doi : 10.17596/0003225

Cruise Report of Yokosuka-Shinkai-6500 dive cruise YK09-12 at Japan Trench from Aug. 28 to Sept. 7, 2009

Tadashi Maruyama and Members of YK09-12 cruise

Contents

Aims of the Cruise

This research cruise, YK09-12, was planned to collect some deep-sea dwelling chemosynthetically symbiotic clams, *Calyptogena phaseoliformis* and *C. fossajaponica*, and to collect some deep-sea dwelling protists in the Japan Trench. Some other unique deep-sea dwelling invertebrates, such as cnidarians and ctenophores, were also planned to be collected.

Members of the cruise

Scientists

Tadashi Maruyama, D. Sc. Principal Investigator of YK09-12 (Marine Biodiversity Research Program, JASMTEC)
Masashi Tsuchia, PhD. (JAMSTEC)
Takao Yoshida, PhD. (JAMSTEC)
Yoshimitsu Nakamura, PhD. (JAMSTEC)
Yuki Hongo, Mr. (Tokyo Univ. Marine Sci. and Technol.)
Akihiro Tame, Mr. (Marine Works Japan, Co.)
Hiroshi Miyake, PhD. (Kitasato Univ.)
Mitsuru Jinbo, PhD. (Kitasato Univ.)
Haruka Shibata Ms. (Kitasato Univ.)
Takuya Mekawa Mr. (Nippon Marine Enterprises, Ltd.)
Béatrice Lecroq, PhD (Univ. Geneva)
Cathalina Aguilar Hurtado, Ms. (Univ. Ryukyus)
Frederic Sinniger, PhD. (Univ. Ryukyus)
Takuma Fujii, Mr. (Univ. Ryukyus)
Takuya Maekawa (Nippon Marine Enterprises, Ltd.)

Shinkai-6500 Operation Team

Toshiaki Sakurai, Mr. (Chief Submersible Staff)
Kazuhiro Chiba, Mr. (Sub-chief Submersible Staff)
Satoshi Ogura, Mr. (Sub-chief Submersible Staff)
Keita Matsumoto, Mr. (1st Submersible Staff)
Hirofumi Ueki, Mr. (2nd Submersible Staff)
Keigo Suzuki, Mr. (2nd Submersible Staff)
Yohsuke Chida, Mr. (2nd Submersible Staff)

Fumitaka Saitoh, Mr. (2nd Submersible Staff)
Hitomi Ikeda, Ms. (3rd Submersible Staff)
Takuma Ohnishi, Mr. (3rd Submersible Staff)
Masaya Katagiri, Mr. (3rd Submersible Staff)
Yudai Tayama, Mr. (3rd Submersible Staff)

Crews of R/V. Yokosuka
Shinya Ryono, Mr. (Captain)
Shin-ichi Kusaka, Mr. (Chief Officer)
Hiroyuki Kato, Mr. (2nd Officer)
Shunsuke Fujii, Mr. (3rd Officer)
Toshihiro Kimura, Mr. (Chief Engineer)
Kazuhiko Kaneda, Mr. (1st Engineer)
Yoshinobu Hiratsuka, Mr. (2nd Engineer)
Ichiro Deguchi, Mr. (3rd Engineer)
Hirosuke Saitake, Mr. (Chief Radio Operator)
Yohei Yamamoto, Mr. (2nd Radio Operator)
Yasuyoshi Kyuuki, Mr. (Boat Swain)
Yuuki Yoshino, Mr. (Able Seaman)
Katumi Shimizu, Mr. (Able Seaman)
Shuji Takuno, Mr. (Able Seaman)
Nobuyuki Ichikawa, Mr. (Able Seaman)
Naoshi Ishizuka, Mr. (Sailor)
Daisuke? Yanagitani, Mr. (Sailor)
Kazuaki Nakai, Mr. (No. 1. Oiler)
Shota Watanabe, Mr. (Oiler)
Tomoyuki Hashimoto, Mr. (Oiler)
Kazuo Abe, Mr. (Oiler)
Takeshi Watanabe, Mr. (Assistant Oiler)
Kaoru Takashima, Mr. (Chief Steward)
Yoshinobu Hasatani, Mr. (Steward)
Kazuhiro Hirayama, Mr. (Steward)
Hiroyuki Ohba, Mr. (Steward)
Hidetosi Kamata, Mr. (Steward)

Cruise Diary

Aug. 28th, 2009.

Weather: Cloudy with some rain. Sea surface: a little wavy but not rough. We departed the Ohfunato-port at 14:00 on Aug. 28th. But because of a trouble of the engine of the R/V Yokosuka, we repaired the trouble and stayed in the Ohfunato-bay in the night. We had a meeting at 14:30. We introduced each other and the PI explained the main subjects of this research cruise. We set laboratories and made preparations for payload of the Shinkai-6500.

Aug. 29th, 2009.

At 6:00 we departed from the Ohfunato-bay and headed to the dive point S-1 (40° 30.0N 144° 50.0E). Arrived at the point around 15:30. Preliminary survey of XBT at the site was done. In the morning, the submersible staffs, gave a lecture of the Shinkai-6500 (6K) to us. They showed us the inside of the sphere and several other materials like diver's specially designed suits for the divers. We saw two sperm-whales and a sea-turtle around noon. We stayed there for a night.

Aug. 30th, 2009.

Because a strong wind warning (probably derived from the typhoon#11) was announced by the weather department, we decided not to dive there and escaped from the Typhoon #11. We headed to the Mutsu-bay. During the voyage to the Mutsu-bay, the sea was very calm and weather was so nice but we were miserable. On the way to the Mutsu-bay, we saw many dolphins (16:40-50) and some whales (17:40-50).

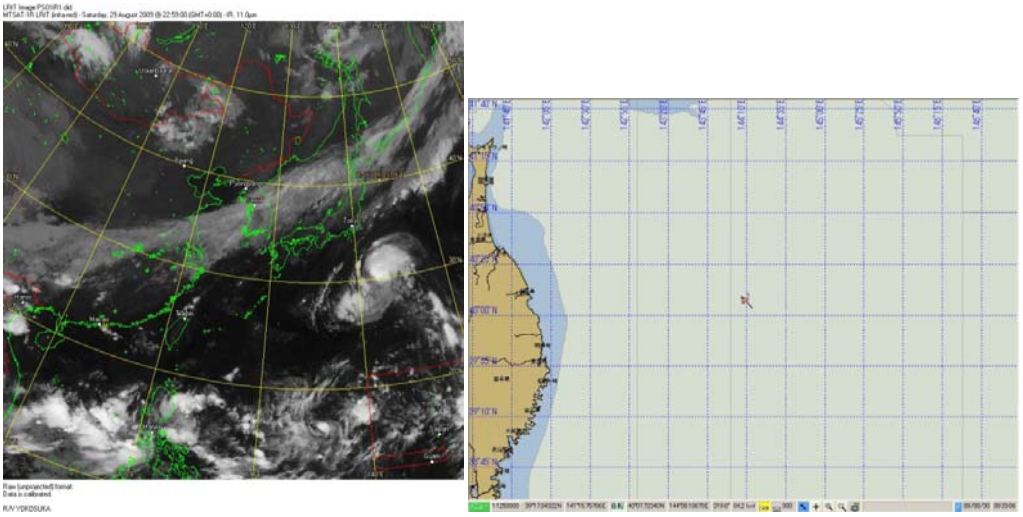

Figure 1. Weather satellite image of the west Pacific and ship track near Tohoku area at 090830.8:05.

Aug. 31st. 2009.

We stayed in the Mutsu-bay. The sea in the bay was calm. In the evening, we had a seminar. Catalina, Frederic and Tad gave talks on the octocoral, zoanthids and diseases in marine mammals, respectively.

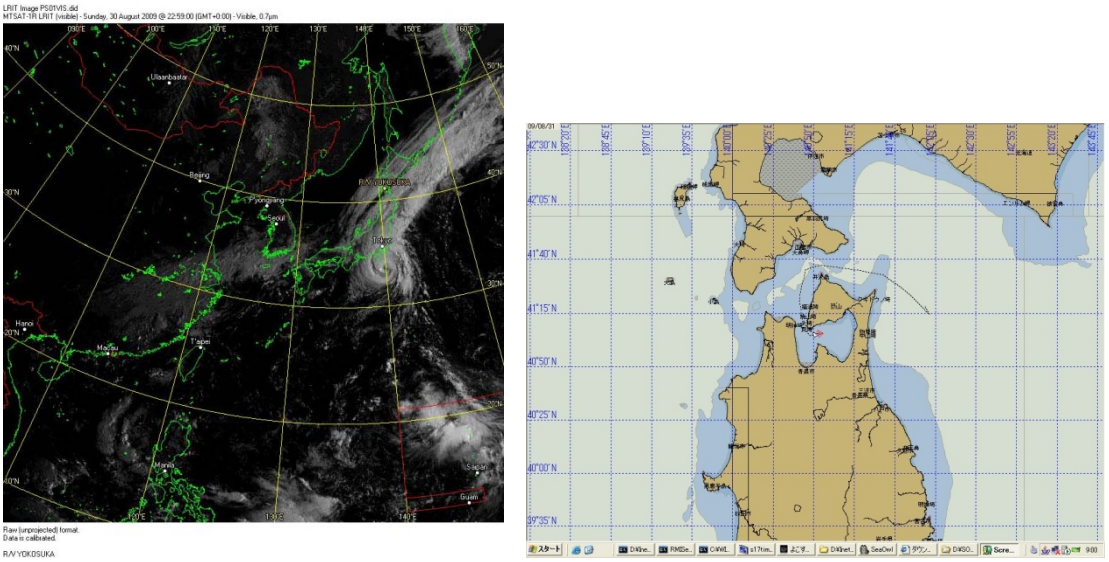

Figure 2. Weather satellite image of the west Pacific and ship track at 090831.8:53

Sept. 1st. 2009.

We stayed in the Mutsu-bay. Weather was nice and the sea was calm. In the evening, we had a seminar again. Dr. Jinbo and Beatrice gave talks on the lectin in symbioses, and deep-sea foraminifers, respectively.

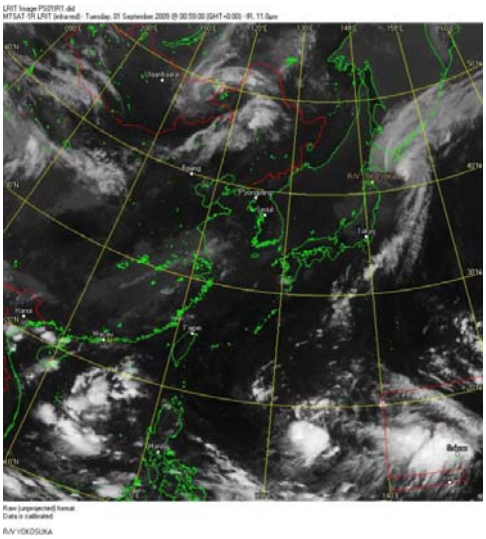

Figure 3. Weather satellite image of the west Pacific at 090901.10:18.

Sept. 2nd, 2009.

Departed the Mutsu-bay at 8:00. From the broadcast news, the wave at the coast of Tohoku (Northern east part of Japan) was still high (approximately 3 m), though the weather was fine when we departed the Mutsu-bay. We were planning to dive on Sept. 6th. In the weather satellite image, we saw some clouds in the area where we planned to dive. Because the rough sea condition, we did not have the seminar.

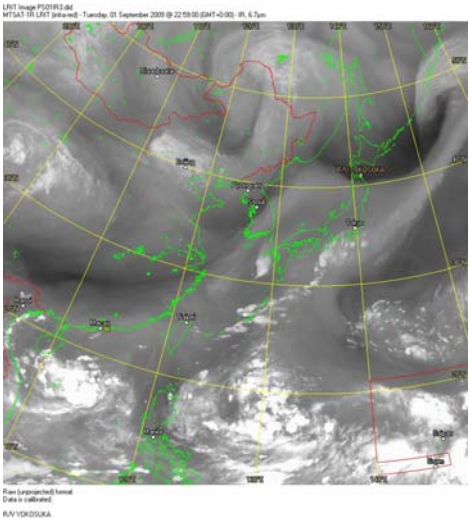

Figure 4. Weather satellite image at 090902.8:18.

Sept. 3rd, 2009.

The weather was fine but the waves were still too high for the dive. We had prepared for the dive but waited the waves calming down. In the southern ocean, a new tropical depression appeared. At 9:10, we decided not to dive today. We headed to the station, S-2 and made the preliminary survey (XBT) there.

We will dive at the S-2 and try to find 2 Calyptogena species and the deep-sea foraminifer. If we find them all, we stay there and dive again in the next day.

At the seminar, Miyake-san gave a talk on cultivation of the deep-sea animals in the Shin-Enoshima Aquarium. Tsukahara-san told us two tories; one about development of the new awamori by finding the new species of yeast from a fruit, mango, and the genome analysis of Aspergilus fungus of the awamori fermentation. Tsukahara-san brought in two bottles of the awamori, they developed.

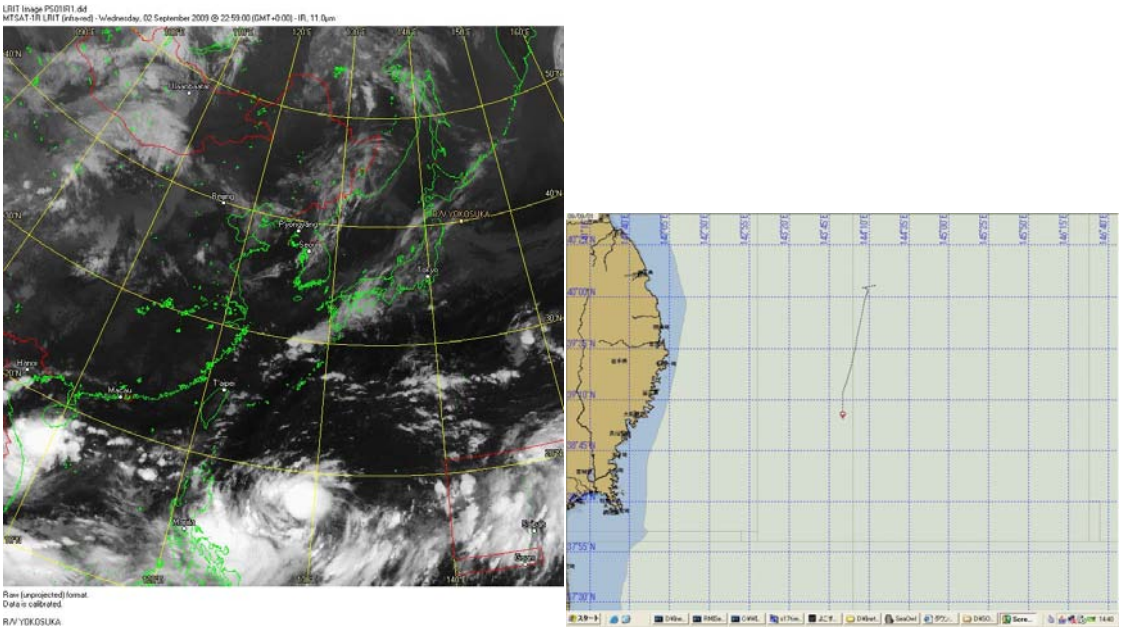

Figure 5. Weather satellite image of the west Pacific (090903.08:18) and the ship track (090903.14:40).

Sept. 4th, 2009.

Cloudy and still wave was high. We made the very first dive in this cruise at S-2. The diver was Dr. Miyake. The S-2 was selected because at this point it was expected to collect most biological samples we needed.

The diving was started at 9:00. At about 11:00, the submersible arrived at the bottom and collected, *Calyptogena phaseoliformis*, some zoanthids, the benthic ctenophore, and some trashes (plastic bags etc) to which some octocorals attached. But we could not find the deep-sea foraminifers and *C. fossajaponica*.

We found a sunken log of 2 m long, on which some sessile organismsattached. It was too big to be collected by the submersible. So that we set a marker near the log.

At night, the meeting was canceled and all members concentrated themselves to their studies with the samples.

Sept. 5th, 2009

Weather was fine, probably the best day in this cruise but the wave was still high. We dive at the S-2 site again. The diver was M. Tsuchiya-san. We hoped that he could find the deep-sea foraminifer.

In the dive, *Calytptogena phaseoliformis*, octocorals, the deep-sea fish and the trash material were collected but the deep-sea foraminifer and the *C. fossajaponica* were not found.

After the dive, we headed to Ohfunato-bay.

Sept. 6th, 2009.

In the early morning, we arrived at Ohfunato-bay. The weather was cloudy. At 8:00 am, five members, Drs. Jinbo, Miyake, Tsukahara and Sinniger, and Ms. Shibata, left the R/V, Yokosuka.

The rest of the members did some experiments and cleaned up the laboratories.

In this cruise, we made only two dives but collected *C. phaseoliformis*, some octocorals and some other samples.

September 7th, 2009.

At 9:00, we arrived at the warf of JAMSTEC in Yokosuka. We left the R/V Yokosuka with our personal goods. To avoid the typhoon, The R/V left the warf at 11:00. That was the end of the cruise YK09-12. We thank the captain, crews and the operation team of the Shinkai 6500.

The wake of R/V Yokosuka during YK09-12 cruise.

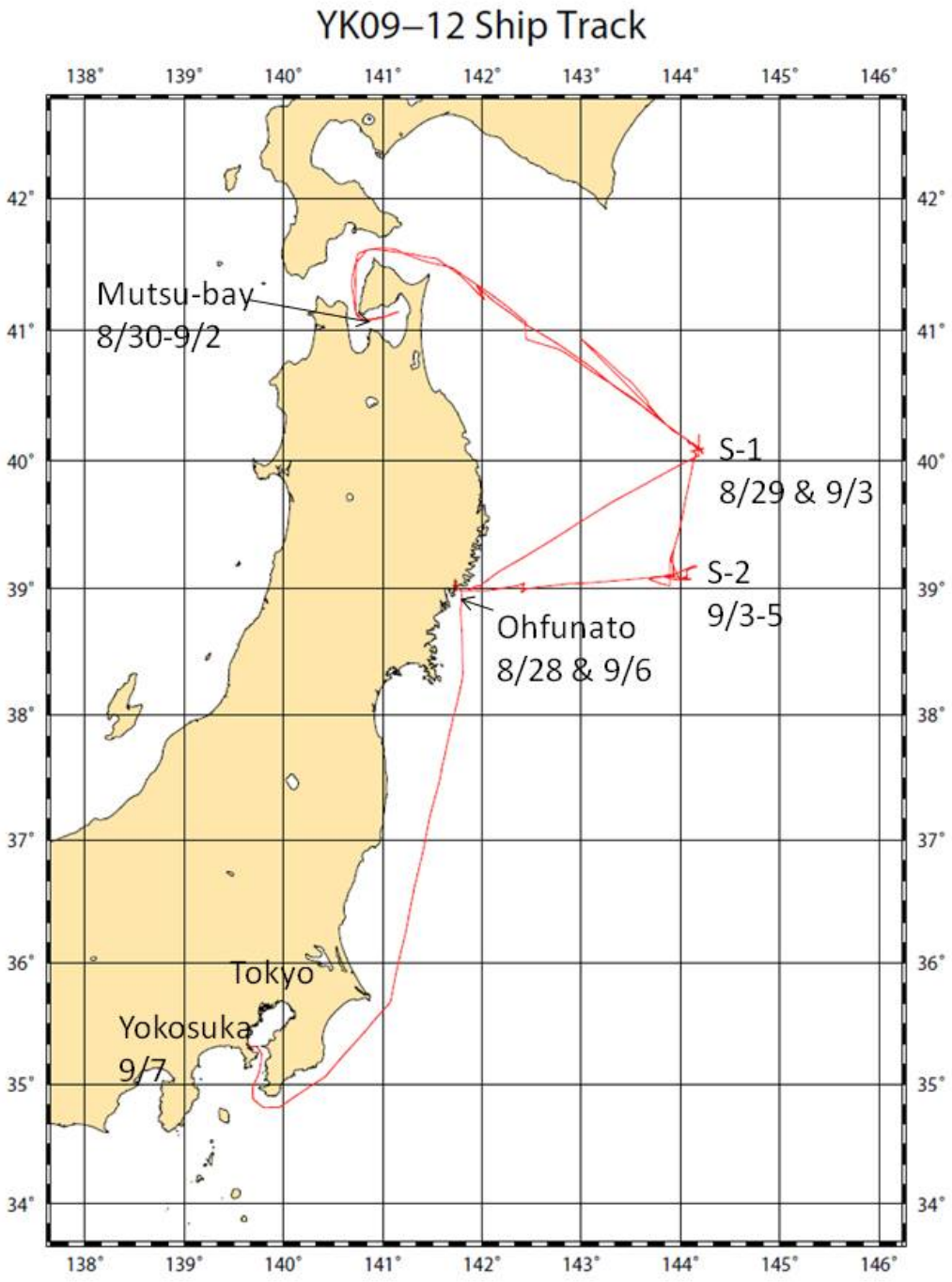

Figure 6. Ship track of the R/V Yokosuka in the YK09-12 cruise.

Diving Area

Dive tracks of the dive #1160 and dive #1161 are depicted in Figure 7.

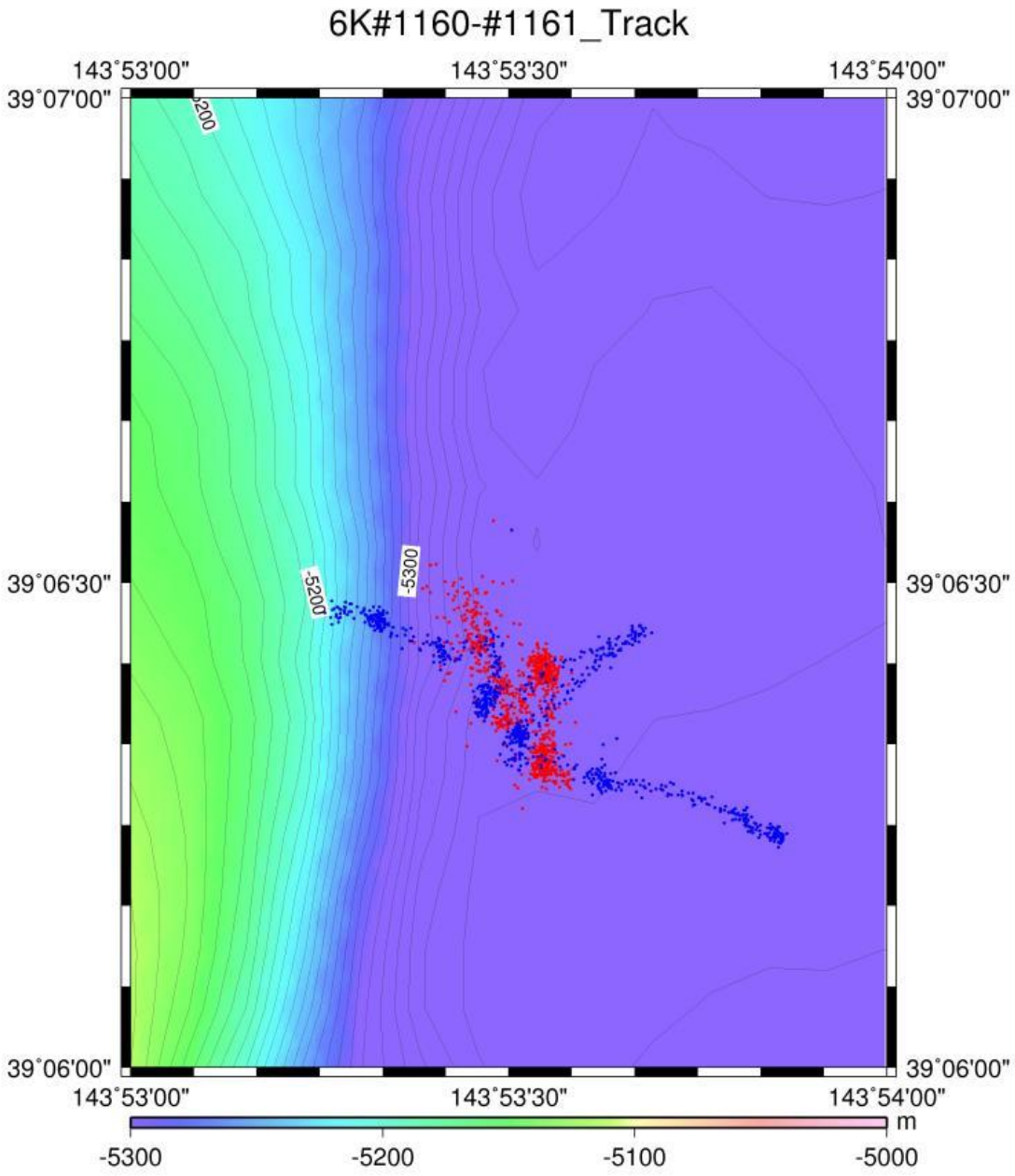

Figure 7. Diving areas of dives #1160 (red) and #1161 (blue).

Payloads of the Shinaki 6500 for dives # 1160 and 1161.

Payload: One suction sampler (multiple canister), one coop sampler, Sample boxes (1 large and 1 small), 6 MBARI-type cores, 2 MT-type cores, and 2 Markers.

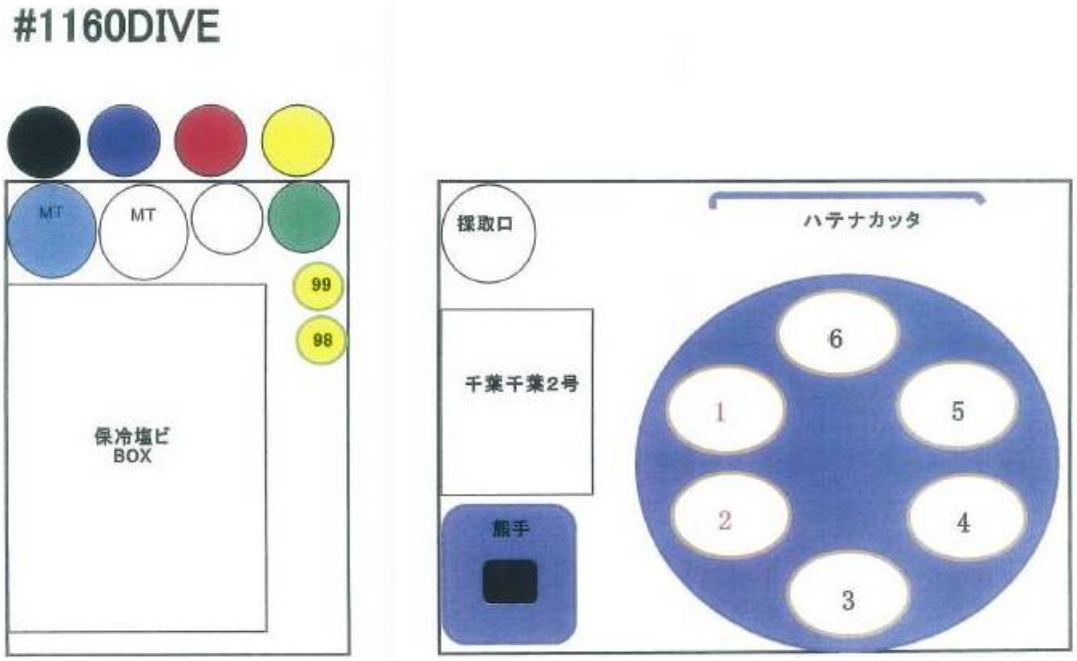

Figure 8. Payload for dive # 1160

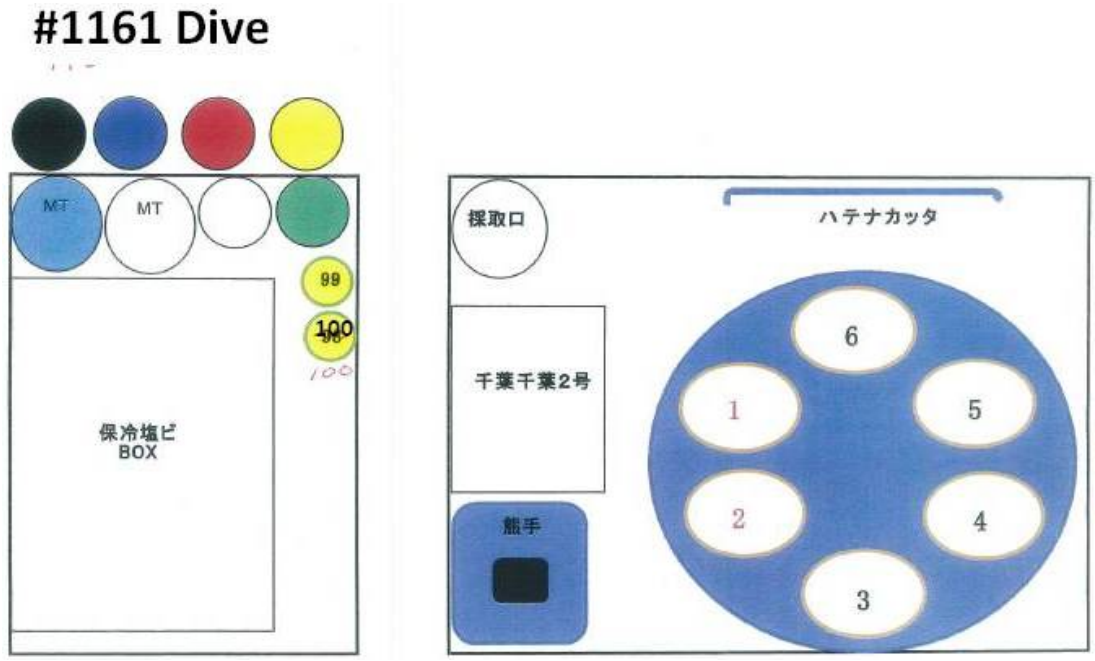

Figure Payload for dive # 1161

Dive report of Shinkai 6500 dive #1160
Dive position: **39° 06.4 N 143°53.5 E**

Date : 4th September, 2009
Area : 5350m Japan Trench, off Miyako, Iwate.
Objective : Sampling Calyptogena clams, foraminifera and Zoanthids.
Reporter : Hiroshi Miyake (Kitasato University)

That was the first dive in YK09-12 after departure from Ofunato port on 28th September, though there was some sea swells by Typhoon. To land at the bottom on the south of the foreordination landing point, we tried to move to the south at the depth of 3500m. However, we descended without moving to south, because there was something wrong with steering of main propeller. Just after landing at a bottom, a colony of *Calyptogena phaseoliformis* was observed. On the way to approach to the colony, a plastic bag was found and sampled. Then some *C. phaseoliformis* were collected and MBARI push core (Black) sampling was conducted near the calyptogena colony.
During looking for giant foraminifera, *Xenophyophor*, a sunken wood which was 2 m long was found. Benthic ctenophore was also found near the wood and was collected using MBARI push core (Blue). Some *Munidopsis* sp. were observed on the sunken wood and collected using slurp gun. A marker #98 was deployed at the sunken wood site.
Furthermore looking for giant foraminifera, xenophyophores, a mudstone which was attached many Zoanthid was found. After observing the Zoanthid, sampling was tried, however mudstone was not collected using manipulator of *Shinkai 6500* because it was too strong power to grab the mudstone. Then broken mudstone with zoanthids were collected using slurp gun. Next we headed to Event mark #30 to find *Calyptogena fossajaponica*. During looking for *C. fossajaponica*, another mudstone with zoanthid was found and sampled using manipulator.
Finally, package plastic was collected and two MBARI push core samples were collected at a colony of C. *phaseoliformis.*

Dive Log of 6K#1160 (1/2)						S2 site, Japan-Trench	2009/9/4
Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Description	Remarks
08:56	0					潜航開始	
10:00	2937					潜航中	
10:11	3426					クラゲ？	
10:24	3940					クラゲ？	
10:49	4989					潜航中，マリンスノー	
11:12	5346					チューブワーム	
11:13	5346					イソギンチャク	
11:14	5346					イソギンチャク	
11:15	5346					着底　底質；泥　視界７m	
11:16	5346					イソギンチャク	
11:17	5346					ヒトデ	
11:18	5346					チューブワーム，イソギンチャク	
11:20	5347					イソギンチャク	
11:22	5347					エビ	
11;22	5347					ヒトデ？	
11;27	5347					ナギナタシロウリガイ	
11;28	5347					ゴミ	
11;31	5247					ゴミ採取開始	
11;35	5247					ナギナタシロウリガイ	
12;43	5247					ナギナタシロウリガイ採取開始	
11;51	5347					巻貝？	
11;55	5347					ソコダラ	
12;02	5347					ひとで？イソギンチャク？	
12'03	5347					ヒトデ	
12'03	5347					ゴミ　ビニール	
12;07	5347					巻貝？シロウリガイっぽい	
12;09	5347					イソギンチャク	
12;12	5347					コア採取開始　テープ黒	
12;15	5347					採取終了	
12;19	5347					ナマコ	
12;22	5346					シロウリガイコロニー	
12;26	5345					クラゲ？	
12;27	5345					イソギンチャク	
12:27	5345					イソギンチャク	
12:31	5345					イソギンチャク	
12:32	5345					ナマコ	
12:33	5345					シロウリガイコロニー	
12:34	5345					ゴミ　コロニー内	
12:36	5345					イソギンチャク	
12:36	5345					ゴミ（木）　かに，イソギンチャク等の付着生物あり	
12:41	5345					クシクラゲ	
12:43	5346					クシクラゲ採取　テープ青	
12:46	5346					採取完了	
12;49	5345					スラープガン発動　沈木のまわり	

Events in the dive #1160 recorded by the R/V Yokosuka control room.

#1160DIVE 日本海溝 三宅 裕志 D-GPS(WGS-84)SSBL

*** EVENT MARK LIST *** 2009-09-04 15:15:42

ORIGIN (XY<->LATLON CONVERT) LAT 39°06.5000'N LON 143°53.4000'E
XY ORIGIN ((X,Y)=(0,0)) LAT 39°06.5000'N LON 143°53.4000'E

NO.	DAY	TIME	LAT	LON	X	Y
1	2009-09-04	09:00:00	39° 6.2500' N	143° 53.6000' E	-462.5	288.2
	Landing Traget					
2	2009-09-04	11:14:00	39° 6.2942' N	143° 53.5980' E	-380.7	285.3
	Landing D=5346m					
3	2009-09-04	11:37:00	39° 6.3094' N	143° 53.5610' E	-352.6	232.0
	Retrieved rubbish D=5347m					
4	2009-09-04	11:55:00	39° 6.3123' N	143° 53.5684' E	-347.2	242.7
	Sampling Calyptogena D=5347m					
5	2009-09-04	12:15:00	39° 6.3296' N	143° 53.5633' E	-315.2	235.3
	Sampling MBARI core(black) D=5347m					
6	2009-09-04	12:53:00	39° 6.4002' N	143° 53.5596' E	-184.6	230.0
	Sampling ctenophore(core blue), Galatheidae D=5345m					
7	2009-09-04	13:00:00	39° 6.3973' N	143° 53.5596' E	-190.0	230.0
	Deployment #98Marker D=5346m					
8	2009-09-04	13:29:00	39° 6.4200' N	143° 53.5559' E	-148.0	224.7
	Sampling zoanthid D=5343m					
9	2009-09-04	13:58:00	39° 6.3559' N	143° 53.5013' E	-266.5	146.0
	Sampling zoanthid D=5347m					
10	2009-09-04	14:20:00	39° 6.3923' N	143° 53.5110' E	-199.2	159.9
	Many zoanthids D=5347m					
11	2009-09-04	14:37:00	39° 6.4330' N	143° 53.4726' E	-123.9	104.6
	Retrieved rubbish, sampling MBARI(red) D=5360m					
12	2009-09-04	14:49:00	39° 6.4366' N	143° 53.4629' E	-117.2	90.6
	Sampling MBARI(yellow,green) D=5360m					
13	2009-09-04	15:12:00	39° 6.4672' N	143° 53.4722' E	-60.6	104.0
	Left Bottom D=5351m					

Track of Shinkai 6500 in dive # 1160 on the sea-bottom map..

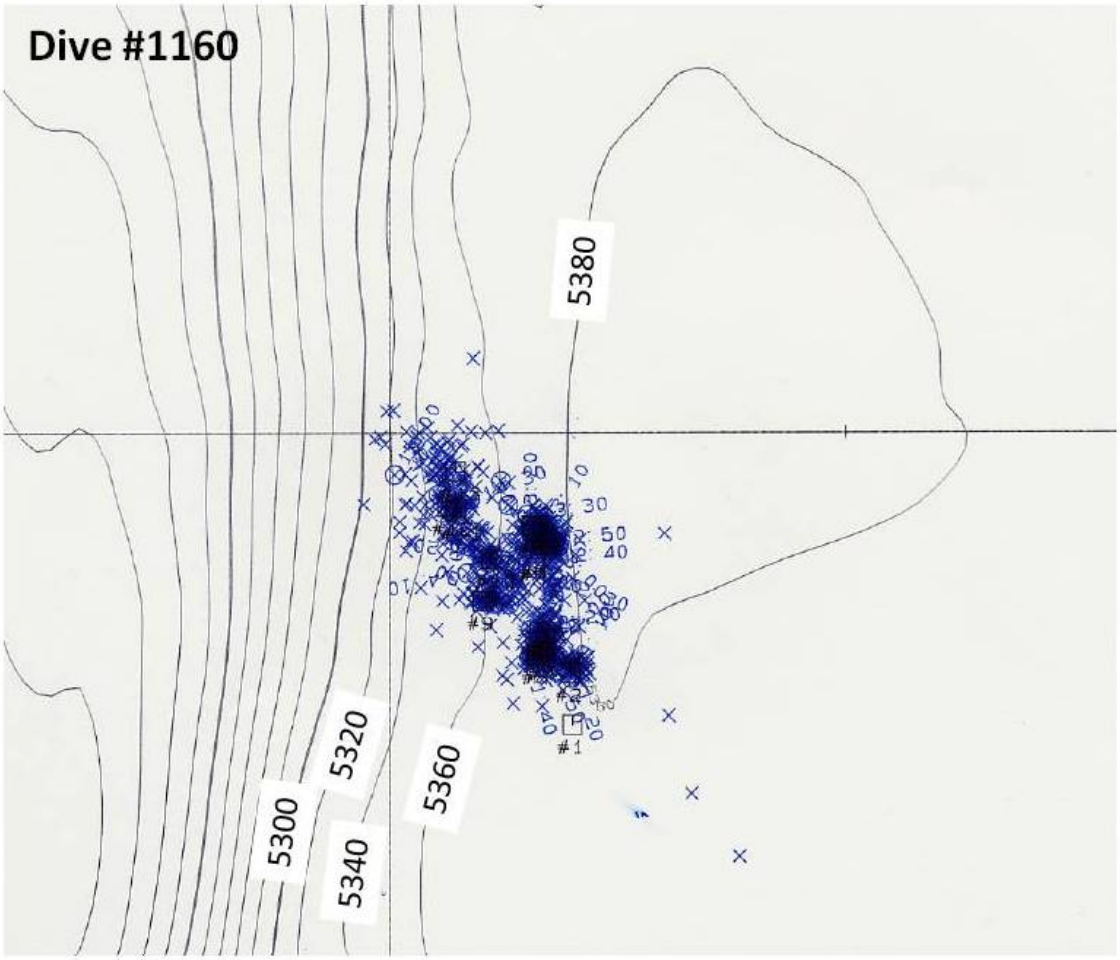

Figure 8. Dive track of the Shinkai 6500 dive # 1160. Figures on the contour lines indicate depth in m.

Dive report of the Shinkai 6500 Dive #1161

Date: Sep. 05, 2009

Site: off Miyako, Japan Trench

Landing: 39-6.2388’ N, 143-53.9208’ E, 5352 m (11:14)

Leaving: 39-6.4719’ N, 143-53.2548’ E, 5199 m (15:14)

Main Purpose:

Collection of deep-sea foraminifers

Sub Purposes:

1. Collection of deep-sea clam, *Calyptogena phaseoliformis*
2. The diversity of deep species of zoanthids and octocorals in the deep sea environment

Payload Equipment:

Suction sampler (多連キャニスター)	1
Scoop sampler	1
Sample box	2 (1 large, 1 small)
MBARI-type core	6
MT-type core	2
Marker	2

Dive Summary

‡ Collected sediment cores with MBARI-type corer from different sites (about 400 m intervals). The sampling sites locate: 39-6.2388N, 143-53.9207E, 5352 m (core green); 39-6.3011N, 143-53.6437E, 5348 m (core red); 39-6.4496N, 143-53.7117E, 5342 m (core yellow).

‡ Collected some organisms (fish, gastropod, ctenophore, and rubbish) with suction sampler or MT-core.

‡ Collected Calyprogena phaseoliformis with scoope sampler into cold insulation box and with suction sampler.

‡ To find Xenophyophore foraminifers and Calyptogena fossajaponica, we observed wide areas of our sampling site S-2.

Dive Log of #1161 (1/2)						S2 site, Japan-Trench	2009/9/5
Time (JST)	Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Description	Remarks
09:00						潜航開始	
11:11	5351		285			到着	
11:12	5352		271			イソギンチャク	
11:17	5352		271			MBARIコア採取（緑）	
11:19	5352		271			採取完了	
11:19	5352		271			クシクラゲ観察	
11:22	5352		271			MTコアでクラゲ採取（白）	
11:25	5352		271			イソギンチャク	
11:31	5350		300			ソコダラ科	
11:32	5351		300			イソギンチャク	
11:35	5350		276			ソコダラ科，イソギンチャク	
11:36	5350		265			ゴミ	
11:38	5352		265			マニピュレータでゴミを採取	
12:00	5343		281			げんげ	
12:09	5348		294			＃２キャニスターに巻貝¥，イソギンチャク	
12:10	5348		294			MBARI（赤）採泥	
12:15	5347					シンカイクサウオの仲間	
12:22	5346		258			シロウリガイのコロニー，イソギンチャク	
12:31	5347		350			シロウリガイノコロニー	
12:32	5347		25			マーカー43番を視認，シロウリガイ観察	
12:48	5347		18			シロウリガイ採集	
12:51	5347		13			魚	
12:55	5347		19			ナギナタシロウリガイ多数大ボックスに採集	
12:59	5346					シロウリガイコロニー	
13:02	5345		50			ソコボウズ	
13:09	5343					ビニールゴミ	
13:13	5343		57			シンカイクサウオの仲間採集＃３キャニスター	
13:20	5342		44			MBARIコア（黄色）採泥	
13:21	5342					シンカイクサウオ	
13:32	5345		231			変色域	
13:33	5345		212			シロウリガイコロニー	
13:33	5347					ビニールゴミ\	
13:38	5347					シロウリガイコロニー	
13:40	5347					泥岩の転石帯	
13:46	5347					Zoanthid?	
13:52	5347					ゲンゲ	
13:56	5347					スナギンチャク採集	
14:01	5347		118			スナギンチャク採集終了	
14'05	5348					シロウリガイコロニー	
14:11	5348					ソコダラ	
14:18	5349		262			シロウリガイコロニー	
14:26	5359					マーカーを視認	
14:43	5302					シロウリガイコロニー	
14:46	5287					シロウリガイコロニー観察	
14:51	5265					シロウリガイをスラープガン，熊手で採集	
15:08	5247					ソコダラ	
15:13	5199					離底	

Events recorded by the R/V Yokosuka control room.

#1161DIVE 日本海溝 土屋 正史 D-GPS(WGS-84)SSBL

*** EVENT MARK LIST *** 2009-09-05 15:15:34

ORIGIN (XY<->LATLON CONVERT) LAT 39°06.5000'N LON 143°53.4000'E
XY ORIGIN ((X,Y)=(0,0)) LAT 39°06.5000'N LON 143°53.4000'E

NO.	DAY	TIME	LAT	LON	X	Y
1	2009-09-05	09:00:00	39° 6.2300' N	143° 53.8900' E	-499.5	706.2
	Landing Traget					
2	2009-09-05	11:14:00	39° 6.2388' N	143° 53.9208' E	-483.2	750.6
	Landing D=5352m					
3	2009-09-05	11:23:00	39° 6.2388' N	143° 53.9207' E	-483.2	750.5
	Sampling MBARI(green), ctenophore(MTcore) D=5352m					
4	2009-09-05	11:39:00	39° 6.2535' N	143° 53.8713' E	-456.0	679.3
	Retrieved rubbish D=5350m					
5	2009-09-05	12:12:00	39° 6.3011' N	143° 53.6437' E	-367.9	351.2
	Sampling gastropod, anemone MBARI(red) D=5348m					
6	2009-09-05	12:56:00	39° 6.3469' N	143° 53.5374' E	-283.2	198.0
	Finding #43Marker, sampling calyptogena D=5347m					
7	2009-09-05	13:15:00	39° 6.4254' N	143° 53.6650' E	-138.0	381.9
	Sampling fish D=5343m					
8	2009-09-05	13:21:00	39° 6.4496' N	143° 53.7117' E	-93.2	449.2
	Sampling MBARI(yellow) D=5342m					
9	2009-09-05	14:02:00	39° 6.3775' N	143° 53.4745' E	-226.6	107.3
	Sampling zoanthid D=5347m					
10	2009-09-05	14:43:00	39° 6.4564' N	143° 53.3195' E	-80.6	-116.0
	Finding calyptogena colony D=5290m					
11	2009-09-05	14:59:00	39° 6.4622' N	143° 53.3186' E	-69.9	-117.3
	Sampling calyptogena D=5285m					
12	2009-09-05	15:14:00	39° 6.4719' N	143° 53.2548' E	-51.9	-209.2
	Left Bottom D=5199m					

Track of Shinkai 6500 in dive # 1161 on the sea-bottom map.

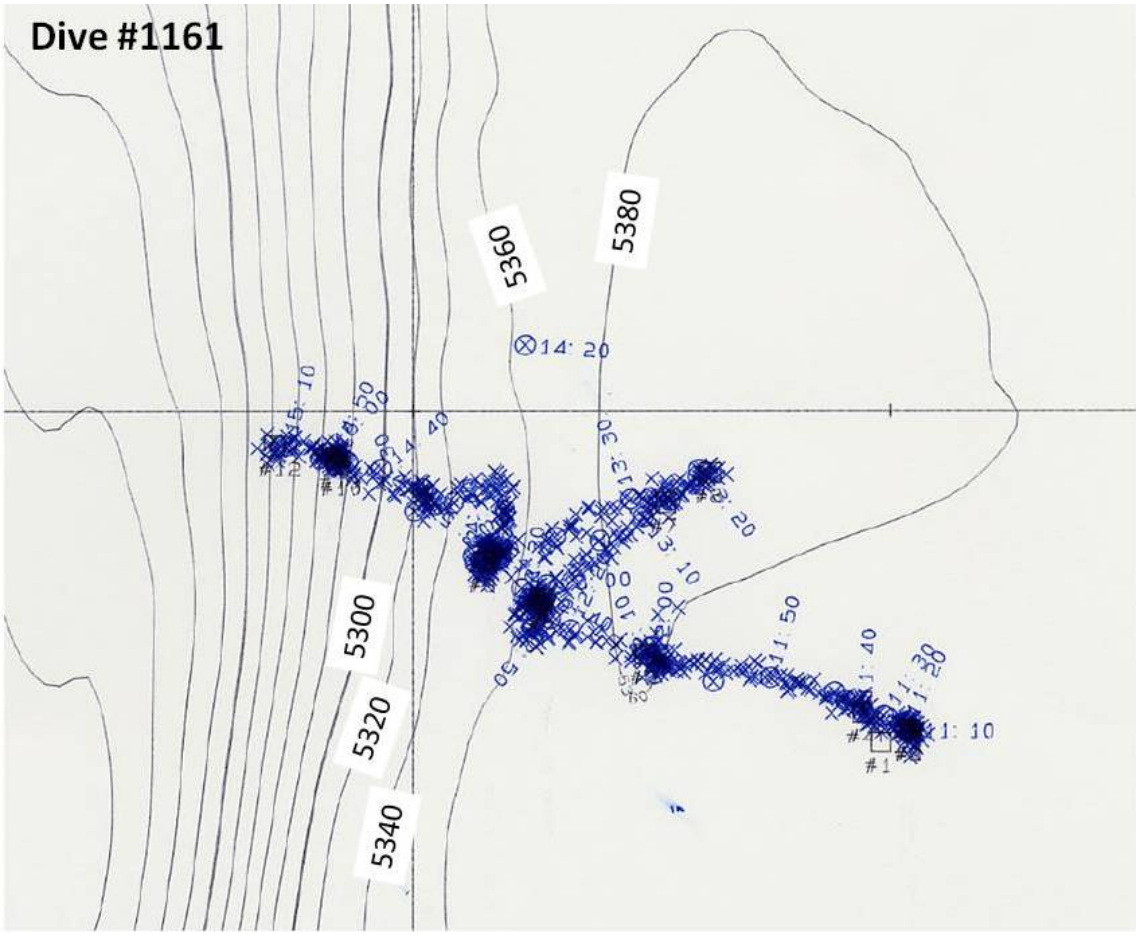

Figure 9. Dive track of the Shinkai 6500 dive # 1161. Figures on the contour lines indicate depth in m.

Organisms observed and/or collected.

Colonies of *Calyptogena phaseoliformis* were found on the sea floor and some of the clams were collected.

Figure 10. Colonies of *Calyptogena phaseoliformis* in the dive # 1160.

Fig. 11. Deep-sea ctenophores observed in the dive # 1160.

Figure 12 . Trash plastic bag on the sea floor.

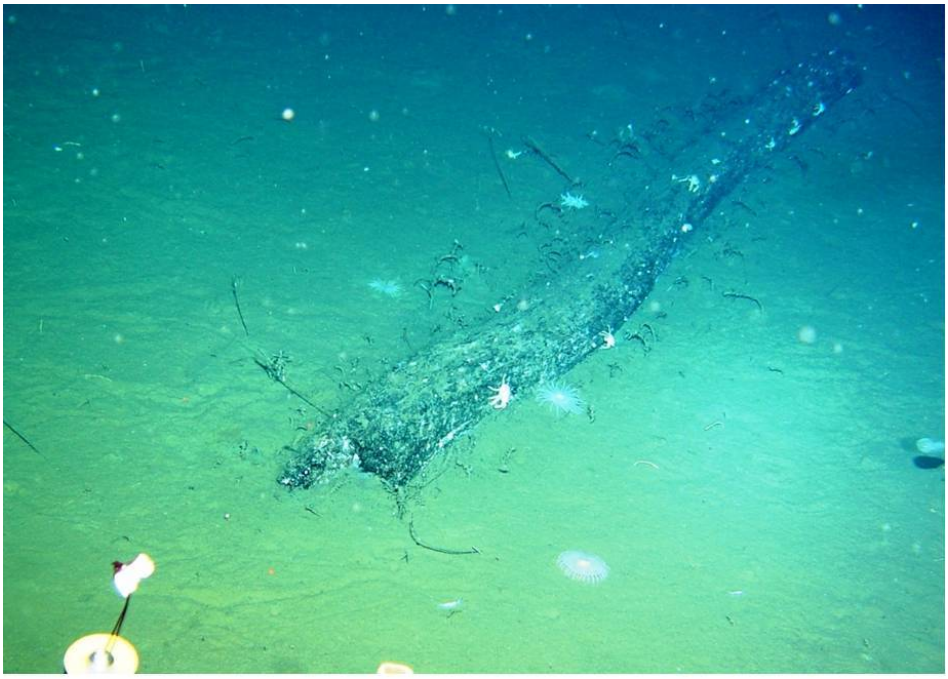

Figure 13. A sunk log on the sea floor.

Preliminary Research report
Yoshida-team

Symbiosis and Evolution studies of deep-sea invertebrates.

Takao Yoshida (JAMSTEC), Yoshimitsu Nakamura (JAMSTEC), Yuki Hongo (JAMSTEC/ Tokyo University of Marine Science and Technology), Akihiro Tame (Marine works Japan), Masatoshi Tsukahara (Tropical technology center Ltd.), Tadashi Maruyama (JAMSTEC)

Symbiosis involves interactions between genetically different biological species and plays a key role in evolution of eukaryote to gain new functions. Intracellular symbioses between chemoautotrophic bacteria and marine invertebrates dominate the fauna at deep-sea hydrothermal vents and seeps. The host invertebrates are nutritionally dependent on the intracellular chemoautotrophic bacteria. However, the detailed mechanisms of their symbiosis remain unknown. Reductive genome evolution has occurred in vertically transmitted intracellular symbionts. The detailed process of reductive genome evolution is also unknown. To understand the mechanisms of reductive genome evolution, deep-sea bivalves, *Calyptogena phaseoliformis* clams were collected from a seep in Japan trench, Japan at a depth of 5300 m during dives (Dive #1160 and #1161) of the submersible “Shinkai 6500” (Table 1). The clams were immediately dissected, and DNA was extracted from the gill tissue, and stored at -20ºC. Other tissues were frozen in liquid nitrogen and stored at -80ºC.

Table 1 Sample list

On board No.	Species Name	Locality Site	Locality Area	Depth (m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No.of inds.	Dive/Collecting Methods	Fixation	Remarks
YK09-12 6K #1160 B CP 01	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 02	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 03	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 04	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 05	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 06	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 07	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 08	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 09	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 10	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 11	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 12	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 13	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 14	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 15	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	1	6K#1160	-80	Experiment
YK09-12 6K #1160 B CP 16	Calyptogena phaseoriformis	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009.9.4	many	6K#1160	-80	Experiment
YK09-12 6K #1161 B CP 01	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 02	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 03	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 04	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 05	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 06	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 07	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 08	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 09	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 10	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 11	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 12	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 13	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 14	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 15	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	1	6K#1161	-80	Experiment
YK09-12 6K #1161 B CP 16	Calyptogena phaseoriformis	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009.9.5	many	6K#1161	-80	Experiment

Jimbo-team

Comparison of lectin between *Calyptogena okutanii* and *C. phaseoliformis*

Mitsuru Jimbo (Kitasato University)

Objective:

We previously purified a carbohydrate binding protein lectin from *Calyptogena okutanii*. The lectin named COL was the most active at 4°C, in more than 500 mM NaCl with 10 mM CaCl2, which condition is similar to their habits. COL has affinity to lipopolysaccharide from Escherichea coli. Moreover the lectin agglutinated the symbiotic bacteria separated from host. Thus the lectin involved to symbiosis of symbiotic bacteria, since lectins often binds to cell surface fo cells to stimulate them. Since *Calyptogena solidissima* also contained a lectin similar to COL in respect to molecular mass and N-terminal amino acid sequence. Thus, the similar lectin to COL may exist in other *Calyptogena*. Recently, we raised anti-COL antibody from rabbit. if the lectins of *Calyptogena* was similar each other, the lectins should be detected by this antibody. In this research, I get each tissues from Calyptogena phaseoriformis to examine the similar lectin exists.

Method:

The blood were drewed by syringe, and centrifuged at 2,500 rpm for 5 min. supernatant was used as haemolymph, and pellets were used as hemocytes. Gill, foot, mantle, and adductor muscle were obtained and store at -80°C. Blood cells were fixed by 4% paraformaldehyde in filtrated sea water. It was washed with FSW, and stored at 4°C.

Results:

Calyptogena phaseoliformis were obtained at shinkai dive #1160. I used fifteen individuals. Tissue samples (gill, foot, mantle, adductor muscle, blood cells and hemolymph) were obtained from five *C. phaseoliformis* and stored. Blood were collected from ten *C. phaseoliformis*, and centrifuged. The supernatant and pellet were stored at -80°C. The supernatant has haemagglutinating activity. From one clam, blood cells were fixed.

Tsuchia-team

Distribution and genetic diversity of Xenophyophoreans and soft-shelled foraminifers at abyssal site in the northwest Pacific

Tsuchiya, Masashi (BioGeos, JAMSTEC), Lecroq, Béatrice (University of Geneve)

Purpose

This study aims to clarify the genetic diversity and ecological roles of the deep-sea population, especially of the protistan population including Xenophyophore and soft-shelled foraminifera, by using molecular techniques and stable isotope measurements to understand the evolution, genetic diversity, and trophic level of Xenophyophores, their ecological roles in the deep-sea are not clarified. In this cruise, we will conduct visual observation from the Shinkai 6500 to understand the distribution, density and ecology of Xenophyophores, and we will also collect samples of sediment/organisms.

Background

Although protists, particularly foraminifers, form an ecologically important link between bacteria and macrobenthos in biological and physical cycles in nature, not enough studies have been conducted to clarify this. In addition, the role of protists in the deep-seas is not clear. Studies on protists are indispensable to clarify the biological diversity of the deep-sea floor.

Xenophyophore, large unicellular organisms, have (a) large cell up to 10 ~ 15 cm in diameter, making their body with reticulate, massive, bush or fan-like structures. Several studies have been conducted for classification and time-lapse observation (Gooday et al., 1993) so far, but not enough ecological studies have been carried out. Recently, molecular phylogenetic studies were conducted for soft-shelled foraminifers and Xenophyophores, Xenophyophores are genetically identified with foraminifers (Pawlowski et al. 2003), closely related to monothalamous soft-shelled foraminifers. Molecular phylogenetic studies and ultrastructural observation were carried out for Xenophyophore that we collected at proposed S-3 site during YK07-15 cruise; Lecroq (2009) identified the novel Xenophophore as *Shinkaiya lindsayi*. However, the ecology and the role of protists in the deep-seas is not clear.

Research results

We conducted; 1) visual observation of landscape, sediment facies, organisms and sampling, observation with underwater video and still camera, 2) Sampling of sediment cores, 3) Sampling of organisms. Sediment core samples, listed in the sample list, will be used for foraminiferal genetic diversity (environmental DNA analyses) and compare other abyssal sites to understand foraminiferal biodiversity, distributuion and

dispersal mechanisms. Unfortunately, we could not dive into our proposed area S-3, due to bad weather conditions; we could not collect Xenophyophorean foraminifers.

Miyake-team On boad report
Taxonomic study of benthic ctenophore

Hiroshi Miyake and Haruka Shibata (Kitasato University)

Objective

I found a benthic ctenophore at a depth of 5350m of Japan Trench in the 6K #959 Dive. At that time, I could not sample this species. Two years ago, in 2007, Dhugal Linday of JAMSTEC tried to sample this species in good condition. Though sampling was succeeded in situ, this specimen was destroyed and melt down in sampling gear when *Shinkai 6500* returned on deck.

In this cruise, I would like to sample the benthic ctenophore in good condition, to describe the morphology of this species, and to analyze DNA.

Preliminary report

In the 6K DIVE #1160 and #1161, Two benthic ctenophore were collected. The ctenophore was good condition when it was collected in MBARI push core sampler and MT push core sampler. However these specimens were destroyed and melt down when these sample were in my hand. Pressure decrease or high temperature on surface would destroy these sample. However, Some fragments of benthic ctenophores were obitained and fixed them in 99.5% Et-OH for DNA

On the other hand, hydrozoa was found on the shell of snail collected in the 6K #1161 Dive. This species may still alive. Especially medusa buds were observed in the colony of the hydorozoa.

Also some stephonoscyphus sp. were collected from the mud-stone.

Further study

1. DNA analysis of benthic ctenophores, *Stephanoscyphus* sp. and hydorozoa
2. Cultivation of hydorozoa

Study of deep-sea debris distribution and animals on and around them at deep-sea floor at Japan Trench, off Sanriku

Haruka Shibata and Hiroshi Miyake (Kitasato University)

Introduction

Distribution and composition of marine debris at seafloor have been investigated by bottom trawl surveys off Iwate (Goto, 2006), in Tokyo Bay (Kuriyama et al, 2003) and Kagosima Bay (Ohtomi et al, 2004). These surveys revealed that most of the marine debris collected from seafloor were derived from our daily life. The trawl surveys of marine debris were able to give us the quantitative data of volume, however, the distribution and condition of them at seafloor in detail was not unclear. In recent years, many marine debris on deep-sea floor where trawl surveys could not operate were observed using deep-sea submersibles. Analyzing the occurrence of deep-sea debris from the video footages of deep-sea dive off Sanriku using submersibles, what was surprising was that many deep-sea debris such as anchors, iron pipes, plastics, cans, and fishing implements were observed. Moreover, sea anemones and feather stars attached to these deep-sea debris. The deep-sea floor where these attached animals were observed was not suitable for their habitat, because where is not hard bottom but soft muddy bottom. However these deep-sea debris were used as substrate for these attached animals in the place where they can not inhabit originally.

It was impossible to observe attached organisms on deep-sea debris in detail that occurred on video image. Therefore it was very difficult to identify these attached organisms and whether these organisms live at the depth originally or not. It is necessary to collect deep-sea debris from deep-sea for observing attached organisms in detail. The aim of this cruise is to observe deep-sea debris in situ and to collect them for observation what kind of organism use deep-sea floor debris as attached substrate.

Materials and Methods

Some deep-sea debris were collected by the manipulator of *Shinkai 6500*. These collected debris were sketched, taken pictures, measured the size, and observed the attached organisms. When attached organism was found, it was taken pictures and recorded features. After obsevation, Sample was preserved in deep freezer (-80 °C). After this cruise, deep-sea debris will be weigh and attached organisms will be identified.

Results

Four deep-sea debris were collected during this cruise (Table 1)

Table1. Collected deep-sea debris in the cruise YK09-12

Date	Dive No.	Depth (m)	Deep-sea debris	Attached organism
2009.09.04	1160	5347	Plastic	Foramionifera, Octocoral, Polychaeta
2009.09.04	1160	5360	Plastic bag	Foramionifera, Octocoral, Polychaeta
2009.09.04	1160	5360	Disposable diaper	Foramionifera, Polychaeta
2009.09.05	1161	5350	Towel	Pycnogonida

Future study

We would like to make an analysis of the biological and physico-chemical environments where deep-sea debris were collected and to identify attached organisms on them.

References

Goto, T, (2006) Comments on marine debris distribution and ghost-fishing on the continental slope off Iwate Prefecture estimated from bottom trawl survey. **Nippon Suisan Gakkaishi** 72, 501-506. (in Japanese)

Kuriyama, Y., T. Tokai, K. Tabata and H Kanehiro (2003) Distribution and composition of litter on seabed of Tokyo Bay and its age analysis. **Nippon Suisan Gakkaishi** 69, 770-781. (in Japanese)

Ohtomi, J., S. Fujieda, M. Higashi and A. Habano (2004) Preliminary Trawl Survey for Estimating Distribution of benthic animals and marine debris in Kagosima Bay Bull. Jpn. Soc. Fish. Occanogr. 68, 158-164. (in Japanese)

Ryukyu-univ. team
September 5, 2009
Frederic Sinniger, Takuma Fujii and Catalina Aguilar
University of the Ryukyus- MISE laboratory

Report Yokosuka 09-12/ Shinkai- 6500

Purpose:

The metazoan diversity part of this research aimed essentially to understand the diversity of deep species of zoanthids and octocorals in the deep sea environment of the Japan Trench. Few specimens have already been collected during the 2007- YK07-15 and additional samples are necessary to describe those species.

Another purpose of this research cruise was to obtain sediment and various metazoan samples in order to investigate metazoan biodiversity using massive sequencing and barcoding methods. The use of a new fixation method (DESS) allowing both molecular and morphological analyses was tested on a pert of the sediment samples.

Results:

Zoanthids and octocorals were collected by manipulator and slurp gun during the two dives at S2 site.

Two zoanthid polyps were collected during the 1160 dive, the species was identified as underscribe *Abyssoanthus* sp. The sample was found on the surface of a muddy rock. One polyp was fixed in ethanol 80% and the other one was transferred to Dr. Tsuchiya and frozen at -80 ºC .

Six octocorals colonies were collected during the two dives (1160 and 1161), the undescribed colonies were identified as Stolonifera, genus *Clavularia*. One of the colonies was found attached to a plastic bag and the remaining on the surface of muddy rocks. The samples were fixed in ethanol 80% and one in formalin. Subsamples were made for isotope analysis by Dr. Masashi Tsuchiya and preserved in -80 ºC.

Multiple metazoan or potential metazoan samples were collected from the various samples brought back to the surface. These samples were fixed in 80% ethanol for further DNA analyses.

A few sediment samples were collected and fixed with DESS or frozen at -80 ºC. those sediments were subsamples from push cores. A part of the sediments were sieved and separated in two fractions (over 300 micro-m and between 300 and 63 micro-m).

Further analysis:

Unfortunately not enough zoanthid could be sampled to complete the analyses, however, selected markers (COI, 16S and ITS rDNA) will be sequenced and compared to the samples previously collected. Octocoral samples will be used for DNA extraction in order to compare with the previous sample and with other octocoral species; moreover, morphological descriptions will be made to complete the description of this new species.

The various metazoan samples will be analysed following the barcoding concept, using universal primer to amplify mitochondrial COI or the nuclear 18S, to identify these organisms. Sediment samples will be partially analysed using massive DNA sequencing while another part will be analysed morphologically. These two points aim to investigate the metazoan diversity in the deep sea.

The diversity of deep sea octocorals and zoanthids being virtually unknown, we will continue to search for anthozoans species in the deep sea to understand more about their diversity in these unique habitats.

Sample list 1. *Calyptogena* clams

Onboard No.	Species Name	Japanease Name	Identified by	Locality Site	Locality Area	Depth(m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No.of inds.	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
YK09-12 6K #1160 B CP 01	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 02	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 03	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 04	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 05	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 06	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 07	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 08	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 09	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 10	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 11	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 12	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 13	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 14	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 15	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	1	6K#1160				-80		Experiment
YK09-12 6K #1160 B CP 16	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	many	6K#1160				-80		Experiment
YK09-12 6K #1160 B G 01		巻き貝	Maruyama	S2	Japan Trench	5347	39	06.312	N	143	53.563	E	2009/9/4	many	6K#1160				-80		Experiment
YK09-12 6K #1161 B CP 01	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 02	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 03	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 04	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 05	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 06	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 07	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 08	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 09	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 10	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 11	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 12	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 13	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 14	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 15	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	1	6K#1161				-80		Experiment
YK09-12 6K #1161 B CP 16	Calyptogena phaseoriformis	ナギナタシロウリガイ	Maruyama	S2	Japan Trench	5285	39	06.462	N	143	53.319	E	2009/9/5	many	6K#1161				-80		Experiment

Sample list 1. Continued.

Onboard No.	Species Name	Japanease Name	Identified by	Locality Site	Locality Area	Depth(m)	Lat deg	Lat min	N/S	Lons deg	Lons min	E/W	Date	No.of inds.	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
1160-TM-1	Acharax? Sp.	キヌタレガイ(殻)	T. Maruyama	Japan Trench, S-2	S-2	5346	39	06.294	N	143	53.598	E	2009/9/4	1	6K1160				air dried	air dried	1160-TM-1と1160-TM-2は同一のビニル袋
1160-TM-2	Gastropod sp.	巻貝(殻)	T. Maruyama	Japan Trench, S-2	S-2	5346	39	06.294	N	143	53.598	E	2009/9/4	1	6K1160				air dried	air dried	1160-TM-1と1160-TM-2は同一のビニル袋
1160-TM-3	Polychaeta sp.	ゴカイ	T. Maruyama	Japan Trench, S-2	S-2	5346	39	06.294	N	143	53.598	E	2009/9/4	2	6K1160				99% Ethanol	99% Ethanol	1160-TM-3&1160-TM-4は同一の遠心管
1160-TM-4	Gastropod sp.	巻貝(殻)	T. Maruyama	Japan Trench, S-2	S-2	5346	39	06.294	N	143	53.598	E	2009/9/4	1	6K1160				99% Ethanol	99% Ethanol	1160-TM-3&1160-TM-4は同一の遠心管
1160-TM-5	Polychaeta sp.	ゴカイ	T. Maruyama	Japan Trench, S-2	S-2	5346	39	06.294	N	143	53.598	E	2009/9/4	many	6K1160				99% Ethanol	99% Ethanol	YK09-12#1160-Bcp01(ナギナタシロウリガイ)の殻内に共生していたゴカイ類
1160-TM-6	polychaeta sp.	ゴカイ	T. Maruyama	Japan Trench, S-2	S-2	5352	39	06.239	N	143	53.921	E	2009/9/5	1	6K1160				70% Ethanol	70% Ethanol	
1160-TM-7		クモヒトデ	T. Maruyama	Japan Trench, S-2	S-2	5352	39	06.239	N	143	53.921	E	2009/9/5	2	6K1160				70% Ethanol	70% Ethanol	
1160-TM-8	Gastropod sp.	巻貝(殻)	T. Maruyama	Japan Trench, S-2	S-2	5352	39	06.239	N	143	53.921	E	2009/9/5	1	6K1160				70% Ethanol	70% Ethanol	

Sample list 2. Sediments and protists.

On board No.	Species Name	Japanease Name	Identified by	Locality Site	Locality Area	Depth(m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No.of inds.	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
6K-#1160-C-BL-1	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-2	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-3	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-4	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Yellow push core (+ polychaete)
6K-#1160-C-BL-5	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Yellow push core (+ polychaete)
6K-#1160-C-BL-6	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Yellow push core (+ polychaete)
6K-#1160-C-BL-7	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Red push core
6K-#1160-C-BL-8	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	=U24-80C	Red push core
6K-#1160-C-BL-9	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		RNAlater	-80C	Red push core
6K-#1160-C-BL-10	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-11	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-12	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Black push core (disturbed interface + polychaete)
6K-#1160-C-BL-13	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Yellow push core (+ polychaete)
6K-#1160-C-BL-14	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Yellow push core (+ polychaete)
6K-#1160-C-BL-15	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Yellow push core (+ polychaete)
6K-#1160-C-BL-16	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Red push core
6K-#1160-C-BL-17	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Red push core
6K-#1160-C-BL-18	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	Shinkai Push Core		Geneva University		DNA extraction buffer	4C	Red push core
6K-#1160-B-BL-19	unidentified foraminifera		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	5.4000	N	143	53.8000	E	04.09.2009	1 fragment	Shinkai arms		Geneva University		DNA extraction buffer	4C	Agglutinated flat foraminifera with stercomata (chain balls) found on plastic bag
6K-#1160-B-BL-20	unidentified foraminifera		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	5.4000	N	143	53.8000	E	04.09.2009	1 fragment	Shinkai arms		Geneva University		DNA extraction buffer	4C	Agglutinated flat foraminifera with stercomata (chain balls) found on plastic bag
6K-#1160-B-BL-21	unidentified foraminifera		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	5.4000	N	143	53.8000	E	04.09.2009	1	Shinkai arms		Geneva University		DNA extraction buffer	4C	Agglutinated flat foraminifera with stercomata (chain balls) found on a baby diper
6K-#1160-B-BL-22	unidentified foraminifera		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	5.4000	N	143	53.8000	E	04.09.2009	1 fragment	Shinkai arms		Geneva University		Formaline 4%	4C	Agglutinated flat foraminifera with stercomata (chain balls) found on plastic bag
6K-#1161-C-BL-23	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-24	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-25	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-26	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-27	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-28	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-29	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-30	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-31	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-32	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Green push core
6K-#1161-C-BL-33	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-34	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-35	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-36	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-37	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-38	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-39	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-40	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-41	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1161-C-BL-42	Sediment		Beatrice Lecroq	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	Shinkai Push Core		Geneva University		Frozen	-80C	Sterile, core profile, Yellow push core
6K-#1160-C-MT1	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5347	39	6.3296	N	143	53.5633	E	04.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Black push core, surface sediment, 5 ml
6K-#1160-C-MT2	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Yellow push core, surface sediment, 5 ml

Sample list 2 (continued).

6K-#1160-C-MT3	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	04.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Red push core, surface sediment, 5 ml
6K-#1161-C-MT4	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Green push core, sieved with >300µm, 5 ml
6K-#1161-C-MT5	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Green push core, sieved with 125-300 µm, 5 ml
6K-#1161-C-MT6	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5352	39	6.2388	N	143	53.9207	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Green push core, sieved with 63-125 µm, 5 ml
6K-#1161-C-MT7	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Yellow push core, , sieved with >300µm, 5 ml
6K-#1161-C-MT8	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Yellow push core, , sieved with 125-300 µm, 5 ml
6K-#1161-C-MT9	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5342	39	6.4496	N	143	53.7117	E	05.09.2009	X	MBARI Core		JAMSTEC		Frozen	-80C	Yellow push core, , sieved with 63-125 µm, 5 ml
6K-#1160-C-Yoshida 1	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	05.09.2009	X	MBARI Core		JAMSTEC Hori (Yoshida, Maruyama)		Frozen	-80C	Green core, 0-5cm, smelled high H2S, H2S @ surface=0.987µg/L
6K-#1160-C-Yoshida 2	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5360	39	6.4366	N	143	53.4629	E	05.09.2009	X	MBARI Core		JAMSTEC Hori (Yoshida, Maruyama)		Frozen	-80C	Green core, 6-10cm, smelled high H2S
6K-#1161-C-Yoshida 3	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5348	39	6.3011	N	143	53.6437	E	05.09.2009	X	MBARI Core		JAMSTEC Hori (Yoshida, Maruyama)		Frozen	-80C	Red core, 0-5cm, well oxygenated, H2S @ surface=0
6K-#1161-C-Yoshida 4	Sediment		Tsuchiya	S2 (YK09-12)	Japan Trench, off Sanriku	5348	39	6.3011	N	143	53.6437	E	05.09.2009	X	MBARI Core		JAMSTEC Hori (Yoshida, Maruyama)		Frozen	-80C	Red core, 6-10cm, well oxygenated

Sample list 3. Invertebrates and trashes.

On board No.	Species Name	Japanease Name	Identified by	Locality Site	Locality Area	Depth(m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No.of inds.	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
6K-#1160-B-HS1	rubbish	漂流ゴミ 包装ビニール	柴田晴佳	S-2	off Sanriku	5347	39	06.309	N	143	53.598	E	2009.9.4	1	1160 マニピュレータ		北里大学			-80 ℃冷凍	有孔虫、八放サンゴ、ゴカイ
6K-#1160-B-HS2	rubbish	漂流ゴミ ビニール袋	柴田晴佳	S-2	off Sanriku	5360	39	06.433	N	143	53.473	E	2009.9.4	1	1160 マニピュレータ		北里大学			-80 ℃冷凍	有孔虫、ゴカイ
6K-#1160-B-HS3	rubbish	漂流ゴミ 紙おむつ	柴田晴佳	S-2	off Sanriku	5360	39	06.433	N	143	53.473	E	2009.9.4	1	1160 マニピュレータ		北里大学			-80 ℃冷凍	有孔虫、ゴカイ
6K-#1160-B-HS4	Octocoral	八放サンゴ	柴田晴佳	S-2	off Sanriku	5347	39	06.392	N	143	53.501	E	2009.9.4	1	1160 マニピュレータ		北里大学			-80 ℃冷凍	
6K-#1160-B-HM1	Ctenophore gen. et sp.	クシクラゲ	三宅裕志	S-2	off Sanriku	5345	39	06.400	N	143	53.560	E	2009.9.4	1	1160 MBARIコア		北里大学		アルコール		
6K-#1160-B-HM2	Tube worm	チューブワーム	三宅裕志	S-2	off Sanriku	5360	39	06.437	N	143	53.463	E	2009.9.4	1	1160 MBARIコア		北里大学		アルコール		
6K-#1160-B-HM3	Pogonophora	有髭動物	三宅裕志	S-2	off Sanriku	5345	39	06.000	N	143	53.5596	E	2009.9.4	1	1160 MBARIコア		北里大学		アルコール		
6K-#1160-B-HM4	*Munidopsis* sp.	シンカイコシオリエビ属の1種	三宅裕志	S-2	off Sanriku	5346	39	06.397	N	143	53.5596	E	2009.9.4	2	1160 スラープガン		北里大学		アルコール		
6K-#1160-B-HM5	*Calyptogena phaseoliformis*	ナギナタシロウリガイ	三宅裕志	S-2	off Sanriku	5347	39	06.312	N	143	53.5684	E	2009.9.4	5	1160 熊手サンプラー		北里大学		乾燥		貝殻のみ
6K-#1160-B-JM1	*Calyphotogena phaseoliformis*	ナギナタシロウリガイ	神保充	S-2	off Sanriku	5347	39	06.312	N	143	53.5684	E	2009.9.4	5	1160 熊手サンプラー		北里大学			-80 ℃冷凍	鰓、貝柱、外トウ膜、足、血球、血リンパ
6K-#1161-B-HN1	Liparidae gen.et sp.	シンカイクサウオの仲間	三宅裕志	S-2	off Sanriku	5343	39	06.425	N	143	53.665	E	2009.9.5	1	1161 スラープガン3		北里大学		ホルマリン・アルコール		
6K-#1161-B-HN2	Hydrozoa polyp	ヒドロ虫綱のポリプ	三宅裕志	S-2	off Sanriku	5348	39	06.301	N	143	53.6437	E	2009.9.5	1	1161 スラープガン2		北里大学			飼育	
6K-#1161-B-HN3	Actniaria gen. et sp.	イソギンチャク	三宅裕志	S-2	off Sanriku	5348	39	06.301	N	143	53.6437	E	2009.9.5	1	1161 スラープガン2		北里大学		ホルマリン・アルコール		
6K-#1161-B-HN4	Ctenophore gen. et sp.	クシクラゲ	三宅裕志	S-2	off Sanriku	5352	39	06.239	N	143	53.9207	E	2009.9.5	1	1161 MTコア		北里大学		アルコール		
6K-#1161-B-HN5	Hydrozoa polyp	ヒドロ虫綱のポリプ	三宅裕志	S-2	off Sanriku	5347	39	06.378	N	143	53.4745	E	2009.9.5	1	1161 マニピュレータ		北里大学			飼育	
6K-#1161-B-JM1	*Calyphotogena phaseoliformis*	ナギナタシロウリガイ	神保充	S-2	off Sanriku	5347	39	06.347	N	143	53.5374	E	2009.9.5	10	1160 熊手サンプラー		北里大学			-80 ℃冷凍	残り、血リンパ
6K-#1161-B-HS1	rubbish	漂流ゴミ タオル	柴田晴佳	S-2	off Sanriku	5350	39	06.254	N	143	53.8713	E	2009.9.5	1	1161 マニピュレータ		北里大学			-80 ℃冷凍	ウミグモ

On board No.	Species Name	Japanease Name	Identified by	Locality Site	Locality Area	Depth(m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No.of inds.	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
6K-#1160-C-HS4	mud	泥(黒)	柴田晴佳	S-2	off Sanriku	5347	39	06.330	N	143	53.563	E	2009.9.4	1	1160 MBARIコア		北里大学			-80 ℃冷凍	
6K-#1160-C-HS5	mud	泥(赤)	柴田晴佳	S-2	off Sanriku	5360	39	06.433	N	143	53.473	E	2009.9.4	1	1160 MBARIコア		北里大学			-80 ℃冷凍	
6K-#1160-C-HS6	mud	泥(黄)	柴田晴佳	S-2	off Sanriku	5360	39	06.437	N	143	53.463	E	2009.9.4	1	1160 MBARIコア		北里大学			-80 ℃冷凍	

Sample list 4. Invertebrates.

On board No.	Species Name	Japanese Name	Identified by	Locality Site	Locality Area	Depth (m)	Lat deg	Lat min	N/S	Long deg	Long min	E/W	Date	No. of inds	Dive/Collecting Methods	Taxon Code	Present location	JAMSTEC No.	Fixation	Preservation	Remarks
6k-#1160-B-R-#1	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.420	N	143	53.5559	E	09/03/2005		6k-#1160/manipulator		U. Ryukyus		Ethanol/formalin/-80	Ethanol	Found in rock
6k-#1160-B-R-#2	Sponge		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#3	Worm		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.420	N	143	53.5559	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#4	Eggs		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#5	Anthozoa?		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#6	Ophiuroidea		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#7	Metazoan?		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#8	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol/-80	Ethanol/-80	Found in rock
6k-#1160-B-R-#9	Metazoan?		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#10	Worm		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#11	Worm?		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#12	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.309	N	143	53.5980	E	09/03/2005		6k-#1160/manipulator		U. Ryukyus		Ethanol	Ethanol	Found in plastic bag
6k-#1160-B-R-#13	Amphipod		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#14	black sediment		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		JAMSTEC /Tsuchiya			-80	
6k-#1160-B-R-#15	Worm		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#16	Sediment from stones		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#17	Zoanthid		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus, JAMSTEC /Tsuchiya		Ethanol/-80	Ethanol/-80	
6k-#1160-B-R-#18	Scyphopolyp		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#19	Scyphopolyp		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#20	Pogonophore		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.356	N	143	53.5013	E	09/03/2005		6k-#1160		JAMSTEC /Tsuchiya		-80	-80	
6k-#1160-B-R-#21	Sediment red core lower		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		JAMSTEC /Tsuchiya		-80	-80	
6k-#1160-B-R-#22	Sediment red core surface		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#23	Sediment yellow core surface		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#24	Isopod		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1160-B-R-#25	Blue core deep over 300micro-meter		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#26	blue core deep over 63micrometer		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#27	kurage core deep over 300micrometer		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#28	kurage core deep over 63micrometer		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#29	kurage core deep over 63micrometer/2		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		DESS	DESS	
6k-#1160-B-R-#30	solenogastre		B. Lecroq	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/03/2005		6k-#1160		U. Ryukyus		Ethanol	Ethanol	
6k-#1161-B-R-#31	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.378	N	143	53.4745	E	09/04/2005		6k-#1161		U. Ryukyus		Ethanol/-80	Ethanol/-80	Found in rock
6k-#1161-B-R-#32	Sponge		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39	06.378	N	143	53.4745	E	09/04/2005		6k-#1161		U. Ryukyus		Ethanol	Ethanol	
6k-#1161-B-R-#33	Hydrozoan		H. Miyake	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/04/2005		6k-#1161		U. Ryukyus				
6k-#1161-B-R-#34	Actiniaria		F. Sinniger	S2	Japan Trench/ Off Sanriku	~5347	39		N	143		E	09/04/2005		6k-#1161		U. Ryukyus				
6k-#1161-B-R-#35	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.378	N	143	53.4745	E	09/04/2005		6k-#1161		U. Ryukyus		Ethanol/-80	Ethanol/-80	Found in rock
6k-#1161-B-R-#36	Octocorallia/Stolonifera		C. Aguilar	S2	Japan Trench/ Off Sanriku	~5347	39	06.378	N	143	53.4745	E	09/04/2005		6k-#1161		U. Ryukyus		Ethanol/-80	Ethanol/-80	Found in rock
6k-#1161-B-R-#37	Brittle Star		T. Fujii	S2	Japan Trench/ Off Sanriku	~5347	39	06.378	N	143	53.4745	E	09/04/2005		6k-#1161		U. Ryukyus		Ethanol	Ethanol	