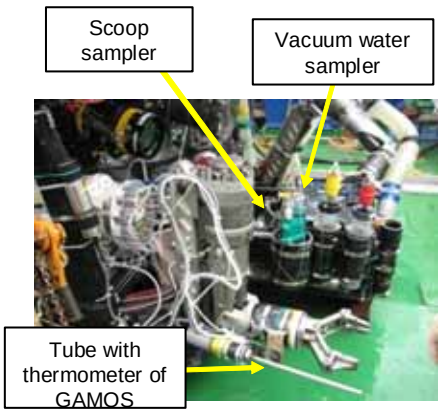
Area: Satsuma Haorimushi site, Northern part of Kagoshima Bay, South Kyushu, Japan

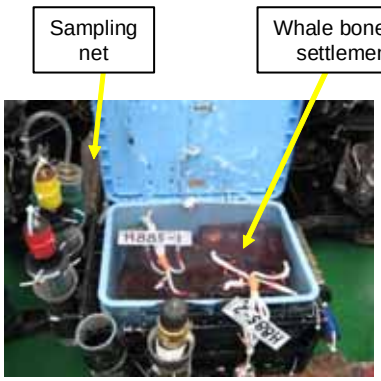
Long: 130˚48.0'E Lat: 31˚39.7'N

Sample Information: See attached "Sample List" file

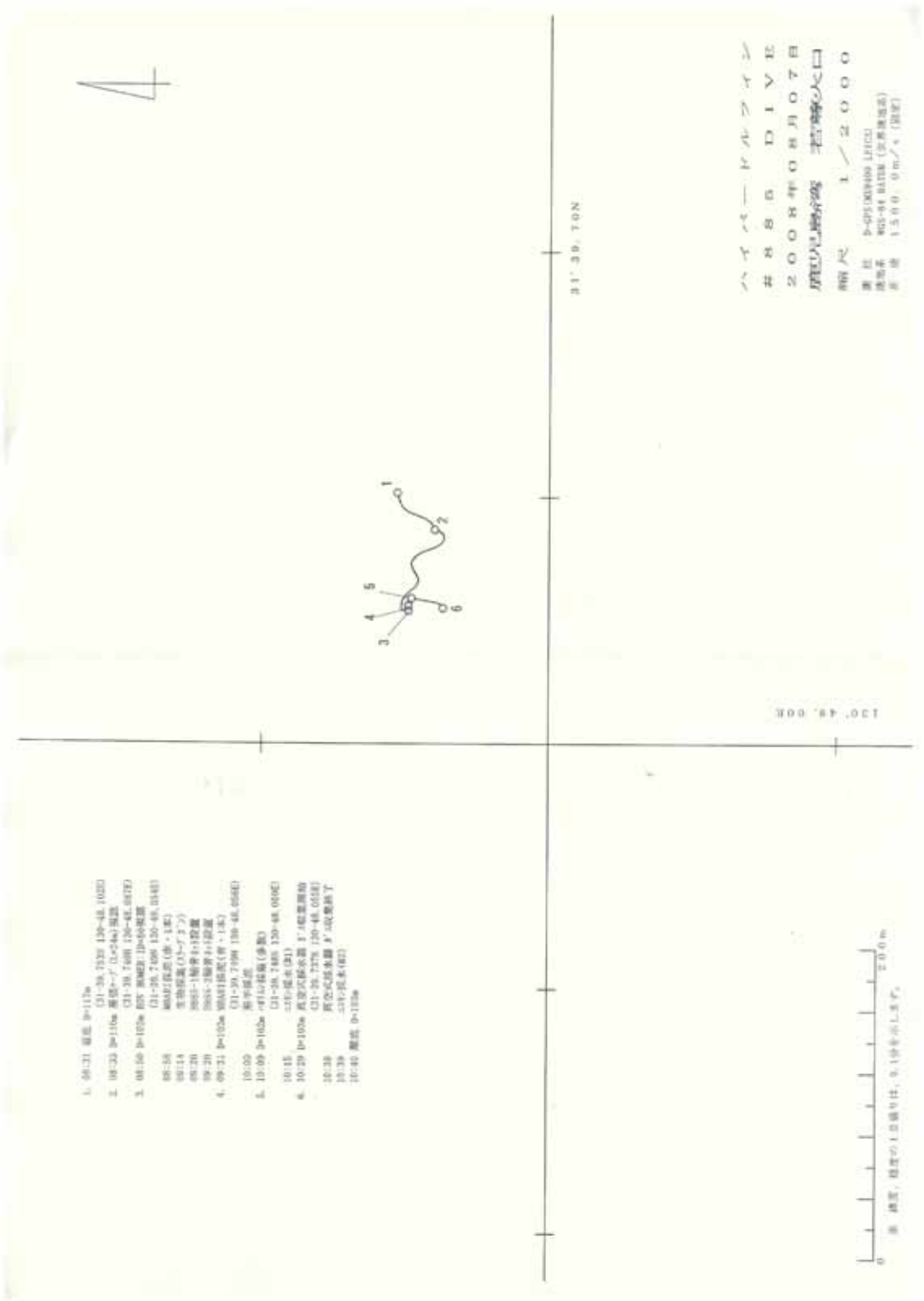
Payload:







Dive Track:



Dive Number: 886

Dive Date: 2008/08/07

Dive Start Time: 13:14 Leave bottom Time: 17:21

Reporter: T. Yamanaka (Okayama Univ.)

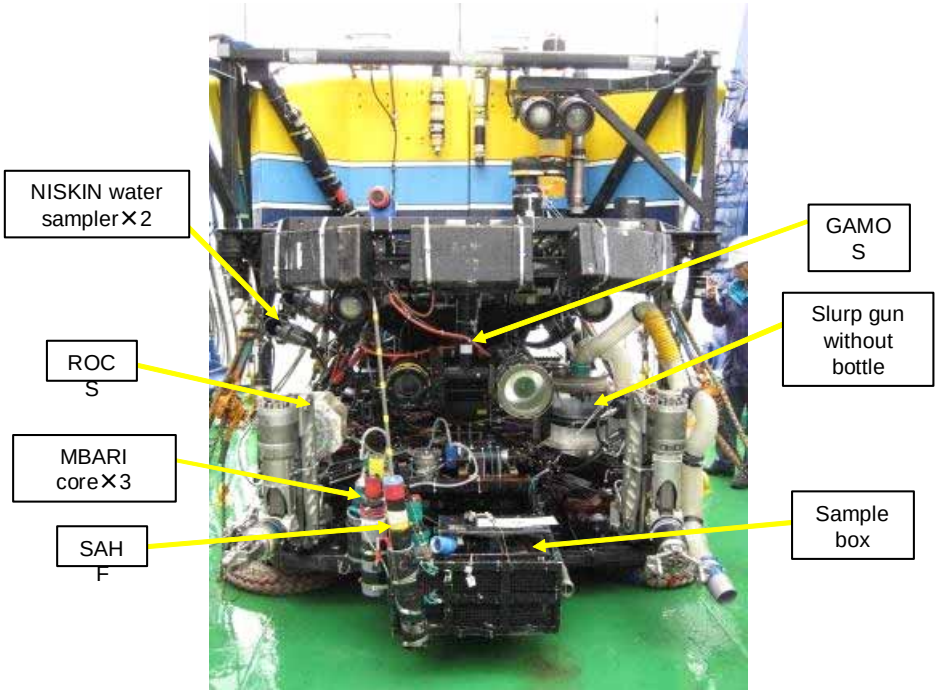
Dive Point Information

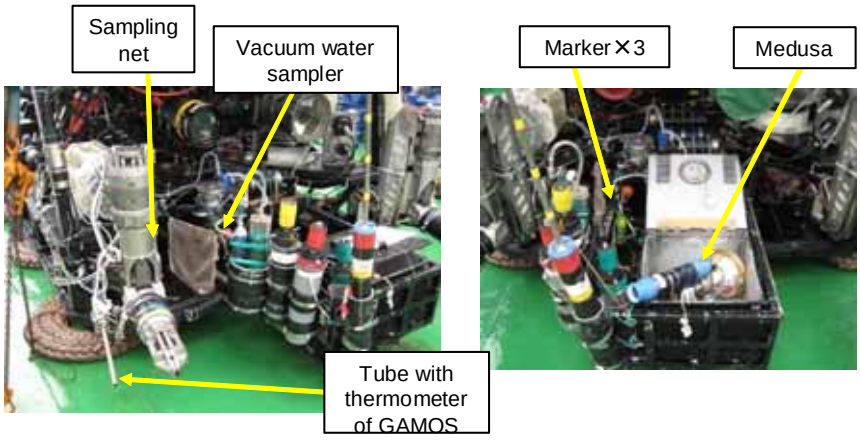
Area: Wakamiko crater, Northern part of Kagoshima Bay, South Kyushu, Japan

Long: 130˚46.0'E Lat: 31˚39.9'N

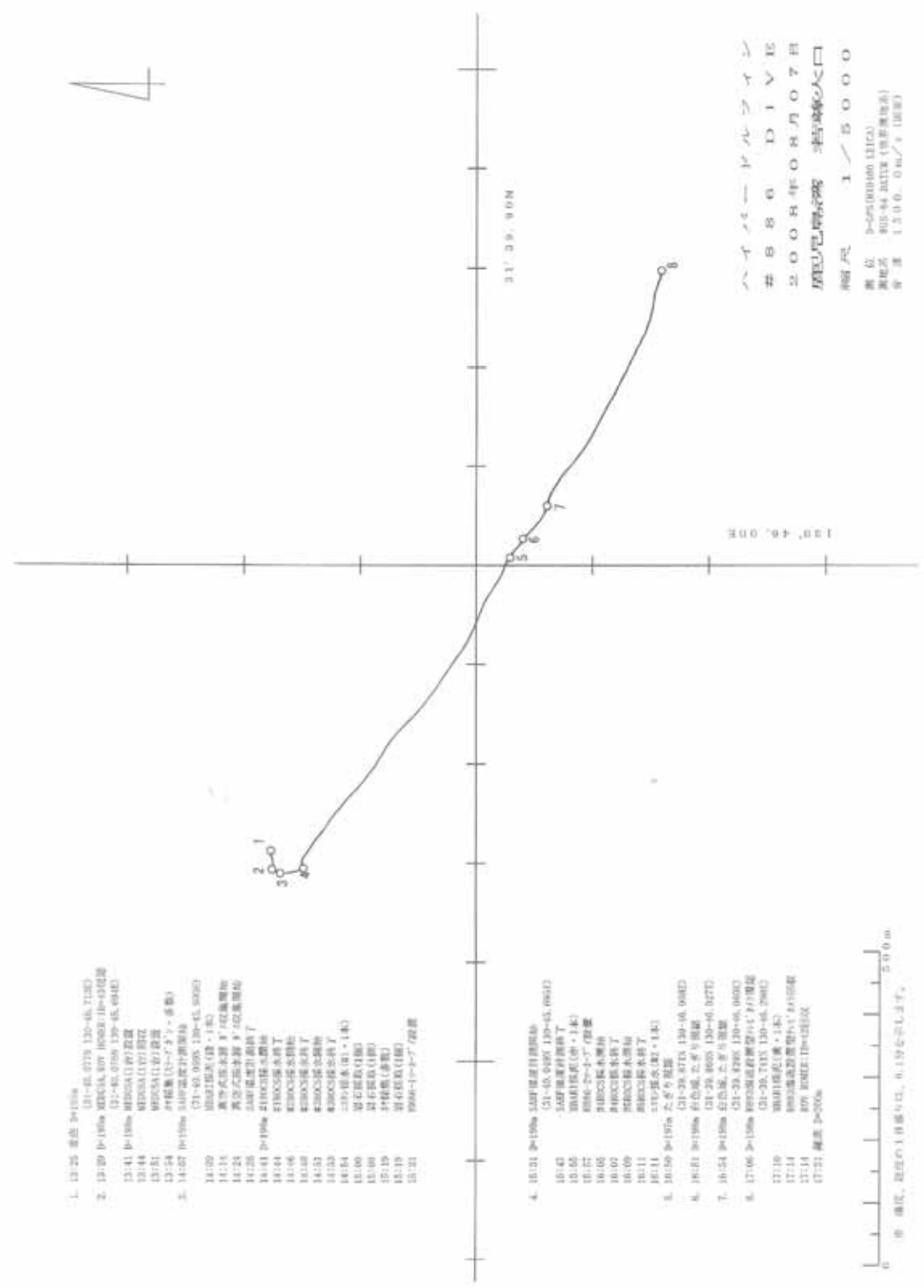
Sample Information: See attached "Sample List" file

Payload:





Dive Track:



Dive Number: 887

Dive Date: 2008/08/09

Dive Start Time: 08:33 Leave bottom Time: 13:07

Reporter: T. Yamamoto (Kagoshima Univ.)

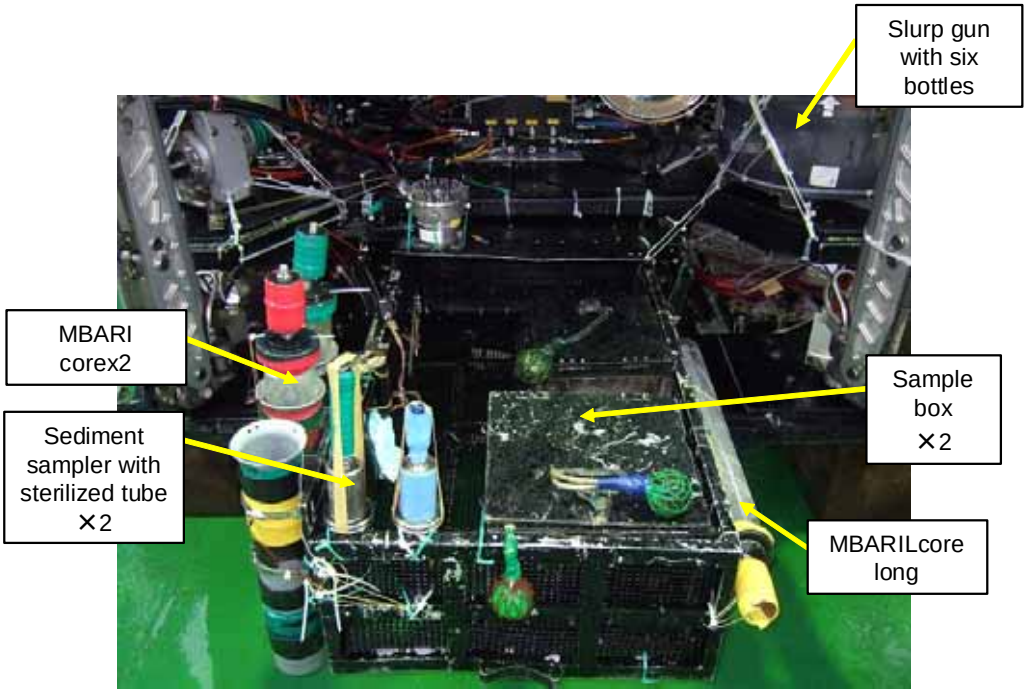
Dive Point Information

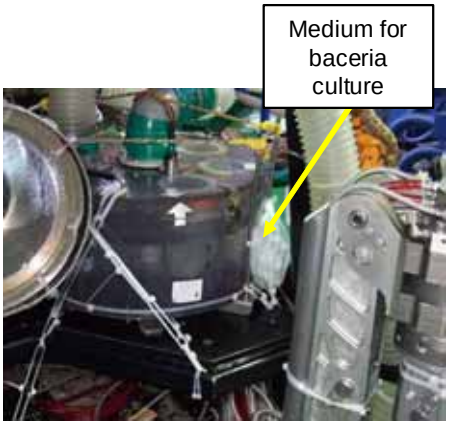
Area: Off Nomamisaki, South Kyushu, Japan

Long: 129˚59.2'E Lat: 31˚20.8'N

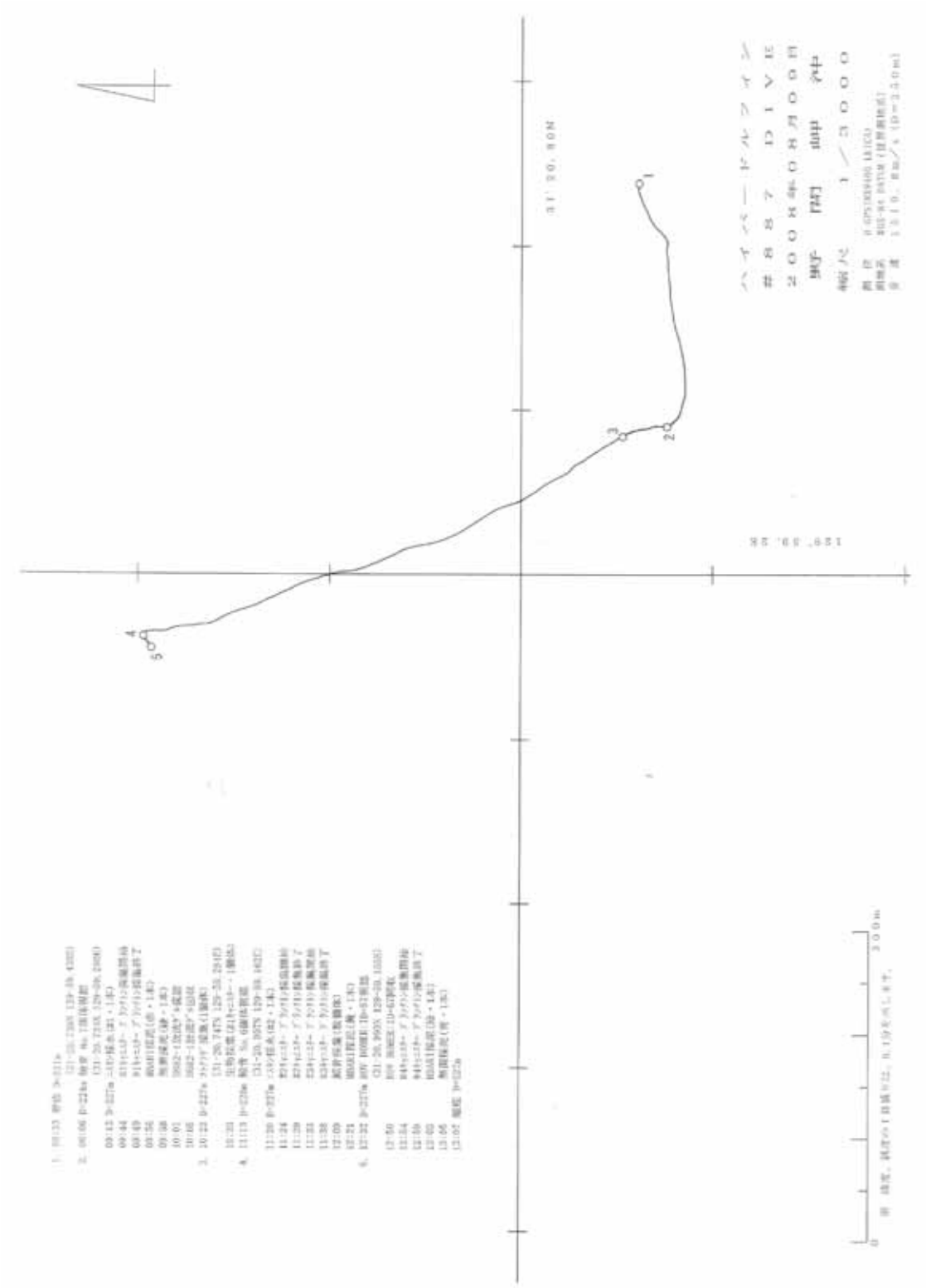
Sample Information: See attached "Sample List" file

Payload:





Dive Track:



Dive Number: 888

Dive Date: 2008/08/09

Dive Start Time: 14:59 Leave bottom Time: 17:04

Reporter: T. Yamamoto (Kagoshima Univ.)

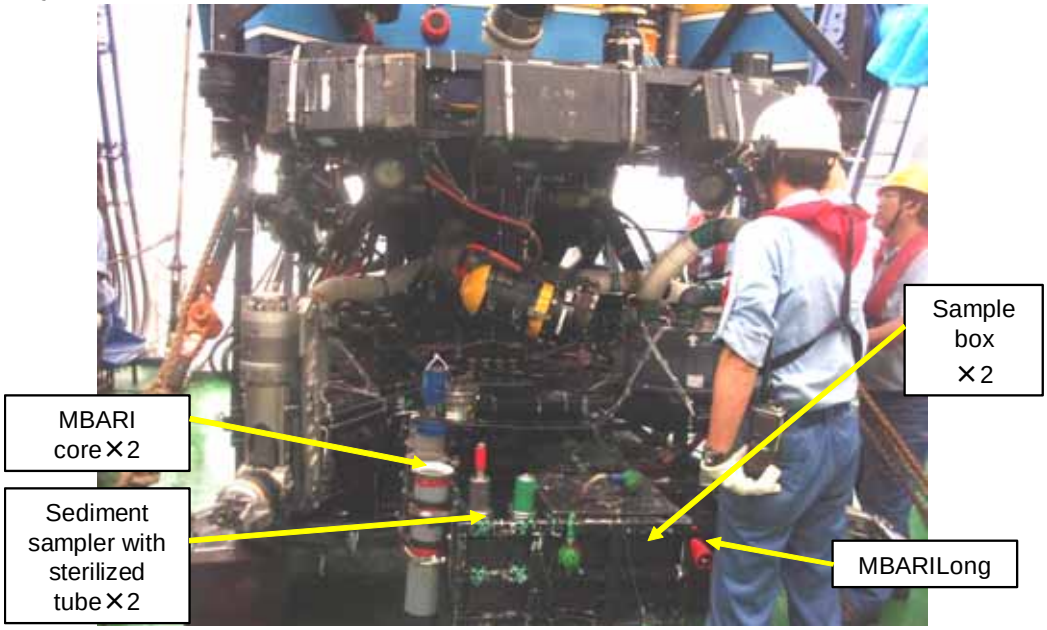
Dive Point Information

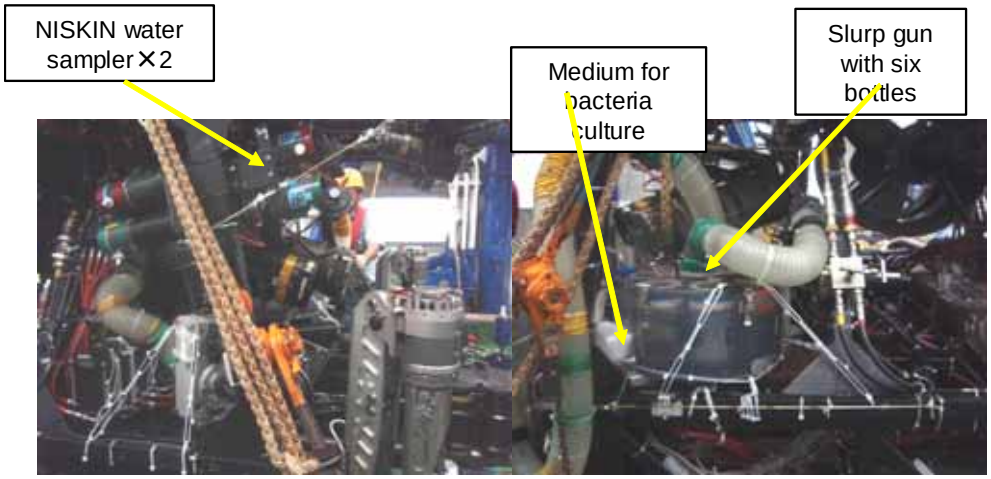
Area: Off Nomamisaki, South Kyushu, Japan

Long: 129˚59.2'E Lat: 31˚20.8'N

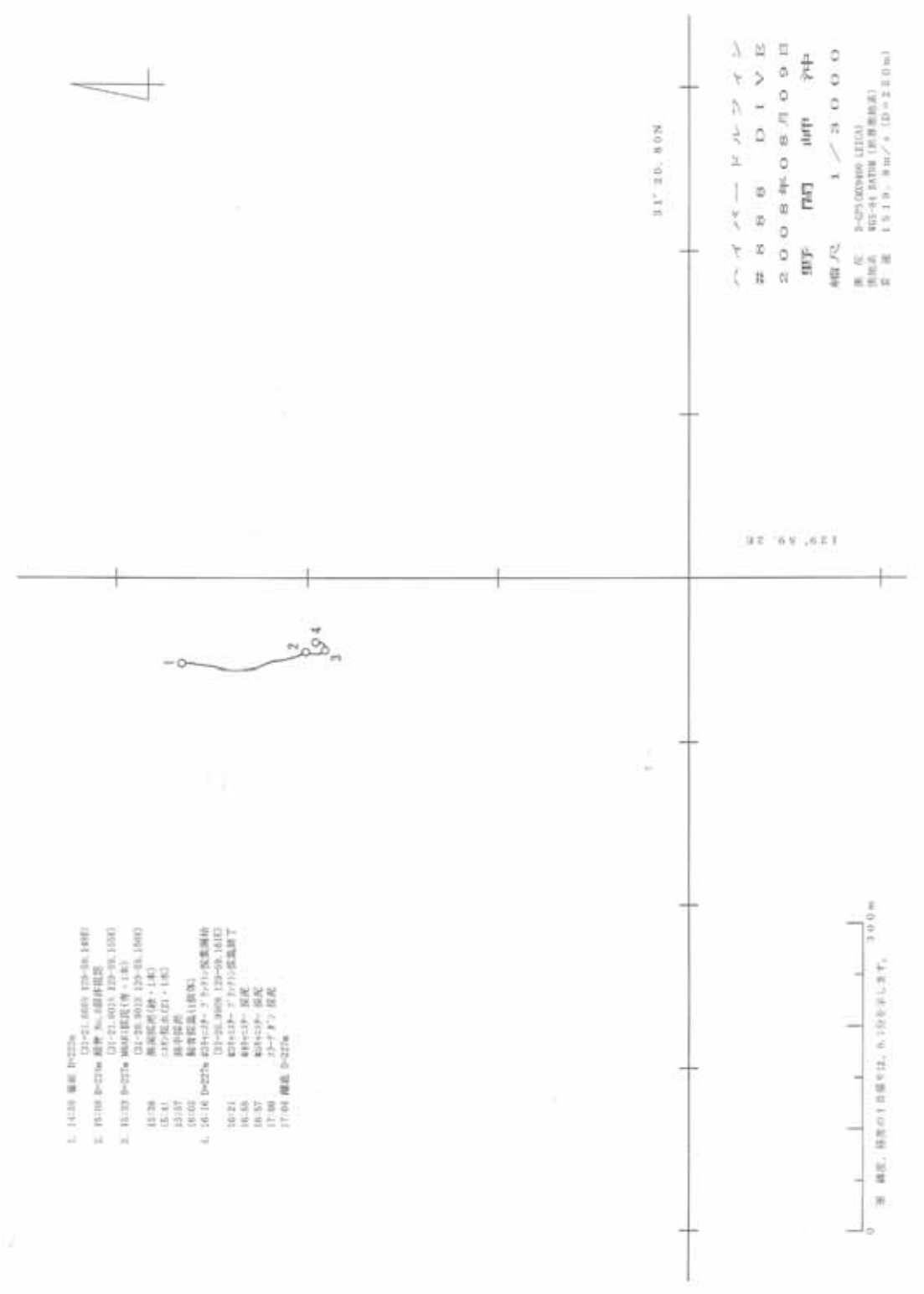
Sample Information: See attached "Sample List" file

Payload:





Dive Track:



Dive Number: 889

Dive Date: 2008/08/10

Dive Start Time: 08:13 Leave bottom Time: 12:49

Reporter: Y. FUJIWARA (JAMSTEC)

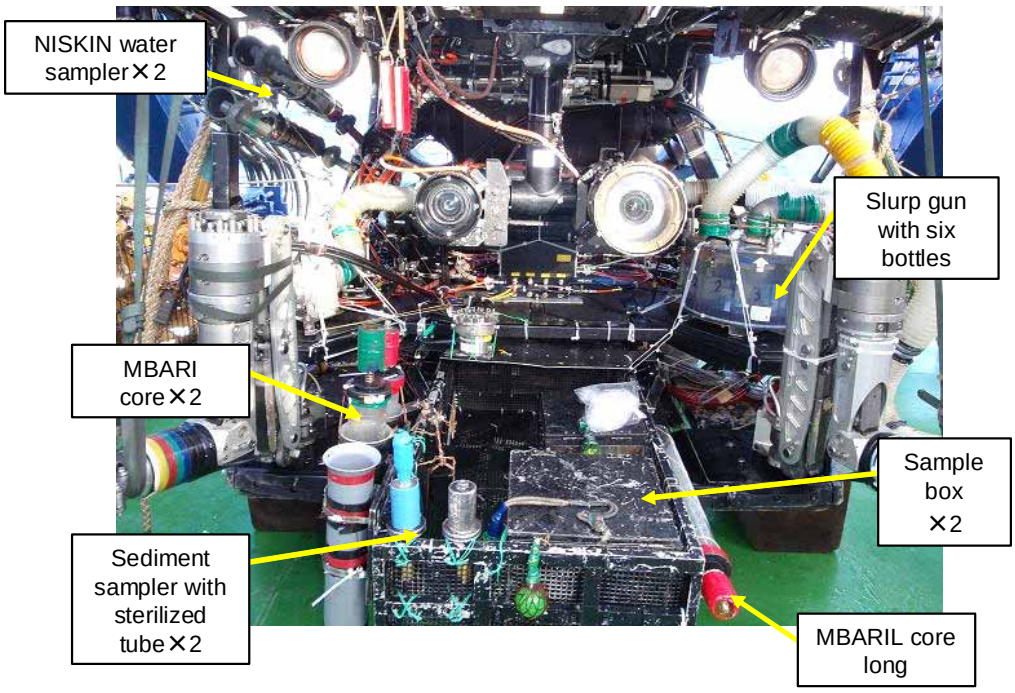
Dive Point Information

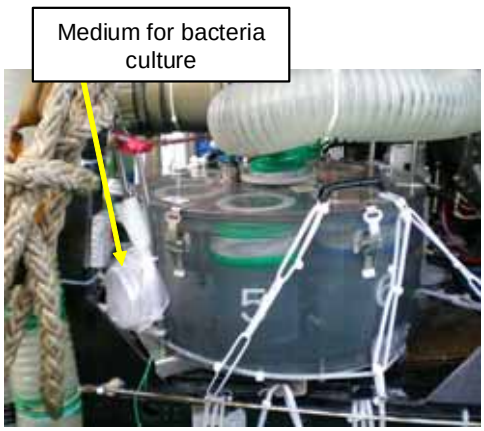
Area: Off Nomamisaki, South Kyushu, Japan

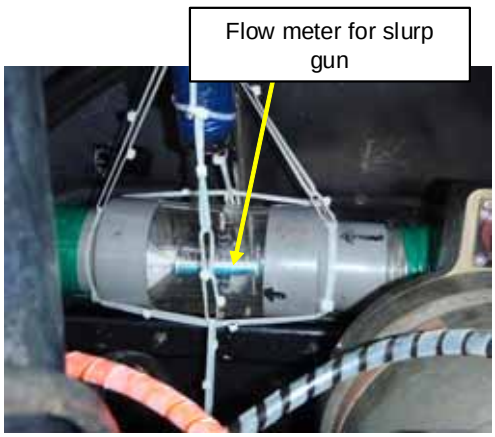
Long: 129˚59.4'E Lat: 31˚18.7'N

Sample Information: See attached "Sample List" file

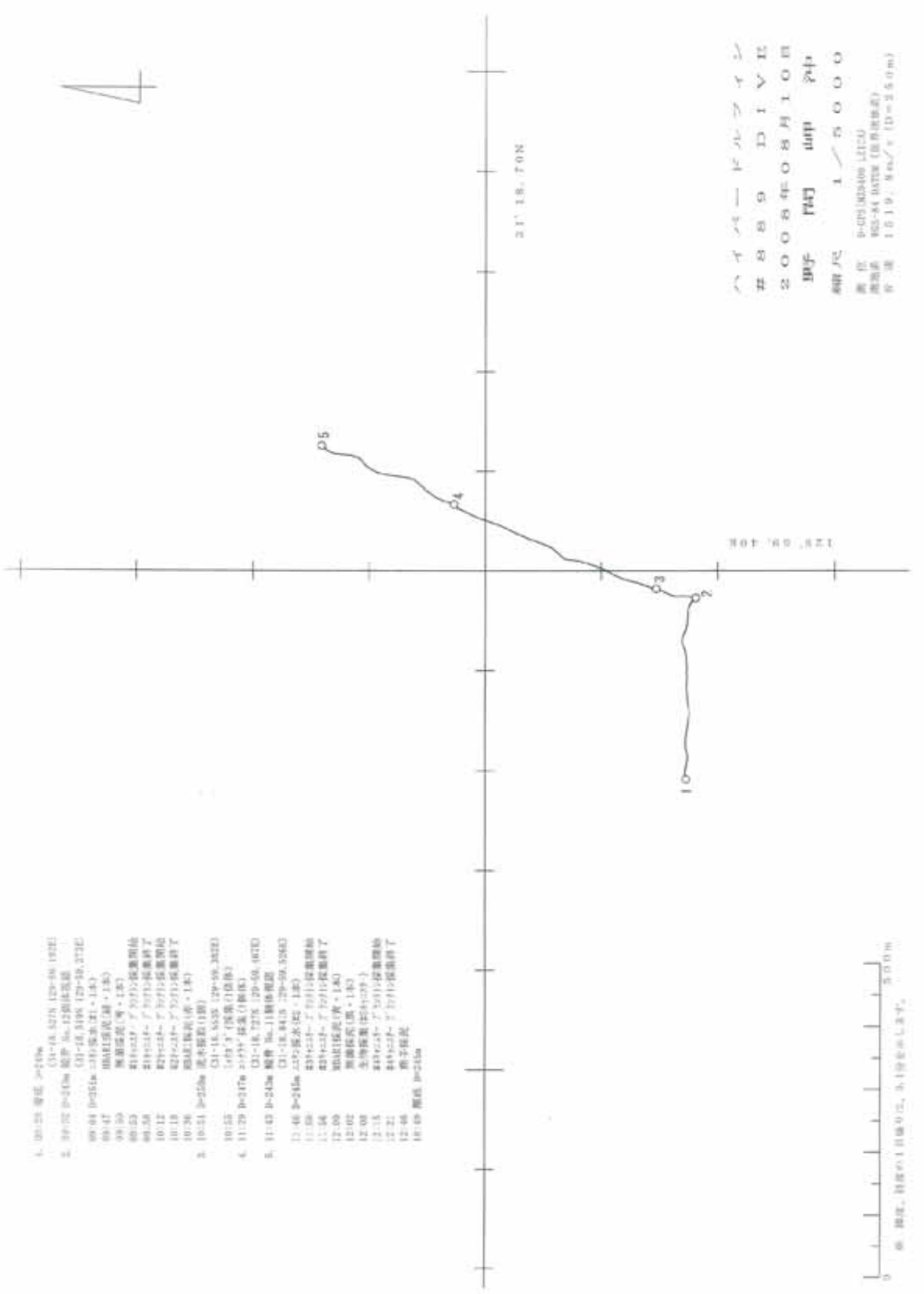
Payload:







Dive Track:



Dive Number: 890

Dive Date: 2008/08/11

Dive Start Time: 08:20 Leave bottom Time: 12:30

Reporter: Y. FUJIWARA (JAMSTEC)

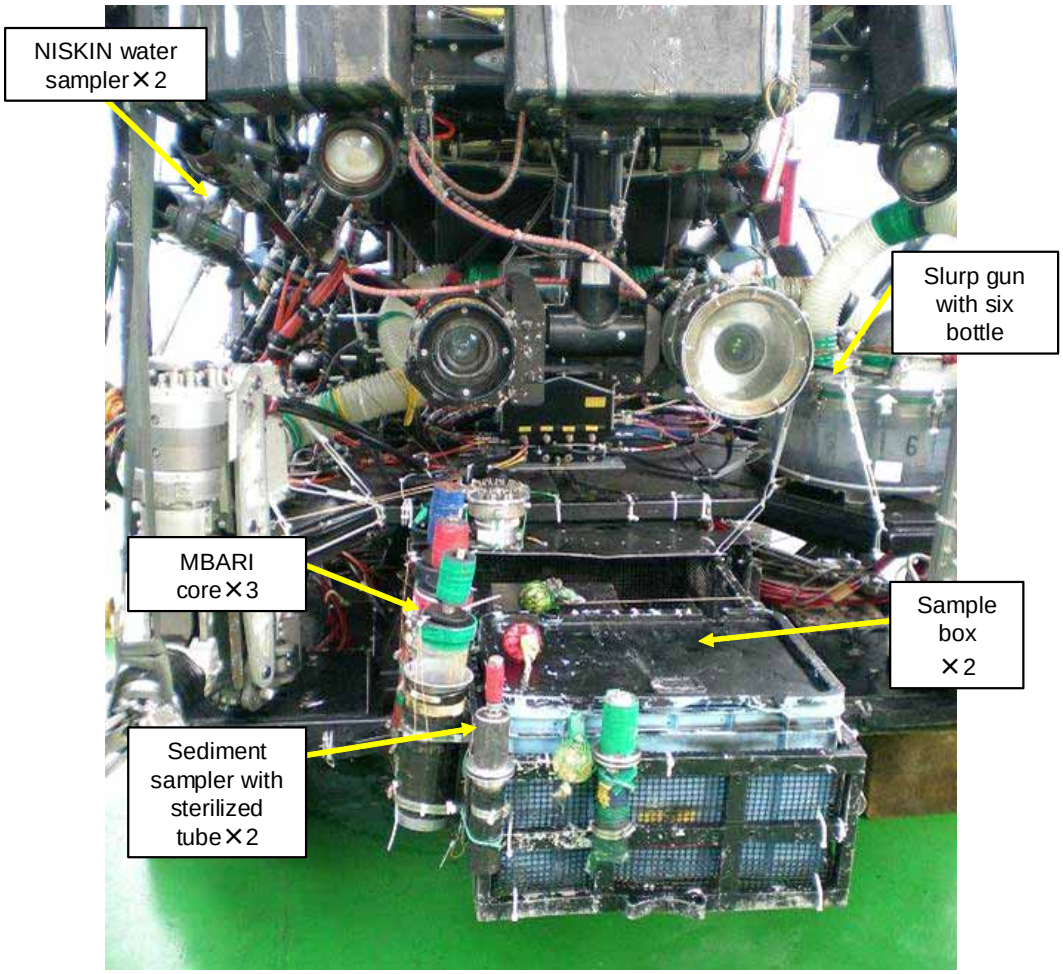
Dive Point Information

Area: Satsuma Haorimushi site, Northern part of Kagoshima Bay, South Kyushu, Japan

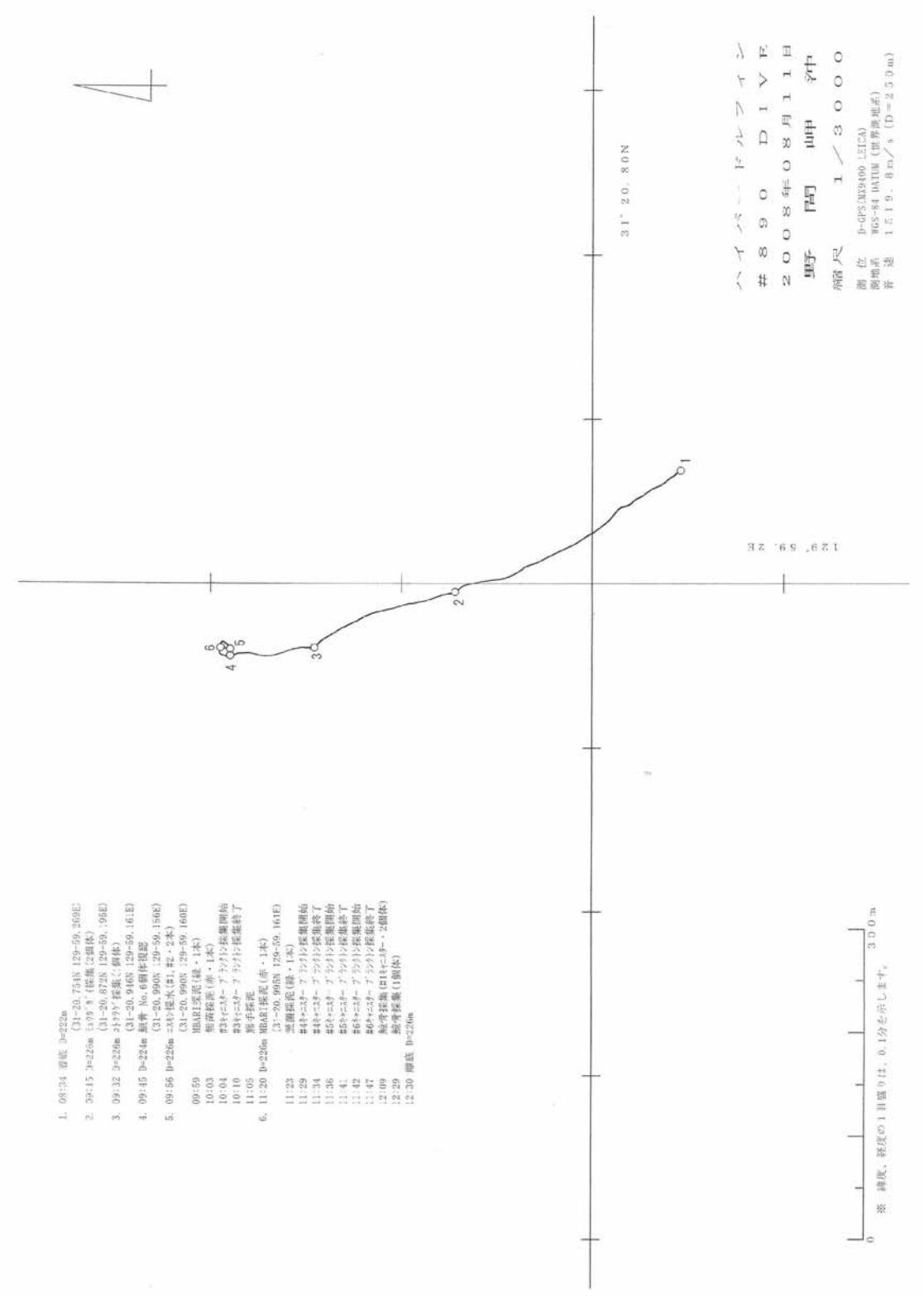
Long: 129˚59.147E Lat: 31˚20.786N

Sample Information: See attached “Sample List” file

Payload:



Dive Track:


ハイパードルフィン
#890 DIVE
2008年08月11日
野間岬沖
縮尺 1／3000
測位 D-GPS(MS9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
算速 1ミ19.8m／s (D=259m)
31° 20.80N
129° 59.2E
1
2
3
4
5
6
0
30m
※ 緯度、経度の1目盛りは、0.1分を示します。
1. 09:34 着底 D=222m
(31-20.754N 129-59.269E)
2. 09:45 D=226m ヨコヅナ採集(2個体)
(31-20.872N 129-59.195E)
3. 09:52 D=226m オトヒメ採集(2個体)
(31-20.946N 129-59.161E)
4. 09:45 D=224m 観察 No.6個体確認
(31-20.990N 129-59.156E)
5. 09:56 D=226m ニオイ採水(#1,#2・2本)
(31-20.990N 129-59.160E)
09:59 MBARI採泥(緑・1本)
10:03 熊岡採泥(赤・1本)
10:04 #3ネスター アラジン採集開始
10:10 #3ネスター アラジン採集終了
11:05 潜手採泥
6. 11:20 D=226m MBARI採泥(赤・1本)
(31-20.995N 129-59.161E)
11:23 堆積採泥(緑・1本)
11:29 #4ネスター アラジン採集開始
11:34 #4ネスター アラジン採集終了
11:36 #5ネスター アラジン採集開始
11:41 #5ネスター アラジン採集終了
11:42 #6ネスター アラジン採集開始
11:47 #6ネスター アラジン採集終了
12:09 海洋採集(ヨコヅナ・2個体)
12:29 海洋採集(1個体)
12:30 揚底 D=226m

Dive Number: 891

Dive Date: 2008/08/11

Dive Start Time: 14:43 Leave bottom Time: 17:55

Reporter: Y. FUJIWARA (JAMSTEC)

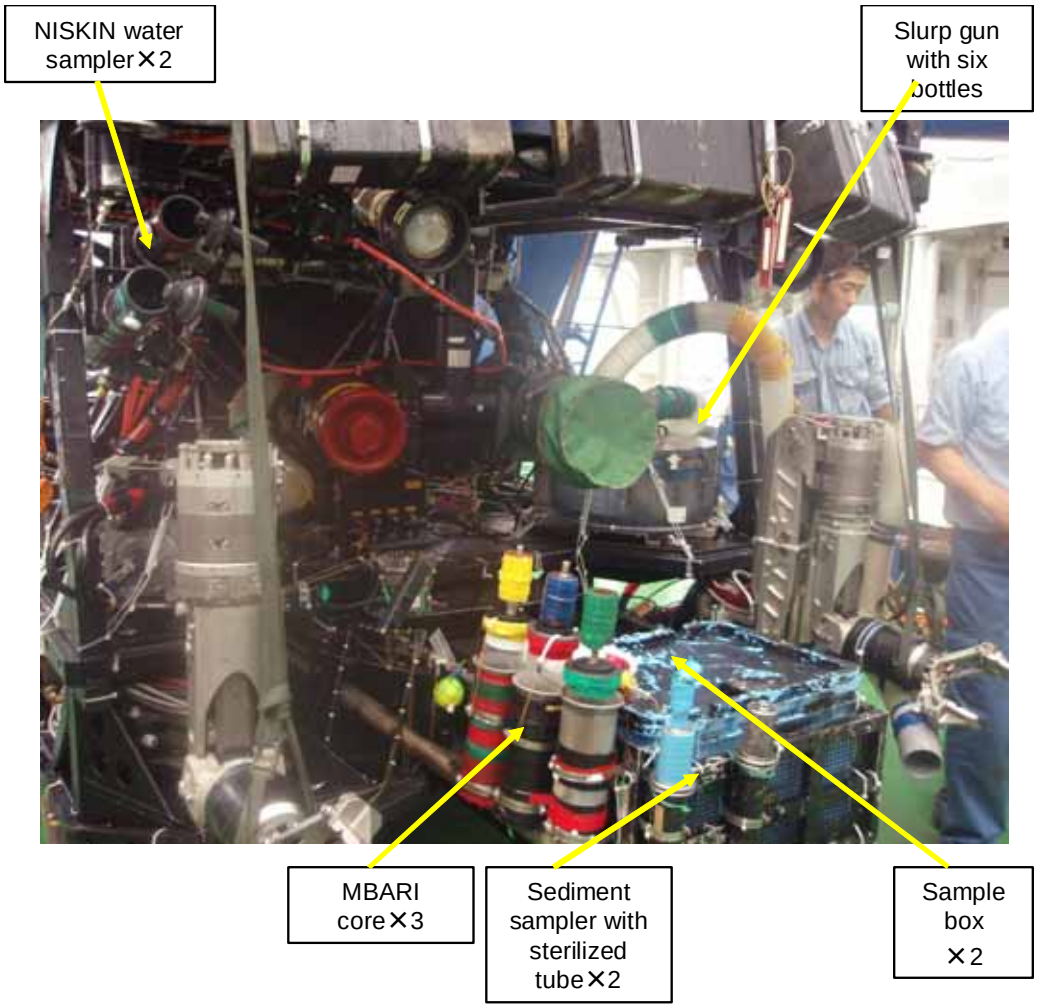
Dive Point Information

Area: Satsuma Haorimushi site, Northern part of Kagoshima Bay, South Kyushu, Japan

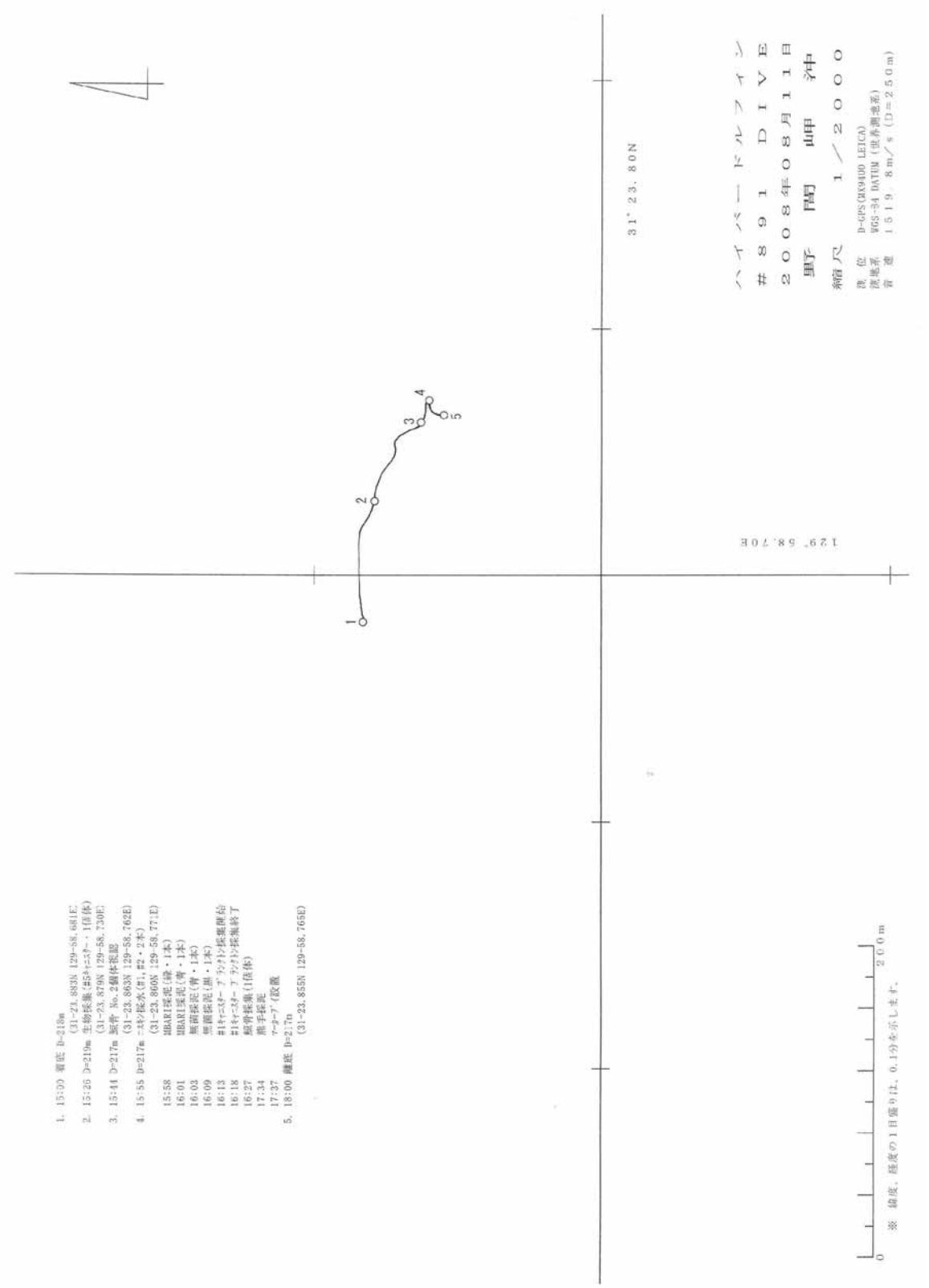
Long: 129˚58.681'E Lat: 31˚23.883'N

Sample Information: See attached "Sample List" file

Payload:



Dive Track:


ハイパードルフィン
#891 DIVE
2008年08月11日
里乃 間山甲沖
縮尺 1／2000
測 位 D-GPS(GX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音 速 1519.8m／s (Δ=250m)
31°23.80N
129°58.70E
1. 15:00 着底 D=218m
(31-23.883N 129-58.681E)
2. 15:26 D=219m 生物採集(ｶｽﾀﾈｯﾄ～・1匹体)
(31-23.879N 129-58.730E)
3. 15:44 D=217m 基骨 No.2鰓係認
(31-23.863N 129-58.762E)
4. 15:55 D=217m ニスキン採水(#1,#2・2本)
(31-23.860N 129-58.771E)
15:58 HARI採泥(緑・1本)
16:01 HARI採泥(青・1本)
16:03 無菌採泥(青・1本)
16:09 無菌採泥(黒・1本)
16:13 #1ｷｬｽﾀｰ ﾌﾗｯﾄﾗｲﾄ採集開始
16:18 #1ｷｬｽﾀｰ ﾌﾗｯﾄﾗｲﾄ採集終了
16:27 鰓骨採集(1匹体)
17:34 熊手採泥
17:37 マーカーブイ設置
5. 18:00 離底 D=217m
(31-23.855N 129-58.765E)
※ 緯度、経度の1目盛りは、0.1分を示します。
0
200m

Dive Number: 892

Dive Date: 2008/08/14

Dive Start Time: 08:20 Leave bottom Time: 09:02

Reporter: Y. FUJIWARA (JAMSTEC)

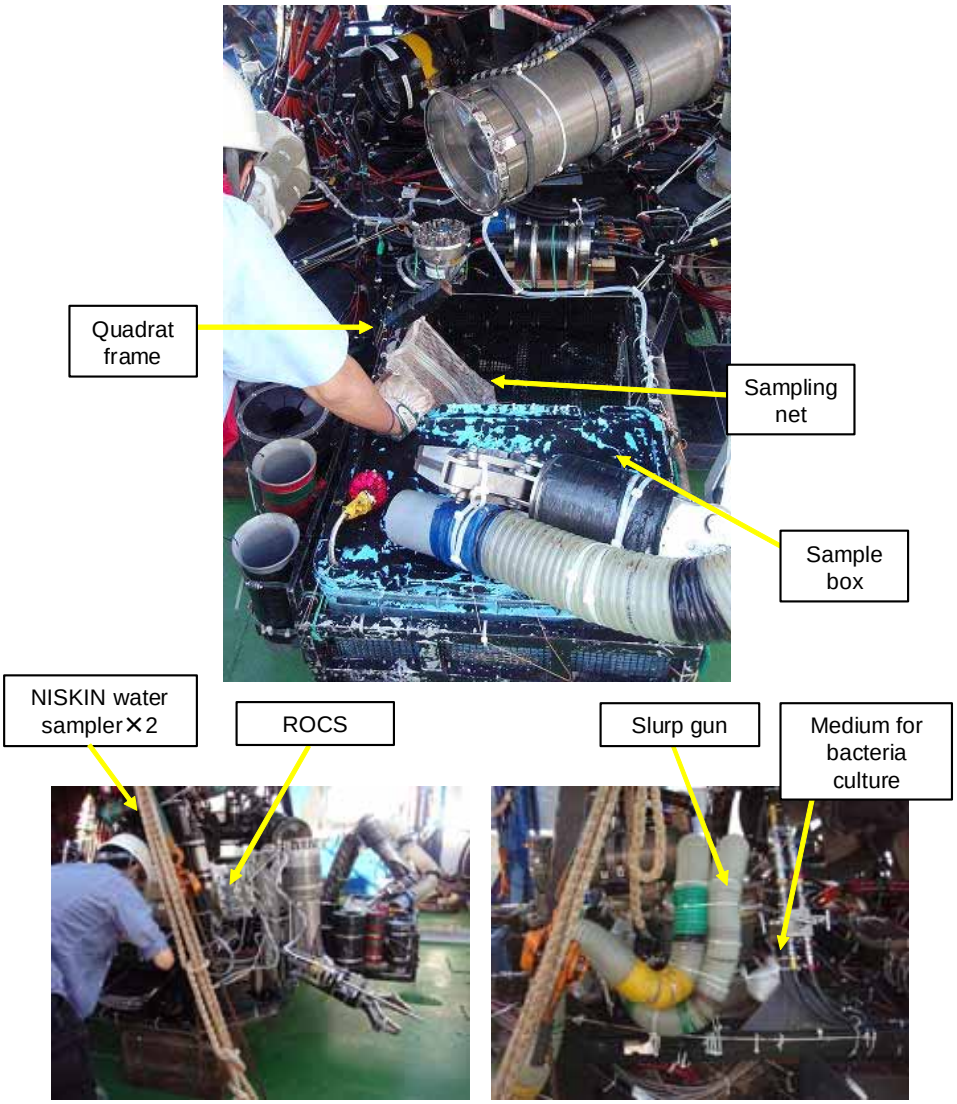
Dive Point Information

Area: Satsuma Haorimushi site, Northern part of Kagoshima Bay, South Kyushu, Japan

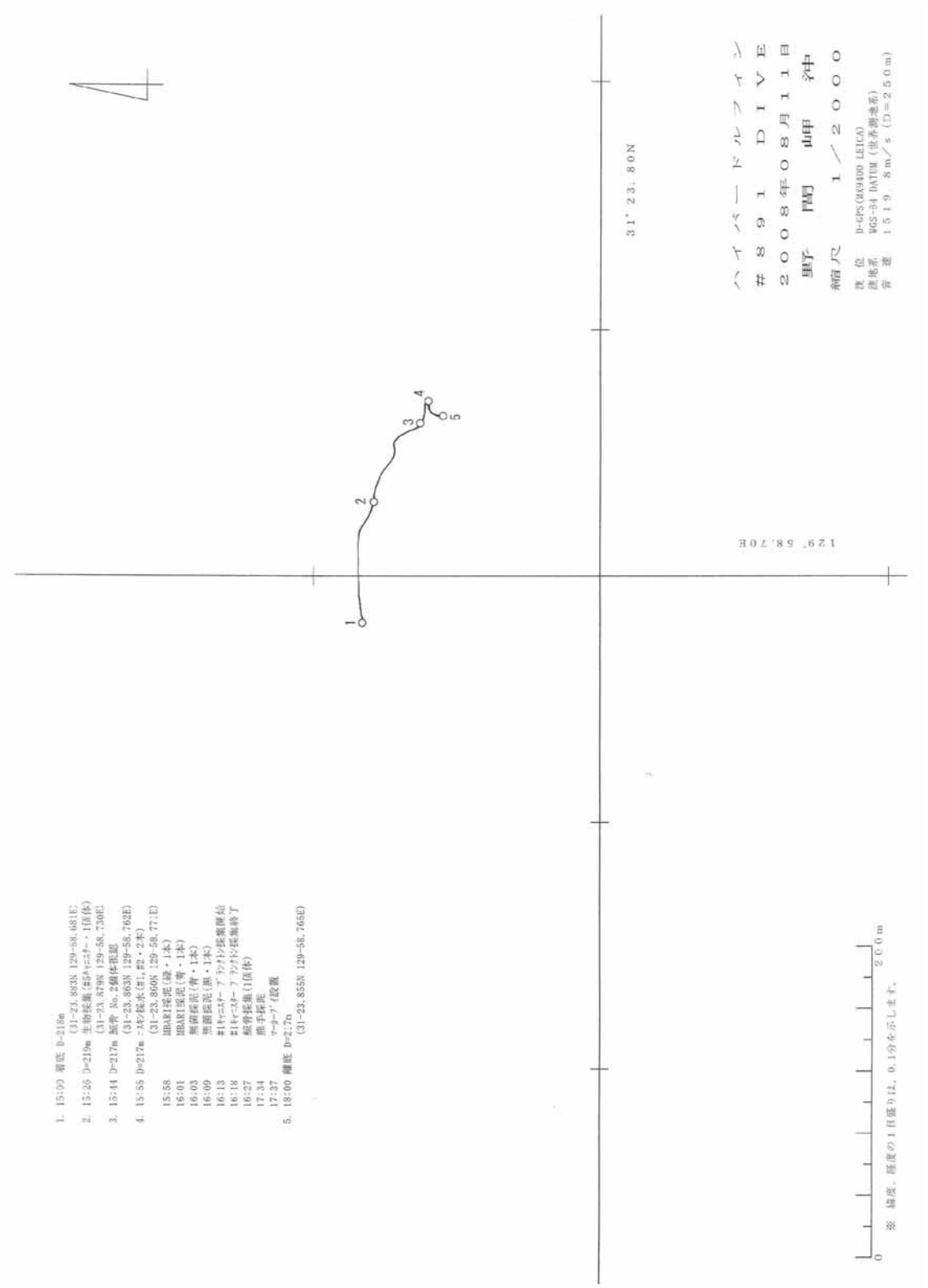
Long: 130˚48.073E Lat: 31˚39.766N

Sample Information: See attached “Sample List” file

Payload:



Dive Track:


ハイパードルフィン
#891 DIVE
2008年08月11日
里子 間山 沖中
縮尺 1／2000
測位 D-GPS(DX9400 LEICA)
測地系 WGS-84 DATUM (世界測地系)
音速 1519.8m／s (D=250m)
31°23.80N
129°58.70E
1. 15:00 潜底 D-218m
(31-23.883N 129-58.681E)
2. 15:26 D=219m 生物採集(#5ﾏﾆﾎﾙｰ・1体)
(31-23.879N 129-58.730E)
3. 15:44 D=217m 展示 No.2個体採捕
(31-23.863N 129-58.762E)
4. 15:55 D=217m ﾆｽﾝ採水(#1,#2・2本)
(31-23.860N 129-58.771E)
15:58 MBARI採泥(緑・1本)
16:01 MBARI採泥(青・1本)
16:03 無脚採泥(青・1本)
16:09 無脚採泥(黒・1本)
16:13 #1ｷｬｽﾀｰ ﾌﾗｸﾄﾞﾗｲﾄ採集開始
16:18 #1ｷｬｽﾀｰ ﾌﾗｸﾄﾞﾗｲﾄ採集終了
16:27 底棲採集(1体)
17:34 徒手採集
17:37 マーク付設置
5. 18:00 離底 D=2.7m
(31-23.855N 129-58.765E)
0
260m
※ 緯度、経度の1目盛りは、0.1分を示します。

Dive Number: 893

Dive Date: 2008/08/014

Dive Start Time: 10:44 Leave bottom Time: 17:41

Reporter: T. Yamamoto (Kagoshima Univ.)

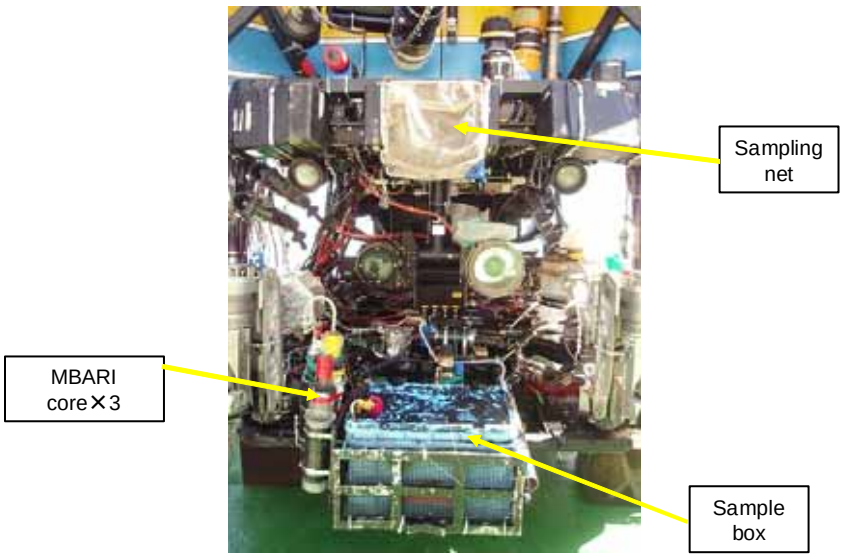
Dive Point Information

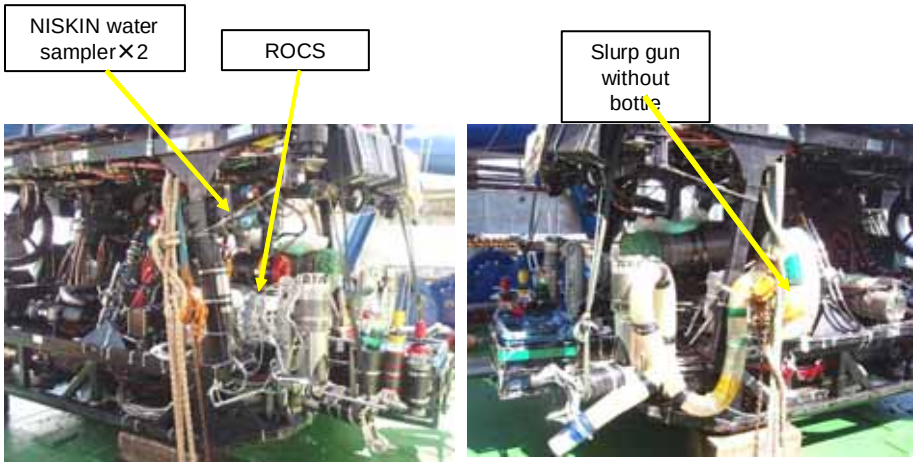
Area: Wakamiko Crater, Northern part of Kagoshima Bay, South Kyushu, Japan

Long: 130˚45.7'E Lat: 31˚40.1'N

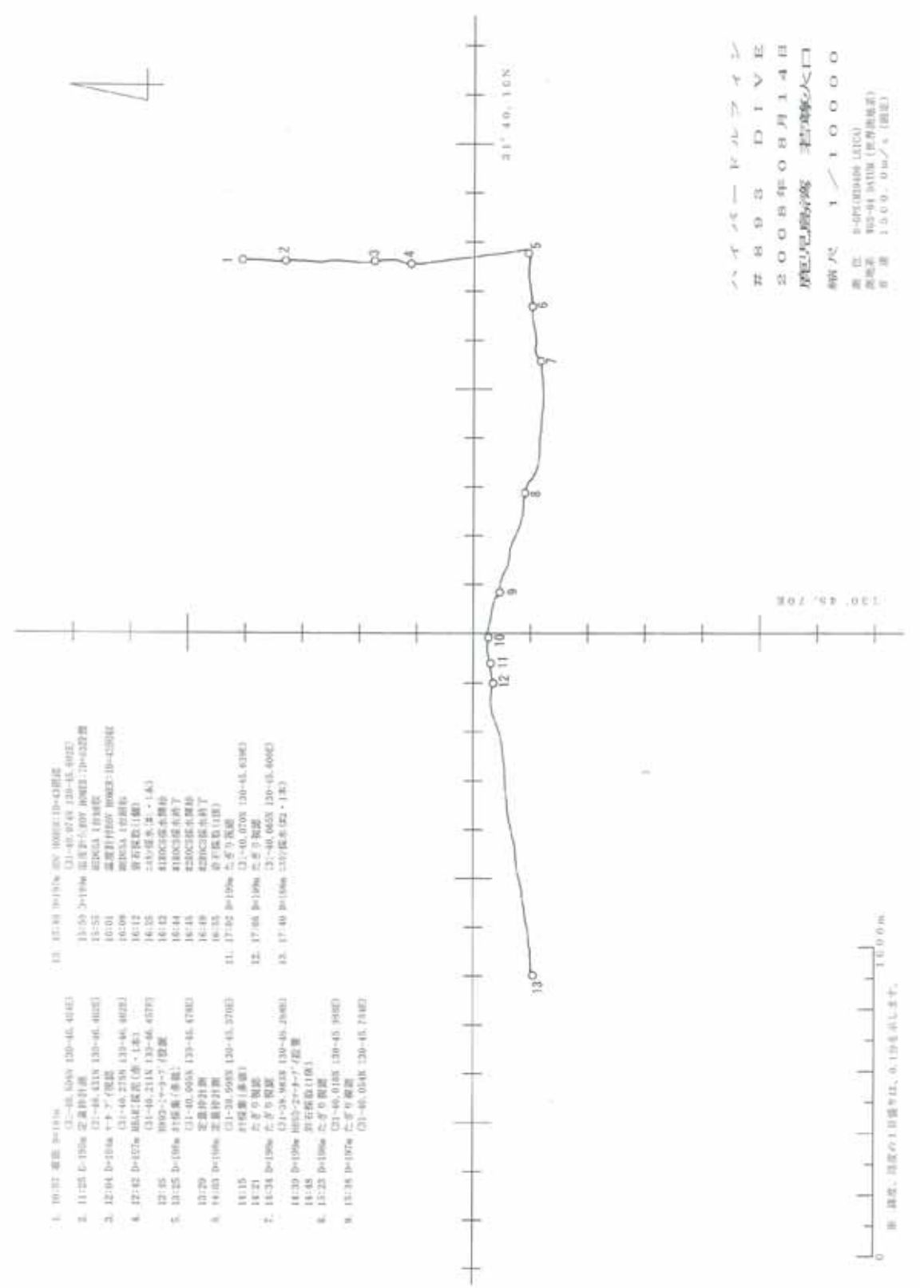
Sample Information: See attached "Sample List" file

Payload:





Dive Track:



8.1 List of the core sediment samples.

Dive	ID	Depth m	Core length (cm)	Site Info
H883	MR	200	20	Bubbling site south from the South site (Mk:H883-1)
	MY	202	21	South site
H884	MY	194	24	Southeast part of the crater
	MB	185	26	
H885	MR	102	25	near the whale bones at Haorimushi site
	MB	102	slime	near tube-worm colony
H886	MG	198	25	near White cone chimney
	MR	198	27	foot of the Daifuku mound
	MY	198	slime	South site
H887	MR	227	slime(15)	No.7 whale
	ML	227	33	No.6 whale
	MG	227	23	ditto
H888	MB	227	12	ditto
H889	MG	251	Slim (10)	No.12 whale
	ML		18	
	MB	245	Slim(7)	No.11 whale
H890	MG	226	12	No.6 whale
	MR	226	16	No.6 whale
H891	MG	217	7	No.2 whale
	MB		1	ditto

8.2 List of the water and gas samples and results of onboard analyses.

Dive	ID	Depth	Si	NH4	H2S	pH	alk.	$\sum CO_2$
		m	μM	mM			mM	mM
H882	N1	199	66	5.4		6.87	2.293	2.471
	N2	195	62	1.5		7.06	2.287	2.389
H883	N1	202	75	5.4		6.96	2.315	2.381
	Gas		–	–		–	–	–
	N2	150	47	3.9		7.36	2.276	2.188
H884	N1	194	70	5.6		7.03	2.312	2.342
	N2	138	43	4.9		7.51	2.251	2.148
H885	N1	103	44	0		7.52	2.268	2.154
	N2	103	43	0		6.85	2.261	2.404
	Gas		–	–		–	–	–
H886	Gas	198	–	–		–	–	–
	N1	196	72	0.56		6.95	2.295	2.393
	R1~3		867	2299	0.08	6.01	4.454	
	R4, 5	198	1410, 1393	5046, 5846	0.33, 0.43	5.45, 5.42	3.13, 4.33	
	N2		71	6.59		6.87	2.284	2.44
H887	N1	227				7.95		
	N2	227				7.95		
H888	N1	227				7.93		
H889	N1	251				7.83		
	N2	245				7.84		
H890	N1	226				7.86		
	N2					7.87		
H891	N1	217				7.88		
	N2					7.88		

8.3 Sample list obtained by the sterilized sediment sampler.

Dive	ID	Depth m	amount	Site Info
H887	SG	227	25	No.7 whale
	SB	227	21	No.6 whale
H888	SG	227	27	ditto
H889	SB	251	20	No.12 whale
	Sblack	245	27	No.11 whale
H890	SR	226	50	No.6 whale
	SG	226	50	ditto
H891	SB	217	50	No.2 whale
	Sblack		50	

8.4 List of the hydrothermal precipitation samples.

Dive	ID	Depth m	Note
H886	GE1	196	Chimney fragments at High-T vent site (white cone)
	GE2		
	GE3		

8.5 Whale Bones

Sample No.	Dive No.	Locality	Depth (m)	Size			Wight (g)
				Width(cm)	Height(cm)	Depth(cm)	
B887-1	HD#887	No.6 off Nomamisaki	226	31.5	21.8	7.2	-
B887-2	HD#887	No.6 off Nomamisaki	226	-	-	-	-
B887-3	HD#887	No.6 off Nomamisaki	226	-	-	-	-
B887-4	HD#887	No.6 off Nomamisaki	226	-	-	-	-
B888-1	HD#888	No.6 off Nomamisaki	227	53.6	23.5	3.6	3500
B890-1A	HD#890	No.6 off Nomamisaki	226	18.3	17.6	10.5	2000
B890-1B	HD#890	No.6 off Nomamisaki	226	9.8	19.3	10.4	1400
B890-1C	HD#890	No.6 off Nomamisaki	226	43.4	19.8	5.9	2700
B890-1D	HD#890	No.6 off Nomamisaki	226	30.0	19.0	8.0	2700
B890-1E	HD#890	No.6 off Nomamisaki	226	39.5	20.7	9.0	3400
B890-1F	HD#890	No.6 off Nomamisaki	226	35.5	16.3	10.3	2700
B890-1G	HD#890	No.6 off Nomamisaki	226	27.5	19.3	5.5	1900
B890-1H	HD#890	No.6 off Nomamisaki	226	42.8	11.2	3.8	900
B890-2	HD#890	No.6 off Nomamisaki	226	-	-	-	-
B890-3	HD#890	No.6 off Nomamisaki	226	-	-	-	-
B891-1	HD#891	No.2 off Nomamisaki	217	-	-	-	-
B891-2	HD#891	No.2 off Nomamisaki	217	-	-	-	-

8.6 Sample list of the benthos

HD#883

Species Name	Depth	Date	On board No.	Fixation
Crustacea gen. spp.	200	2008/8/6	883-1	70% EtOH
Theora sp.	200	2008/8/6	883-2	70% EtOH
Lepetodrilus sp.	200	2008/8/6	883-3	70% EtOH
Shell of *Theora* sp.	200	2008/8/6	883-4	70% EtOH
Ciona sp.	200	2008/8/6	883-5	10%FA
Holothuroidea gen. sp.	200	2008/8/6	883-6	10%FA
Ciona sp.	200	2008/8/6	883-7	freeze
Ciona sp.	200	2008/8/6	883-8	10%FA
Ciona sp.	200	2008/8/6	883-9	99.5% EtOH
Ciona sp.	200	2008/8/6	883-10	4% PFA
Ciona sp.	200	2008/8/6	883-11	LN2
Ciona sp.	200	2008/8/6	883-12	Bouin
Scalibregmatidae	200	2008/8/6	883-101	freeze
Scalibregmatidae	200	2008/8/6	883-102	10% FA
Scale worm	200	2008/8/6	883-103	freeze
Scale worm	200	2008/8/6	883-104	10% FA
Cirratulidae	200	2008/8/6	883-105	freeze
Cirratulidae	200	2008/8/6	883-106	freeze

Species Name	Depth	Date	On board No.	Fixation
Cirratulidae	200	2008/8/6	883-107	10% FA
Onuphidae posterior end	200	2008/8/6	883-108	freeze
Onuphidae anterior end	200	2008/8/6	883-109	freeze
Onuphidae	200	2008/8/6	883-110	10% FA
Dorvilleidae	200	2008/8/6	883-111	99.5% EtOH
Terebellidae	200	2008/8/6	883-112	freeze
Terebellidae	200	2008/8/6	883-113	freeze
Terebellidae	200	2008/8/6	883-114	10% FA
Sabellidae	200	2008/8/6	883-115	freeze
Sabellidae	200	2008/8/6	883-116	10% FA
Paraonidae	200	2008/8/6	883-117	99.5% EtOH
Terebellid	200	2008/8/6	883-118-1	freeze
Terebellidae	200	2008/8/6	883-118-2	10% FA
Terebellid	200	2008/8/6	883-119-1	freeze
Terebellid	200	2008/8/6	883-119-2	10% FA
Glyceriformia	200	2008/8/6	883-120	99.5% EtOH
Unknown polychaete	200	2008/8/6	883-121	10% FA

HD#884

Species Name	Depth	Date	On board No.	Fixation
Ciona sp.	185	2008/8/6	884-1	Bouin
Theora sp.	185	2008/8/6	884-2	freeze
Shells of *Theora* sp.	185	2008/8/6	884-3	70% EtOH
Raeta sp.	185	2008/8/6	884-4	freeze
Theora sp.	185	2008/8/6	884-5	70% EtOH
Raeta sp.	185	2008/8/6	884-6	freeze
Shells of *Raeta sp.*	185	2008/8/6	884-7	70% EtOH
Solemyidae gen. sp.	185	2008/8/6	884-8	70% EtOH
Raeta sp.	185	2008/8/6	884-9	70% EtOH
Crangonidea gen. sp.	185	2008/8/6	884-10	70% EtOH
Holothuroidea gen. sp.	185	2008/8/6	884-11	10% FA
Holothuroidea gen. sp.	185	2008/8/6	884-12	freeze
Ciona sp.	185	2008/8/6	884-13	99.5% EtOH
Ciona sp.	185	2008/8/6	884-14	4% PFA
Terebellidae	185	2008/8/6	884-101	freeze
Terebellidae	185	2008/8/6	884-102	10% FA
Capitellidae	185	2008/8/6	884-103	freeze
Capitellidae	185	2008/8/6	884-104	freeze
Capitellidae	185	2008/8/6	884-105	10% FA

Species Name	Depth	Date	On board No.	Fixation
Diverse broken pieces of Polychaeta	185	2008/8/6	884-106	99.5% EtOH
Glyceriformia	185	2008/8/6	884-107	freeze
Glyceriformia	185	2008/8/6	884-108	10% FA
Scalibregmatidae	185	2008/8/6	884-109	freeze
Scalibregmatidae	185	2008/8/6	884-110	10% FA
Cirratulidae	185	2008/8/6	884-111	freeze
Cirratulidae	185	2008/8/6	884-112	10% FA
Unknown polychaete	185	2008/8/6	884-113	99.5% EtOH
Spionidae piece of tail	185	2008/8/6	884-114	freeze
Spionidae	185	2008/8/6	884-115	10% FA

HD#885

Species Name	Depth	Date	On board No.	Fixation
Mysidacea gen. sp.	102	2008/8/7	885-1	freeze
Mysidacea gen. sp.	102	2008/8/7	885-2	10% FA
Sagittoidea gen. sp.	102	2008/8/7	885-3	10% FA
Gammaridea gen. sp.	102	2008/8/7	885-4	70% EtOH
Copepoda gen. sp.	102	2008/8/7	885-5	10% FA
Ostracoda gen. sp.	102	2008/8/7	885-6	10% FA
Platyhelminthes gen. sp.	102	2008/8/7	885-7	70% EtOH
Soemya sp.	102	2008/8/7	885-8	
Soemya sp.	102	2008/8/7	885-9	freeze
Soemya sp.	102	2008/8/7	885-9P	PF
Soemya sp.	102	2008/8/7	885-9PG	PFG
Soemya sp.	102	2008/8/7	885-9G	freeze
Soemya sp.	102	2008/8/7	885-9F	freeze
Soemya sp.	102	2008/8/7	885-10	70% EtOH
Solemyoida gen. sp.	102	2008/8/7	885-11	70% EtOH
Ciona sp.	102	2008/8/7	885-12	freeze
Philine sp.	102	2008/8/7	885-13	10% FA
Codakia sp.	102	2008/8/7	885-14	70% EtOH
Codakia sp.	102	2008/8/7	885-15	

Species Name	Depth	Date	On board No.	Fixation
small crustacea	102	2008/8/7	885-16	10% FA
Neballidae gen. sp.	102	2008/8/7	885-17	freeze
Theora sp.	102	2008/8/7	885-18	70% EtOH
Fasciolariidae gen. sp.	102	2008/8/7	885-19	70% EtOH
Gastropoda gen. sp.	102	2008/8/7	885-20	70% EtOH
Soemya sp.	102	2008/8/7	885-21	freeze
Soemya sp.	102	2008/8/7	885-21P	PF
Soemya sp.	102	2008/8/7	885-21PG	PFG
Soemya sp.	102	2008/8/7	885-21G	freeze
Soemya sp.	102	2008/8/7	885-21F	freeze
Lamellibrachia sp.	102	2008/8/7	885-22	alive
Periclimenes sp.	102	2008/8/7	885-23	freeze
Gastropoda gen. sp.	102	2008/8/7	885-24	70% EtOH
Gastropoda gen. sp.	102	2008/8/7	885-25	70% EtOH
Gastropoda gen. sp.	102	2008/8/7	885-26	70% EtOH
Ostracoda gen. sp.	102	2008/8/7	885-27	70% EtOH
Theora sp.	102	2008/8/7	885-28	70% EtOH
Gastropoda gen. sp.	102	2008/8/7	885-29	70% EtOH
Tanaidacea gen. sp.	102	2008/8/7	885-30	70% EtOH

Species Name	Depth	Date	On board No.	Fixation
Ciona sp.	102	2008/8/7	885-31	99.5% EtOH
Ciona sp.	102	2008/8/7	885-32	99.5% EtOH
Ciona sp.	102	2008/8/7	885-33	99.5 % EtOH
Ciona ?	102	2008/8/7	885-34	99.5 % EtOH
Lamellibrachia sp.	102	2008/8/7	885-35	Bouin
Lamellibrachia sp.	102	2008/8/7	885-36	PFA
Lamellibrachia sp.	102	2008/8/7	885-37	LN2
Lamellibrachia sp.	102	2008/8/7	885-38	freeze
Lamellibrachia sp.	102	2008/8/7	885-39	alive
Lamellibrachia sp. male gill + vestim	102	2008/8/7	885-101-1	freeze
Lamellibrachia sp. male trunk	102	2008/8/7	885-101-2	freeze
Lamellibrachia sp.a male gill + vestim	102	2008/8/7	885-102-1	freeze
Lamellibrachia sp. male trunk	102	2008/8/7	885-102-2	freeze
Lamellibrachia sp. male gill + vestim	102	2008/8/7	885-103-1	freeze
Lamellibrachia sp. male trunk	102	2008/8/7	885-103-2	freeze
Lamellibrachia sp. fem gonads	102	2008/8/7	885-104-1	freeze
Lamellibrachia sp. eggs	102	2008/8/7	885-104-2	10% FA

Species Name	Depth	Date	On board No.	Fixation
Lamellibrachia sp. fem gill + vestim	102	2008/8/7	885-104-3	freeze
Lamellibrachia sp. fem trunk	102	2008/8/7	885-104-4	freeze
Lamellibrachia sp. embryos + 24h, 1 atm, 16 deg	102	2008/8/7	885-104-5	10% FA
Lamellibrachia sp. embryos + 24h, 5 MPa, 16 deg	102	2008/8/7	885-104-6	10% FA
Lamellibrachia sp.a embryos + 24h, 10 MPa, 16 deg	102	2008/8/7	885-104-7	10% FA
Lamellibrachia sp. embryos + 24h, 20 MPa, 16 deg	102	2008/8/7	885-104-8	10% FA
Lamellibrachia sp. embryos + 24h, 30 MPa, 16 deg	102	2008/8/7	885-104-9	10% FA
Lamellibrachia sp. male gill + vestim	102	2008/8/7	885-105-1	freeze
Lamellibrachia sp. male trunk	102	2008/8/7	885-105-2	freeze
Lamellibrachia sp. male gill + vestim	102	2008/8/7	885-106-1	freeze
Lamellibrachia sp. male trunk	102	2008/8/7	885-106-2	freeze
Lamellibrachia sp. male gill + vestim	102	2008/8/7	885-107-1	freeze

Species Name	Depth	Date	On board No.	Fixation
Lamellibrachia sp. male trunk	102	2008/8/7	885-107-2	freeze
Lamellibrachia sp. fem gill + vestim	102	2008/8/7	885-108-1	freeze
Lamellibrachia sp. fem trunk	102	2008/8/7	885-108-2	freeze
Lamellibrachia sp. fem gill + vestim	102	2008/8/7	885-109-1	freeze
Lamellibrachia sp. fem trunk	102	2008/8/7	885-109-2	freeze
Lamellibrachia sp. fem gill + vestim	102	2008/8/7	885-110-1	freeze
Lamellibrachia sp. fem trunk	102	2008/8/7	885-110-2	freeze
Lamellibrachia sp. eggs	102	2008/8/7	885-110-3	freeze
Lamellibrachia sp.	102	2008/8/7	885-110-4	10% FA
Lamellibrachia sp.	102	2008/8/7	885-110-5	10% FA
Maldanidae, Spionidae, flatworm, scolecida	102	2008/8/7	885-111	99.5% EtOH
Cirratulidae	102	2008/8/7	885-112	freeze
Cirratulidae	102	2008/8/7	885-113	freeze
Cirratulidae	102	2008/8/7	885-114	10% FA
Acrocirridae + Sabellidae	102	2008/8/7	885-115	10% FA
Dorvilleidae	102	2008/8/7	885-116	10% FA
Capitellidae	102	2008/8/7	885-117	10% FA

Species Name	Depth	Date	On board No.	Fixation
Capitellidae	102	2008/8/7	885-118	10% FA
Mixed polychaetes pieces, flatworms	102	2008/8/7	885-119	99.5% EtOH
Maldanidae	102	2008/8/7	885-120	freeze
Maldanidae	102	2008/8/7	885-121	10% FA
Ampharetidae	102	2008/8/7	885-122	freeze
Ampharetidae	102	2008/8/7	885-123	10% FA
Terebellidae	102	2008/8/7	885-124	freeze
Terebellidae	102	2008/8/7	885-125	10% FA
Scale worm	102	2008/8/7	885-126	freeze
Scale worm	102	2008/8/7	885-127	10% FA
Dorvilleidae	102	2008/8/7	885-128	freeze
Dorvilleidae	102	2008/8/7	885-129	10% FA
Sabellidae	102	2008/8/7	885-130	10% FA
Sternapsidae	102	2008/8/7	885-131	freeze
Sternapsidae	102	2008/8/7	885-132	10% FA
Cirratulidae	102	2008/8/7	885-133	freeze
Cirratulidae	102	2008/8/7	885-134	10% FA
Nereididae	102	2008/8/7	885-135	freeze
Nereididae	102	2008/8/7	885-136	10% FA
Hesionidae	102	2008/8/7	885-137	freeze

Species Name	Depth	Date	On board No.	Fixation
Hesionidae	102	2008/8/7	885-138	10% FA
Glyceriformia	102	2008/8/7	885-139	freeze
Glyceriformia	102	2008/8/7	885-140	10% FA
Acrocirridae	102	2008/8/7	885-141	99.5% EtOH
Acrocirridae eggs	102	2008/8/7	885-142	10% FA
Lumbrinereidae	102	2008/8/7	885-143	freeze
Lumbrinereidae	102	2008/8/7	885-144	10% FA
Lumbrinereidae	102	2008/8/7	885-145	freeze
Orbiniidae (?)	102	2008/8/7	885-146	freeze
Orbiniidae (?)	102	2008/8/7	885-147	10% FA
Mixed polychaetes	102	2008/8/7	885-148	10% FA
Lamellibrachia sp. fem gill + vestim	102	2008/8/7	885-149-1	freeze
Lamellibrachia sp. fem trunk	102	2008/8/7	885-149-2	freeze

HD#886

Species Name	Depth	Date	On board No.	Fixation
Bacteria mat	198	2008/8/7	886-1	freeze
Ciona sp.	198	2008/8/7	886-2	Bouin
Ciona sp.	198	2008/8/7	886-3	freeze
Ciona sp.	198	2008/8/7	886-4	Bouin
Solemyidae gen. sp.	198	2008/8/7	886-5	70% EtOH
Neballidae gen. sp.	198	2008/8/7	886-6	freeze
Neballidae gen. sp.	198	2008/8/7	886-7	freeze
Neballidae gen. sp.	198	2008/8/7	886-8	70% EtOH
Neballidae gen. sp.	198	2008/8/7	886-9	10% FA
Solemyidae gen. sp.	198	2008/8/7	886-10	70% EtOH
Theora sp.	198	2008/8/7	886-11	70% EtOH
Neballidae gen. sp.	198	2008/8/7	886-12	70% EtOH
Crustacea gen. spp.	198	2008/8/7	886-13	10% FA
Ciona sp.	198	2008/8/7	886-14	70% EtOH
Ciona sp.	198	2008/8/7	886-15	70% EtOH
Ciona sp.	198	2008/8/7	886-16-1	LN2
Ciona sp.	198	2008/8/7	886-16-2	LN2
Ciona sp.	198	2008/8/7	886-16-3	LN2

Species Name	Depth	Date	On board No.	Fixation
Ciona sp.	198	2008/8/7	886-17	freeze
Ciona sp.	198	2008/8/7	886-18	99.5% EtOH
Ciona sp.	198	2008/8/7	886-19	99.5% EtOH
Scalibregmatidae + Scale worm	198	2008/8/7	886-101	10% FA
Terebellidae	198	2008/8/7	886-102	freeze
Terebellidae	198	2008/8/7	886-103	10% FA
Mixed polychaetes	198	2008/8/7	886-104	10% FA

HD#887

Species Name	Depth	Date	On board No.	Fixation
Lyrocteis sp.	227	2008/8/9	887-1	freeze
Platyhelminthes gen. sp.	224	2008/8/9	887-2	10%FA
Holothuroidea gen. sp.	227	2008/8/9	887-3	?
Galatheidae gen. sp.	224	2008/8/9	887-4	70% EtOH
Brachyura gen. sp.	227	2008/8/9	887-5	70% EtOH
Shells of Mytilidae	224	2008/8/9	887-7	70% EtOH
Shells	227	2008/8/9	887-8	70% EtOH
Ophiuroidea gen. sp.	224	2008/8/9	887-9	70% EtOH
Shells	224	2008/8/9	887-10	70% EtOH
Cnidaria gen. sp.	227	2008/8/9	887-11	?
Gastropoda gen. sp.	224	2008/8/9	887-12	70% EtOH
Cumacea gen. sp.	224	2008/8/9	887-13	10%FA
Gammaridea gen. sp.	224	2008/8/9	887-14	10%FA
Galatheidae gen. sp.	224	2008/8/9	887-15	70% EtOH
Gammaridea gen. sp.	227	2008/8/9	887-16	70% EtOH
Cnidaria gen. sp.	224	2008/8/9	887-17	10%FA
Cnidaria gen. sp.	224	2008/8/9	887-18	freeze
Echinoidea gen. sp.	224	2008/8/9	887-19	10%FA

Species Name	Depth	Date	On board No.	Fixation
Idasola sp.	227	2008/8/9	887-20	Bouin
Adipicola sp.	227	2008/8/9	887-21	Bouin
Gammaridea gen. spp.	227	2008/8/9	887-22	70% EtOH
Decapoda gen. sp.	227	2008/8/9	887-23	70% EtOH
Gnathiidae gen. sp.	227	2008/8/9	887-24	10%FA
Gnathiidae gen. sp.	227	2008/8/9	887-25	10%FA
Shells	227	2008/8/9	887-26	70% EtOH
Sipuncula gen. spp.	227	2008/8/9	887-27	70% EtOH
Pleurobranchaeidae gen. sp.	227	2008/8/9	887-28	10%FA
Gastropoda gen. sp.	227	2008/8/9	887-29	70% EtOH
Gastropoda gen. sp.	227	2008/8/9	887-30	70% EtOH
Galatheidae gen. sp.	227	2008/8/9	887-31	70% EtOH
Asymmetron sp.	227	2008/8/9	887-32	alive
Asymmetron sp.	224	2008/8/9	887-33	alive
Asymmetron sp.	227	2008/8/9	887-34	alive
Nemertinea sp.	227	2008/8/9	887-35	10%FA
Mytilidae gen. spp.	227	2008/8/9	887-36	freeze
Mytilidae gen. spp.	227	2008/8/9	887-37	freeze

Species Name	Depth	Date	On board No.	Fixation
Mytilidae gen. spp.	227	2008/8/9	887-38	freeze
Eggs of *Lyrocteis* sp.	227	2008/8/9	887-39	alive
Eggs of *Lyrocteis* sp.	227	2008/8/9	887-40	5% FA
Eggs of *Lyrocteis* sp.	227	2008/8/9	887-41	freeze
Eggs of *Lyrocteis* sp.	227	2008/8/9	887-42	freeze
Eggs of *Lyrocteis* sp.	227	2008/8/9	887-44	5% FA
Osedax trunk + gill	227	2008/8/9	887-101	freeze
Osedax mucous tube with males & larvae	227	2008/8/9	887-102	2.5% GA
Osedax female with tube, embryos & males	227	2008/8/9	887-103	10% FA
Osedax trunk + gill	227	2008/8/9	887-104	freeze
Protodrilidae	227	2008/8/9	887-105	freeze
Protodrilidae	227	2008/8/9	887-106	10% FA
Unknown broken piece of worm (yellow)	227	2008/8/9	887-107	99.5% EtOH
Scale worm	227	2008/8/9	887-108	freeze
Scale worm	227	2008/8/9	887-109	10% FA
Dorvilleidae	227	2008/8/9	887-110	freeze
Dorvilleidae	227	2008/8/9	887-111	10% FA
Dorvillea eggs	227	2008/8/9	887-112	10% FA

Species Name	Depth	Date	On board No.	Fixation
Dorvilleidae	227	2008/8/9	887-113	99.5% EtOH
Cirratulidae	227	2008/8/9	887-115	10% FA
Cirratulidae	227	2008/8/9	887-116	10% FA
Cirratulidae	224	2008/8/9	887-117	freeze
Cirratulidae	224	2008/8/9	887-118	10% FA
Cirratulidae eggs	224	2008/8/9	887-119	10% FA
Oenonidae (?)	224	2008/8/9	887-120	freeze
Oenonidae (?)	224	2008/8/9	887-121	10% FA
Nereididae & other polychaetes pieces	224	2008/8/9	887-122	99.5% EtOH
Plankton sample	227	2008/8/9	887-123	10% FA
Plankton sample	227	2008/8/9	887-124	10% FA
50 micron filtered water from Osedax collection box	227	2008/8/9	887-125	10% FA
50 micron filtered water from transfer bucket Osedax	227	2008/8/9	887-126	10% FA
Osedax mucus tubes	227	2008/8/9	887-127	10% FA
50 micron filtered water from Osedax glass tank (08/11/08)	227	2008/8/9	887-128	10% FA

Species Name	Depth	Date	On board No.	Fixation
male Osedax from female 887-129	227	2008/8/9	887-129-2	freeze
male Osedax from female 887-129	227	2008/8/9	887-129-3	freeze
male Osedax from female 887-129	227	2008/8/9	887-129-4	freeze
male Osedax from female 887-129	227	2008/8/9	887-129-5	freeze
male Osedax from female 887-129	227	2008/8/9	887-129-6	freeze
Piece of root from Osedax female 887-129	227	2008/8/9	887-129-7	freeze
Female Osedax, tube, larvae and males	227	2008/8/9	887-129-8	10% FA
male Osedax from female 887-130	227	2008/8/9	887-130-1	freeze
male Osedax from female 887-130	227	2008/8/9	887-130-2	freeze
Piece of root from Osedax female 887-130	227	2008/8/9	887-130-3	freeze
Female Osedax, tube, larvae and males	227	2008/8/9	887-130-4	10% FA
male Osedax from female 887-131	227	2008/8/9	887-131-1	freeze
male Osedax from female 887-131	227	2008/8/9	887-131-2	freeze
male Osedax from female 887-131	227	2008/8/9	887-131-3	freeze
male Osedax from female 887-131	227	2008/8/9	887-131-4	freeze
Piece of root from Osedax female 887-131	227	2008/8/9	887-131-5	freeze
Female Osedax, tube, larvae and males	227	2008/8/9	887-131-6	10% FA
Mixed polychaetes	227	2008/8/9	887-132	99.5% EtOH

HD#888

Species Name	Depth	Date	On board No.	Fixation
Shells	227	2008/8/9	888-2	70% EtOH
Adipicola sp.	227	2008/8/9	888-3	Bouin
Shells	227	2008/8/9	888-5	70% EtOH
Shells	227	2008/8/9	888-6	70% EtOH
Adipicola sp.	227	2008/8/9	888-7	Bouin
Adipicola sp.	227	2008/8/9	888-8	Bouin
Shells	227	2008/8/9	888-12	70% EtOH
Solemyidae gen. sp.	227	2008/8/9	888-13	
Solemyidae gen. sp.	227	2008/8/9	888-14	freeze
Shells	227	2008/8/9	888-15	70% EtOH
Shells	227	2008/8/9	888-16	70% EtOH
Idasola sp.	227	2008/8/9	888-17	
Idasola sp.	227	2008/8/9	888-17F	freeze
Idasola sp.	227	2008/8/9	888-17G	freeze
Idasola sp.	227	2008/8/9	888-17FA	10% FA
Idasola sp.	227	2008/8/9	888-17GA	2.5% GA
Gammaridea gen. sp.	227	2008/8/9	888-88	70% EtOH
Soft tissue of whale	227	2008/8/9	888-89	

Species Name	Depth	Date	On board No.	Fixation
Brachyura gen. sp.	227	2008/8/9	888-20	70% EtOH
Neballidae gen. sp.	227	2008/8/9	888-21	70% EtOH
Gammaridea gen. sp.	227	2008/8/9	888-22	70% EtOH
Nemertinea sp.	227	2008/8/9	888-23	70% EtOH
Chlamys sp.	227	2008/8/9	888-24	70% EtOH
Gastropoda gen. sp.	227	2008/8/9	888-25	70% EtOH
Nemertinea sp.	227	2008/8/9	888-26	10% FA
Cumacea gen. sp.	227	2008/8/9	888-27	freeze
Anomura gen. sp.	227	2008/8/9	888-28	alive
Bivalvia gen. sp.	227	2008/8/9	888-29	70% EtOH
Solemyidae gen. sp.	227	2008/8/9	888-30	freeze
Solemyidae gen. sp.	227	2008/8/9	888-30P	PF
Solemyidae gen. sp.	227	2008/8/9	888-30PG	PFG
Solemyidae gen. sp.	227	2008/8/9	888-30G	freeze
Solemyidae gen. sp.	227	2008/8/9	888-30F	freeze
Solemyidae gen. sp.	227	2008/8/9	888-31	freeze
Solemyidae gen. sp.	227	2008/8/9	888-31P	PF
Solemyidae gen. sp.	227	2008/8/9	888-31PG	PFG

Species Name	Depth	Date	On board No.	Fixation
Solemyidae gen. sp.	227	2008/8/9	888-31G	freeze
Solemyidae gen. sp.	227	2008/8/9	888-31F	freeze
Solemyidae gen. sp.	227	2008/8/9	888-32	freeze
Solemyidae gen. sp.	227	2008/8/9	888-32P	PF
Solemyidae gen. sp.	227	2008/8/9	888-32PG	PFG
Solemyidae gen. sp.	227	2008/8/9	888-32G	freeze
Solemyidae gen. sp.	227	2008/8/9	888-32F	freeze
Brachyura gen. sp.	227	2008/8/9	888-33	70% EtOH
Asymmetron sp.	227	2008/8/9	888-34	alive
Asymmetron sp.	227	2008/8/9	888-35	LN2
Asymmetron sp.	227	2008/8/9	888-36	alive
Asymmetron sp.	227	2008/8/9	888-37	alive
Asymmetron sp.	227	2008/8/9	888-38	alive
Asymmetron sp.	227	2008/8/9	888-39	alive
Idasola sp.	227	2008/8/9	888-40	
Idasola sp.	227	2008/8/9	888-40F	freeze
Idasola sp.	227	2008/8/9	888-40G	freeze
Idasola sp.	227	2008/8/9	888-40FA	10% FA
Idasola sp.	227	2008/8/9	888-40GA	2.5% GA
Gnathiidae gen. sp.	227	2008/8/9	888-41	alive
Gnathiidae gen. sp.	227	2008/8/9	888-42	10% FA

Species Name	Depth	Date	On board No.	Fixation
Gnathiidae gen. sp.	227	2008/8/9	888-43	alive
Gnathiidae gen. sp.	227	2008/8/9	888-44	70% EtOH
Solemyidae gen. sp.	227	2008/8/9	888-45	70% EtOH
Nereididae	227	2008/8/9	888-101	freeze
Nereididae	227	2008/8/9	888-102	10% FA
Nephtydae	227	2008/8/9	888-103	freeze
Nephtydae	227	2008/8/9	888-104	10% FA
Eggs	227	2008/8/9	888-105	freeze
Eggs	227	2008/8/9	888-106	10% FA
Capitellidae + Cirratulidae	227	2008/8/9	888-107	99.5% EtOH
Protodrilidae + Nereididae + Cirratulidae	227	2008/8/9	888-108	10% FA
Mixed polychaetes damaged	227	2008/8/9	888-109	99.5% EtOH
Polychaete eggs	227	2008/8/9	888-110	10% FA

HD#889

Species Name	Depth	Date	On board No.	Fixation
Lyrocteis sp.	247	2008/8/10	889-1	alive
Scalpellidae gen. sp.	250	2008/8/10	889-2	alive
Shells	245	2008/8/10	889-3	70% EtOH
Gammaridea gen. sp.	250	2008/8/10	889-4	70% EtOH
Shells	245	2008/8/10	889-5	70% EtOH
Gammaridea gen. sp.	245	2008/8/10	889-6	70% EtOH
Decapoda gen. sp.1	245	2008/8/10	889-7	70% EtOH
Shells	245	2008/8/10	889-8	70% EtOH
Neballidae gen. sp.	245	2008/8/10	889-9	70% EtOH
Majidae gen. sp.	250	2008/8/10	889-10	70% EtOH
Sipuncula gen. sp.	245	2008/8/10	889-11	10%FA
Solemyidae gen. sp.	245	2008/8/10	889-12	
Gammaridea gen. sp.	250	2008/8/10	889-13	70% EtOH
Decapoda gen. sp.	250	2008/8/10	889-14	70% EtOH
Porifera gen. sp.	247	2008/8/10	889-15	70% EtOH
Solemyidae gen. sp.	245	2008/8/10	889-16	70% EtOH
Sipuncula gen. sp.	245	2008/8/10	889-17	70% EtOH
Brachyura gen. sp.	245	2008/8/10	889-18	70% EtOH
Gammaridea gen. sp.	245	2008/8/10	889-19	70% EtOH

Species Name	Depth	Date	On board No.	Fixation
Porifera gen. sp.	245	2008/8/10	889-20	70% EtOH
Shells	251	2008/8/10	889-21	70% EtOH
Decapoda gen. sp.	245	2008/8/10	889-22	70% EtOH
Bivalvia gen. sp.	245	2008/8/10	889-23	70% EtOH
Nemertinea sp.	245	2008/8/10	889-24	10%FA
Asymmetron sp.	245	2008/8/10	889-25	PFA
Asymmetron sp.	245	2008/8/10	889-26	Bouin
Asymmetron sp.	245	2008/8/10	889-27	alive
Asymmetron sp.	245	2008/8/10	889-28	alive
Asymmetron sp.	245	2008/8/10	889-29	alive
Shells	249	2008/8/10	889-30	70% EtOH
Gammaridea gen. sp.	250	2008/8/10	889-31	70% EtOH
Gammaridea gen. sp.	245	2008/8/10	889-32	70% EtOH
Solemyidae gen. sp.	249	2008/8/10	889-33	70% EtOH
Neballidae gen. sp.	249	2008/8/10	889-34	70% EtOH
Echinoidea gen. sp.	249	2008/8/10	889-35	70% EtOH
Nemertinea sp.	245	2008/8/10	889-36	10%FA
Codakia sp.	245	2008/8/10	889-37	
Codakia sp.	245	2008/8/10	889-37F	freeze

Species Name	Depth	Date	On board No.	Fixation
Codakia sp.	245	2008/8/10	889-37G	freeze
Codakia sp.	245	2008/8/10	889-37FA	10% FA
Codakia sp.	245	2008/8/10	889-37GA	2.5% GA
Codakia sp.	245	2008/8/10	889-38	
Codakia sp.	245	2008/8/10	889-38F	freeze
Codakia sp.	245	2008/8/10	889-38G	freeze
Codakia sp.	245	2008/8/10	889-38FA	10% FA
Codakia sp.	245	2008/8/10	889-38GA	2.5% GA
Decapoda gen. sp.	250	2008/8/10	889-39	10% FA
Gnathiidae gen. sp.	249	2008/8/10	889-40	10% FA
Asymmetron sp.	245	2008/8/10	889-42	alive
Polychaeta gen. sp.	251	2008/8/10	889-43	freeze
Eggs of *Lyrocteis* sp.	247	2008/8/10	889-44	5% FA
Gnathiidae gen. sp.	243	2008/8/10	889-45	alive
Eggs of *Lyrocteis* sp.	247	2008/8/10	889-46	freeze
Osedax female	250	2008/8/10	889-101	freeze
Osedax female	250	2008/8/10	889-102	10% FA
Polychaete larvae	243	2008/8/10	889-103	10% FA
Syllidae	250	2008/8/10	889-103 (bis!)	freeze
Syllidae, Dorvillea, Spionidae	250	2008/8/10	889-104	10% FA

Species Name	Depth	Date	On board No.	Fixation
Capitellidae, whitish flatworm, other polychaete	249	2008/8/10	889-105	99.5% EtOH
Paraonidae	250	2008/8/10	889-106	freeze
Capitellidae	250	2008/8/10	889-107	freeze
Paraonidae, Capitellidae , Spionidae	250	2008/8/10	889-108	10% FA
Mixed polychaetes damaged	245	2008/8/10	889-109	99.5% EtOH
Plankton sample	251	2008/8/10	889-110	10% FA
Plankton sample	243	2008/8/10	889-111	10% FA
few sorted planktonic animals from plankton sample	243	2008/8/10	889-112	10% FA

HD#890

Species Name	Depth	Date	On board No.	Fixation
Gammaridea gen. sp.	226	2008/8/11	890-1	70% EtOH
Lyrocteis sp.	226	2008/8/11	890-2	alive
Porifera gen. sp.	226	2008/8/11	890-3	10%FA
Dromiidae gen. sp.	226	2008/8/11	890-4	70% EtOH
Scalpellidae gen. sp.	226	2008/8/11	890-5	alive
Gastropoda gen. sp.	226	2008/8/11	890-6	70% EtOH
Shells	226	2008/8/11	890-7	70% EtOH
Shells	226	2008/8/11	890-8	70% EtOH
Shells	226	2008/8/11	890-9	70% EtOH
Cumacea gen. sp.	226	2008/8/11	890-10	70% EtOH
Anomura gen. sp.	226	2008/8/11	890-11	70% EtOH
Ophiuroidea gen. sp.	226	2008/8/11	890-12	70% EtOH
Majidae gen. sp.	226	2008/8/11	890-13	70% EtOH
Gastropoda gen. sp.	226	2008/8/11	890-14	70% EtOH
Porifera gen. sp.	226	2008/8/11	890-15	70% EtOH
Cumacea gen. sp.	226	2008/8/11	890-16	freeze
Cumacea gen. sp.	226	2008/8/11	890-17	10%FA
Solemyidae gen. sp.	226	2008/8/11	890-18	70% EtOH
Petrasma sp.	226	2008/8/11	890-19	70% EtOH

Species Name	Depth	Date	On board No.	Fixation
Galatheidae gen. sp.	226	2008/8/11	890-20	70% EtOH
Cumacea gen. sp.	226	2008/8/11	890-21	10%FA
Nemertinea sp.	226	2008/8/11	890-22	10%FA
Gastropoda gen. sp.	226	2008/8/11	890-23	70% EtOH
Galatheidae gen. sp.	226	2008/8/11	890-24	70% EtOH
Galatheidae gen. sp.	226	2008/8/11	890-25	70% EtOH
Brachyura gen. sp.	226	2008/8/11	890-26	70% EtOH
Majidae gen. sp.	226	2008/8/11	890-27	70% EtOH
Adipicola sp.	226	2008/8/11	890-28	alive
Holothuroidea gen. sp.	226	2008/8/11	890-29	10%FA
Gammaridea gen. sp.	226	2008/8/11	890-30	70% EtOH
Brachyura gen. sp.	226	2008/8/11	890-31	70% EtOH
Brachyura gen. sp.	226	2008/8/11	890-32	70% EtOH
Holothuroidea gen. sp.	226	2008/8/11	890-33	70% EtOH
Gastropoda gen. sp.	226	2008/8/11	890-34	70% EtOH
Gastropoda gen. sp.	226	2008/8/11	890-35	70% EtOH
Holothuroidea gen. sp.	226	2008/8/11	890-36	70% EtOH
Anomura gen. sp.	226	2008/8/11	890-37	70% EtOH
Adipicola sp.	226	2008/8/11	890-38	LN2

Species Name	Depth	Date	On board No.	Fixation
Asymmetron sp.	226	2008/8/11	890-39	alive
Gammaridea gen. sp.	226	2008/8/11	890-40	70% EtOH
Shells	226	2008/8/11	890-41	70% EtOH
Shell of Hydatinidae gen. sp.	226	2008/8/11	890-42	70% EtOH
Fraction	226	2008/8/11	890-43	70% EtOH
Hydatinidae gen. sp.	226	2008/8/11	890-44	10%FA
Nemertinea sp.	226	2008/8/11	890-45	10%FA
Sipuncula gen. sp.	226	2008/8/11	890-46	70% EtOH
Brachyura gen. sp.	226	2008/8/11	890-47	70% EtOH
Sipuncula gen. sp.	226	2008/8/11	890-48	10%FA
Adipicola sp.	226	2008/8/11	890-49	Bouin
Mytilidae gen. spp.	226	2008/8/11	890-51	freeze
Idasola sp.	226	2008/8/11	890-52	freeze
Idasola sp.	226	2008/8/11	890-52F	freeze
Idasola sp.	226	2008/8/11	890-52G	freeze
Idasola sp.	226	2008/8/11	890-52FA	10% FA
Idasola sp.	226	2008/8/11	890-52GA	2.5% GA
Idasola sp.	226	2008/8/11	890-53	freeze
Idasola sp.	226	2008/8/11	890-53F	freeze
Idasola sp.	226	2008/8/11	890-53G	freeze
Idasola sp.	226	2008/8/11	890-53FA	10% FA

Species Name	Depth	Date	On board No.	Fixation
Idasola sp.	226	2008/8/11	890-53GA	2.5% GA
Gnathiidae gen. sp.	226	2008/8/11	890-54	70% EtOH
Gastropoda gen. sp.	226	2008/8/11	890-55	70% EtOH
Polychaera	226	2008/8/11	890-56	70% EtOH
Fraction	226	2008/8/11	890-57	70% EtOH
Protodrilidae gen. sp.	226	2008/8/11	890-58	70% EtOH
Protodrilidae gen. sp.	226	2008/8/11	890-59	freeze
Protodrilidae gen. sp.	226	2008/8/11	890-60	70% EtOH
Fraction	226	2008/8/11	890-61	70% EtOH
Plychaeta mix	226	2008/8/11	890-62	70% EtOH
Adipicola sp.	226	2008/8/11	890-63	Calture
Gnathiidae gen. sp.	226	2008/8/11	890-64	alive
Gnathiidae gen. sp.	226	2008/8/11	890-65	alive
Polychaete juvenile	226	2008/8/11	890-101	10% FA
Plankton sample	226	2008/8/11	890-102	10% FA
Trochophore and juvenile polychaetes	226	2008/8/11	890-103	10% FA
juvenile ophiuridae	226	2008/8/11	890-104	10% FA
juvenile sea urchin	226	2008/8/11	890-105	10% FA
planktonic organisms unknown	226	2008/8/11	890-106	10% FA
Plankton sample	226	2008/8/11	890-107	10% FA

Species Name	Depth	Date	On board No.	Fixation
Osedax mucus tubes	226	2008/8/11	890-108	10% FA
Small piece of Osedax mucus with embryos	226	2008/8/11	890-109	10% FA
Spionidae and other polychaetes	226	2008/8/11	890-110	99.5% EtOH
Sabellidae + Terebellidae (?)	226	2008/8/11	890-111	99.5% EtOH
Protodrilidae	226	2008/8/11	890-112	freeze
Mixed polychaetes	226	2008/8/11	890-113	99.5% EtOH
Mucus with trochophore larvae	226	2008/8/11	890-114	2.5% GA
Osedax mucus tube with larvae and males	226	2008/8/11	890-115	10% FA
Mucus with early larvae or embryos	226	2008/8/11	890-116	2.5% GA
Osedax male	226	2008/8/11	890-117	2.5% GA
Osedax piece of root	226	2008/8/11	890-118-1	freeze
Osedax trunk, gills and little root	226	2008/8/11	890-118-2	10% FA
Osedax piece of trunk	226	2008/8/11	890-119-1	freeze
Osedax Trunk, root damaged	226	2008/8/11	890-119-2	10% FA
Osedax tube and mucus	226	2008/8/11	890-120-1	99.5% EtOH
Osedax tube and mucus	226	2008/8/11	890-120-2	99.5% EtOH
Dorvillea	226	2008/8/11	890-121	99.5% EtOH
Protodrilidae + Capitellidae	226	2008/8/11	890-122	99.5% EtOH

Species Name	Depth	Date	On board No.	Fixation
Dorvillea eggs	226	2008/8/11	890-123-1	10% FA
Dorvillea	226	2008/8/11	890-123-2	freeze
Mixed polychaeta	226	2008/8/11	890-124	10% FA
Cirratulidae	226	2008/8/11	890-125	freeze
Cirratulidae	226	2008/8/11	890-126	99.5% EtOH
Dorvillea male	226	2008/8/11	890-127	freeze
Cirratulidae	226	2008/8/11	890-128	10% FA
Mixed polychaeta	226	2008/8/11	890-129	99.5% EtOH
Nereididae	226	2008/8/11	890-130	freeze
Nereididae	226	2008/8/11	890-131	10% FA
Cirratulidae	226	2008/8/11	890-132	freeze
Cirratulidae	226	2008/8/11	890-133	10% FA
Mixed polychaeta	226	2008/8/11	890-134	99.5% EtOH
Osedax larvae	226	2008/8/11	890-135	10% FA
Dorvilleidae	226	2008/8/11	890-136	freeze
Dorvilleidae	226	2008/8/11	890-137	freeze
Mixed Dorvilleidae	226	2008/8/11	890-138	10% FA
Capitellidae (?)	226	2008/8/11	890-139	99.5% EtOH
Protodrilidae	226	2008/8/11	890-140	freeze
Protodrilidae	226	2008/8/11	890-141	10% FA
Cirratulidae	226	2008/8/11	890-142	freeze

Species Name	Depth	Date	On board No.	Fixation
Cirratulidae	226	2008/8/11	890-143	10% FA

HD#891

Species Name	Depth	Date	On board No.	Fixation
Shells	217	2008/8/11	891-1	70% EtOH
Nemertinea sp.	217	2008/8/11	891-2	10%FA
Nemertinea sp.	217	2008/8/11	891-3	10%FA
Brachyura gen. sp.	217	2008/8/11	891-4	70% EtOH
Decapoda gen. sp.	217	2008/8/11	891-5	70% EtOH
Brachyura gen. sp.	217	2008/8/11	891-6	70% EtOH
Cumacea gen. sp.	217	2008/8/11	891-7	70% EtOH
Gammaridea gen. sp.	217	2008/8/11	891-8	70% EtOH
Decapoda gen. sp.	217	2008/8/11	891-9	70% EtOH
Galatheidae gen. sp.	217	2008/8/11	891-10	70% EtOH
Shells	217	2008/8/11	891-11	70% EtOH
Cnidaria gen. sp.	217	2008/8/11	891-12	70% EtOH
Gammaridea gen. sp.	217	2008/8/11	891-13	70% EtOH
Alcyonacea gen. sp.	219	2008/8/11	891-14	alive
Gammaridea gen. sp.	217	2008/8/11	891-15	70% EtOH
Gastropoda gen. sp.	217	2008/8/11	891-16	70% EtOH
Petrasma sp.	217	2008/8/11	891-17	freeze
Solemyidae gen. sp.	217	2008/8/11	891-18	freeze
Codakia sp.	217	2008/8/11	891-19	

Species Name	Depth	Date	On board No.	Fixation
Asymmetron sp.	217	2008/8/11	891-20	alive
Asymmetron sp.	217	2008/8/11	891-21	freeze
Asymmetron sp.	217	2008/8/11	891-22	LN2
Asymmetron sp.	217	2008/8/11	891-23	PFA
Asymmetron sp.	217	2008/8/11	891-24	alive
Echinoidea gen. sp.	217	2008/8/11	891-25	70% EtOH
Echinoidea gen. sp.	217	2008/8/11	891-26	70% EtOH
Gnathiidae gen. sp.	217	2008/8/11	891-27	10%FA
Gnathiidae gen. sp.	217	2008/8/11	891-28	10%FA
Shell of Hydatinidae gen. sp.	217	2008/8/11	891-29	70% EtOH
Plankton sample	217	2008/8/11	891-101	10% FA
Capitellidae	217	2008/8/11	891-102	freeze
Spionidae	217	2008/8/11	891-103	freeze
Cirratulidae	217	2008/8/11	891-104	freeze
Paralacydonia	217	2008/8/11	891-105	freeze
Nereididae	217	2008/8/11	891-106	freeze
Lumbrinereidae	217	2008/8/11	891-107	freeze
white lond achaetous worm	217	2008/8/11	891-108	freeze
Mixed polychaetes	217	2008/8/11	891-109	10% FA

Species Name	Depth	Date	On board No.	Fixation
male Osedax	217	2008/8/11	891-110-1	freeze
male Osedax	217	2008/8/11	891-110-2	freeze
male Osedax	217	2008/8/11	891-110-3	freeze
male Osedax	217	2008/8/11	891-110-4	freeze
male Osedax	217	2008/8/11	891-110-5	freeze
Palp	217	2008/8/11	891-110-6	freeze
Piece of root	217	2008/8/11	891-110-7	freeze
Osedax female with tube, embryos & males	217	2008/8/11	891-110-8	2.5% GA + 10% FA (3:2)
Osedax larvae	217	2008/8/11	891-110-9	2.5% GA
Piece of root	217	2008/8/11	891-111-1	freeze
Osedax female with tube, embryos & males	217	2008/8/11	891-111-2	10% FA
Piece of root	217	2008/8/11	891-112-1	freeze
Osedax female with tube, embryos & males	217	2008/8/11	891-112-2	10% FA

HD#892

Species Name	Depth	Date	On board No.	Fixation
Ciona sp.	103	2008/8/14	892-1	70% EtOH
Lamellibrachia sp.	103	2008/8/14	892-2	Bouin
Lamellibrachia sp.	103	2008/8/14	892-3	freeze
Lamellibrachia sp.	103	2008/8/14	892-4	PFA/MOPS
Lamellibrachia sp.	103	2008/8/14	892-5	PFA/PBS
Maurolicus sp.	103	2008/8/14	892-6	10%FA
Diaphus sp.	103	2008/8/14	892-7	10%FA
Tanaidacea gen. sp.	103	2008/8/14	892-8	70% EtOH
Gastropoda gen. sp.	103	2008/8/14	892-9	70% EtOH
Theora sp.	103	2008/8/14	892-10	70% EtOH
Bivalvia gen. sp.	103	2008/8/14	892-11	70% EtOH
Solemyoida gen. sp.	103	2008/8/14	892-12	70% EtOH
Gammaridea gen. sp.	103	2008/8/14	892-13	70% EtOH
Ostracoda gen. sp.	103	2008/8/14	892-14	70% EtOH
Mysidacea gen. sp.	103	2008/8/14	892-15	70% EtOH
Polychaeta mix	103	2008/8/14	892-16	70% EtOH
Periclimenes sp.	103	2008/8/14	892-17	alive
Chelidonichthys sp.	103	2008/8/14	892-18	alive
Sebastiscus sp.	103	2008/8/14	892-19	alive

Species Name	Depth	Date	On board No.	Fixation
Lamellibrachia sp.	103	2008/8/14	892-20	freeze
Bivalvia gen. sp.	103	2008/8/14	892-21	freeze
Lamellibrachia sp.	103	2008/8/14	892-22	alive
Lamellibrachia sp. female	103	2008/8/14	892-101	freeze
Lamellibrachia sp. female	103	2008/8/14	892-102	freeze
Lamellibrachia sp. eggs	103	2008/8/14	892-103	10% FA
Lamellibrachia sp. female	103	2008/8/14	892-104	freeze
Lamellibrachia sp. female	103	2008/8/14	892-105	freeze
Lamellibrachia sp. female	103	2008/8/14	892-106	freeze
Lamellibrachia sp. male	103	2008/8/14	892-107	freeze
Lamellibrachia sp. eggs	103	2008/8/14	892-108	freeze
Lamellibrachia sp. eggs	103	2008/8/14	892-109	99.5% EtOH
Lamellibrachia sp. eggs	103	2008/8/14	892-110	10% FA
Lamellibrachia sp. eggs	103	2008/8/14	892-111	freeze
Lamellibrachia sp. embryos	103	2008/8/14	892-112-1	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-112-2	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-112-3	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-112-4	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-112-5	10% FA

Species Name	Depth	Date	On board No.	Fixation
Lamellibrachia sp. embryos	103	2008/8/14	892-113-1	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-113-2	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-113-3	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-113-4	10% FA
Lamellibrachia sp. larvae	103	2008/8/14	892-113-5	live
Lamellibrachia sp. larvae	103	2008/8/14	892-113-6	live
Lamellibrachia sp. embryos	103	2008/8/14	892-114-1	10% FA
Lamellibrachia sp. embryos	103	2008/8/14	892-114-2	10% FA
Lamellibrachia sp. larvae	103	2008/8/14	892-114-3	live
Lamellibrachia sp. embryos	103	2008/8/14	892-115-1	10% FA
Lamellibrachia sp. larvae	103	2008/8/14	892-115-2	live

HD#893

Species Name	Depth	Date	On board No.	Fixation
Soemya sp.	198	2008/8/14	893-1	70% EtOH
Neballidae gen. sp.	198	2008/8/14	893-2	70% EtOH
Tube of Plychaeta	198	2008/8/14	893-3	70% EtOH
Neballidae gen. sp.	197	2008/8/14	893-4	70% EtOH
Neballidae gen. sp.	198	2008/8/14	893-5	70% EtOH
Polychaeta mix	198	2008/8/14	893-6	70% EtOH
Polychaeta mix	198	2008/8/14	893-7	70% EtOH
Ciona sp.	198	2008/8/14	893-8	10%FA
Ciona sp.	198	2008/8/14	893-9	70% EtOH
Ciona sp.	198	2008/8/14	893-10	10%FA
Ciona sp.	198	2008/8/14	893-11	70% EtOH
Ciona sp.	198	2008/8/14	893-12	LN2
Ciona sp.	198	2008/8/14	893-13	70% EtOH
Ciona sp.	198	2008/8/14	893-14	freeze
Ciona sp.	198	2008/8/14	893-15	freeze

9. 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 my also be changed without notice. Data on the cruise report may be raw or not processed. Please ask the PIs 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.

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