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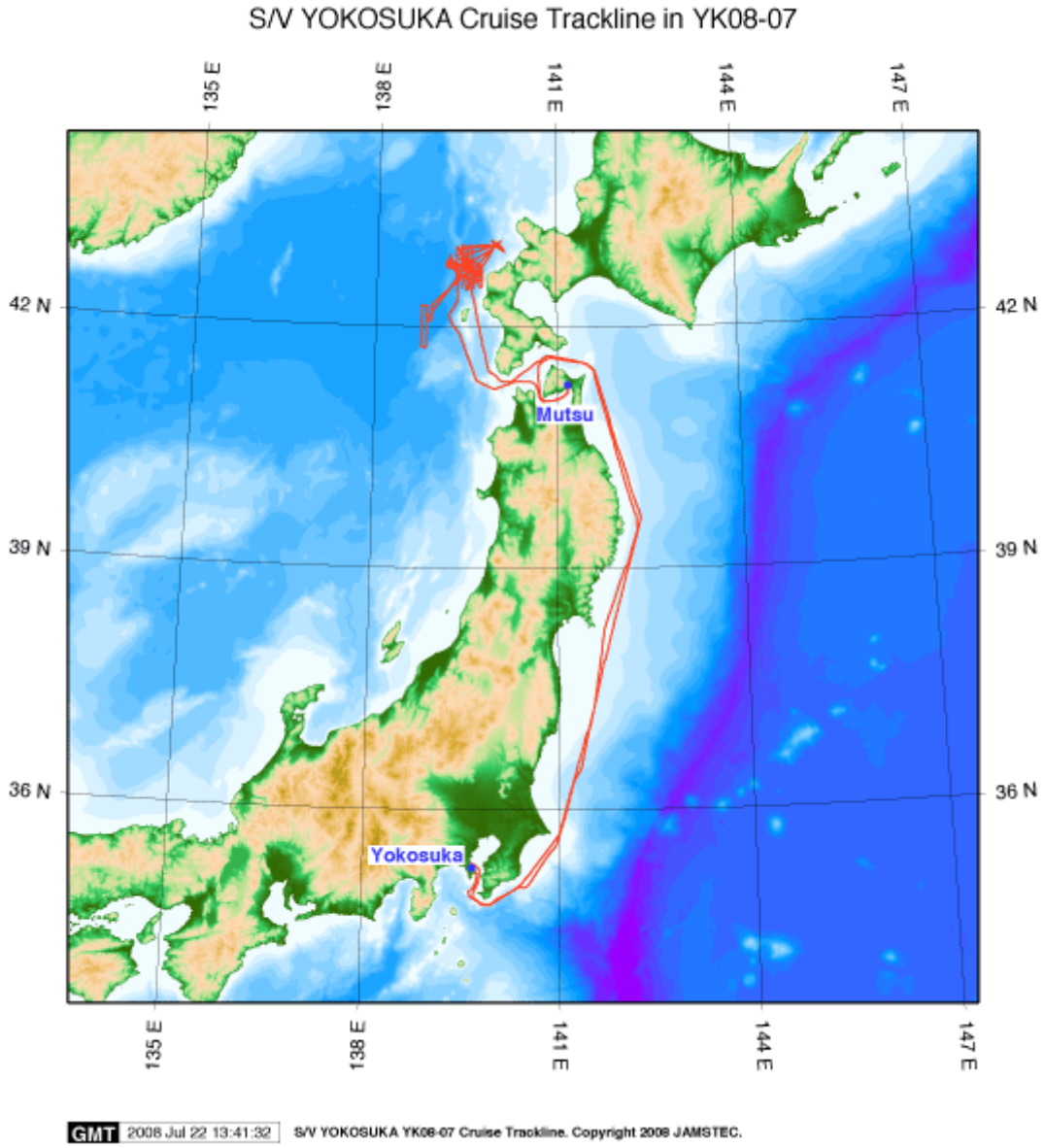
YK08-07 Cruise Report

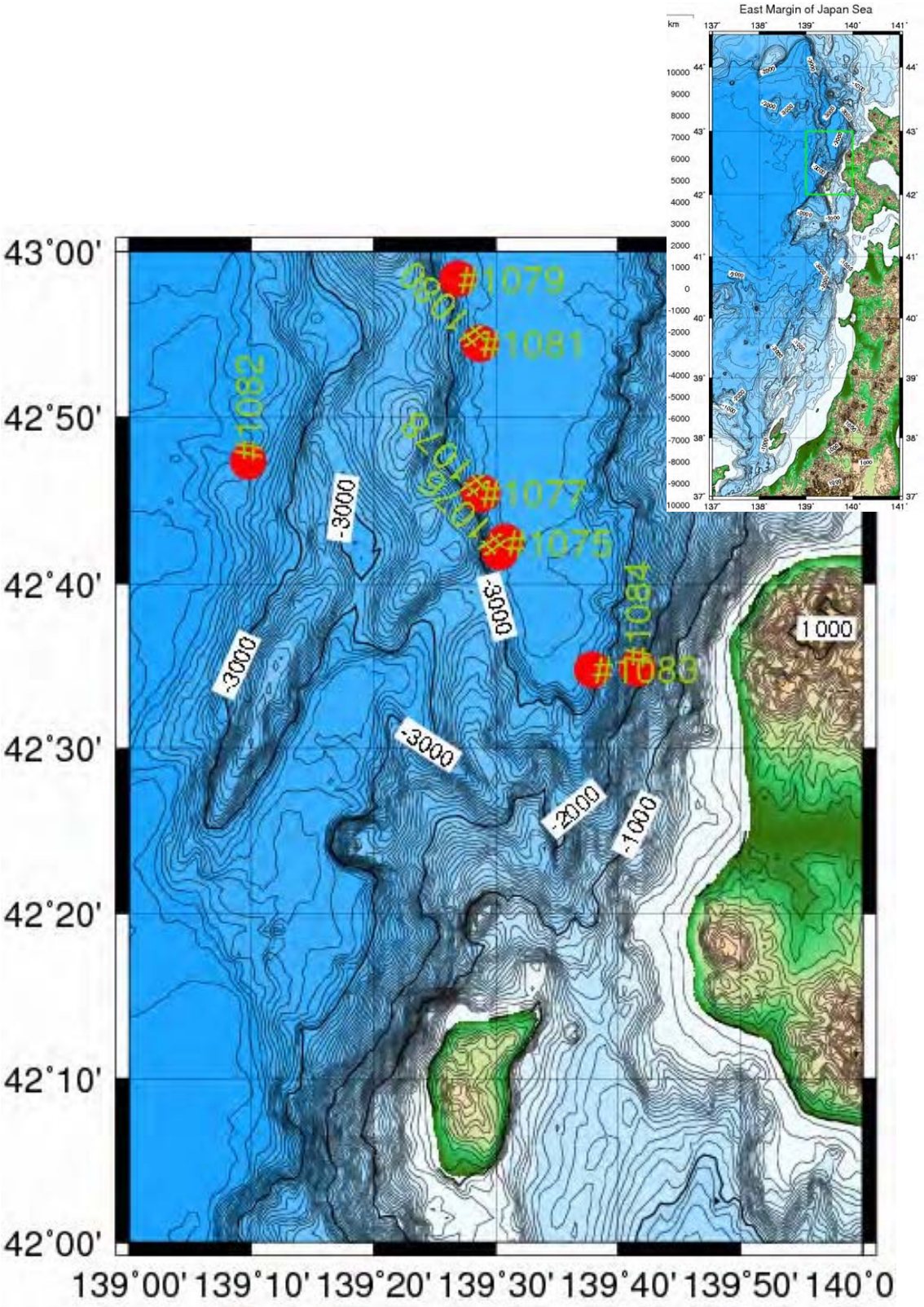
Mission Okushiri Ridge 2008

YOKOSUKA/SHINKAI Japan Sea Cruise, May-June 2008

Akira Takeuchi and the YK08-07 Shipboard Scientific Party

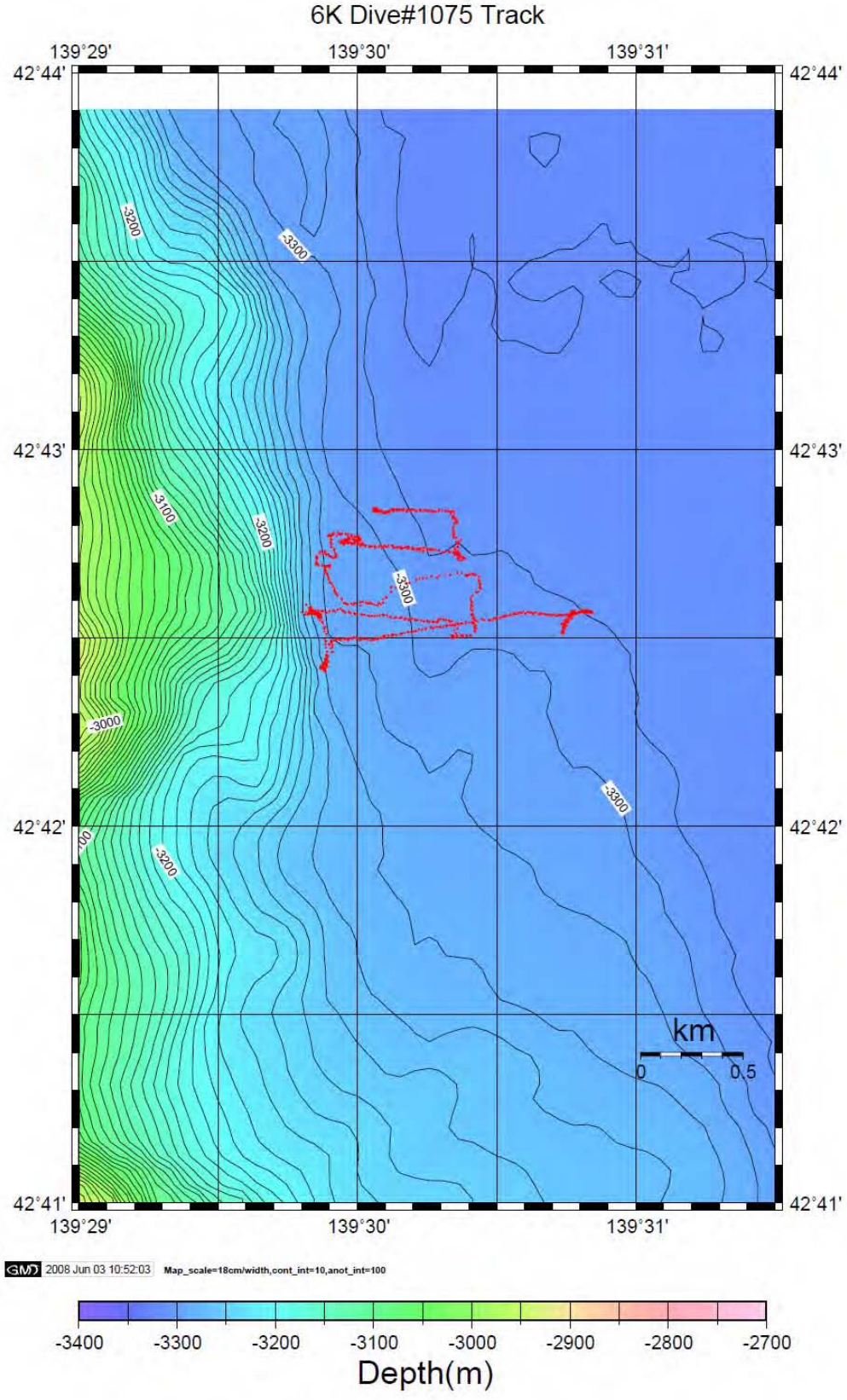


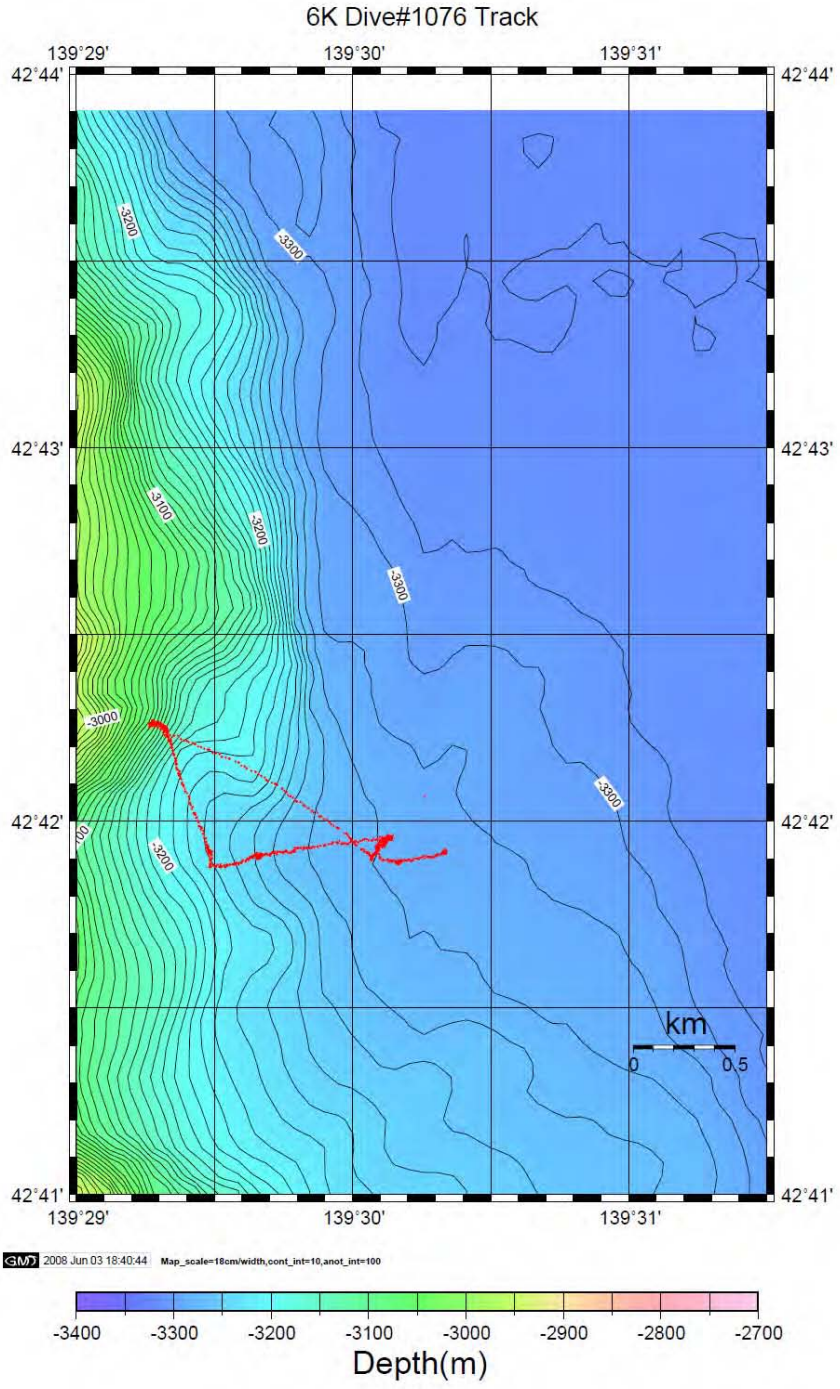
Frontispiece 1: Track chart of R/V YOKOSUKA YK08-07 Cruise



Frontispiece 2: Bathymetry map of Dive site area

Frontispiece 3:　Route Maps (#1075~#1084)

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42°42'
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-3300
-3100
-3000
km
0
0.5
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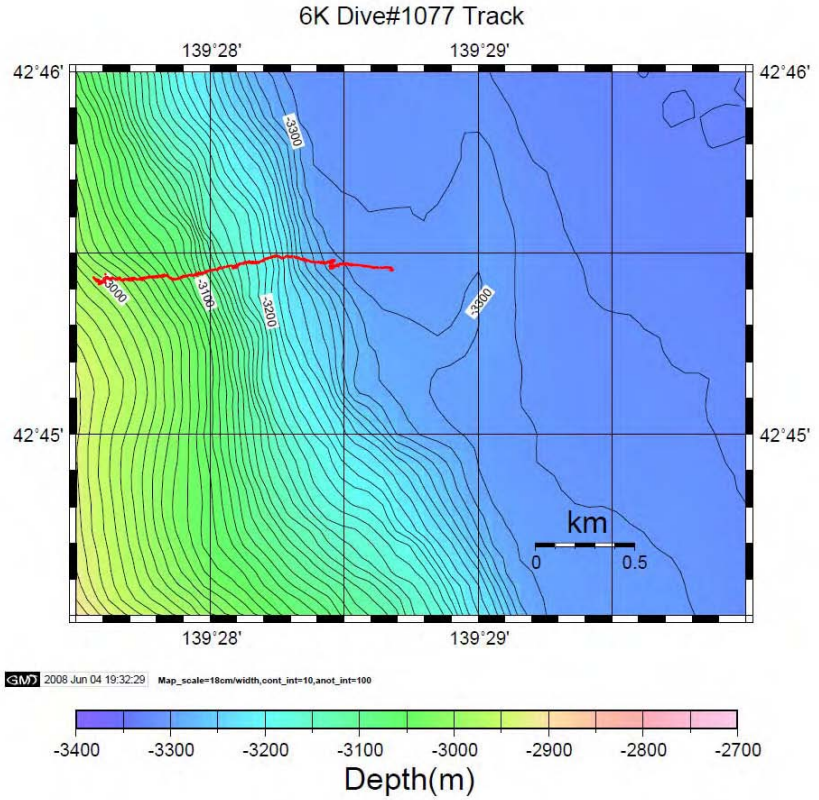
-3200
-3100
-3000
-2900
-2800
-2700
Depth(m)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-3200
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km
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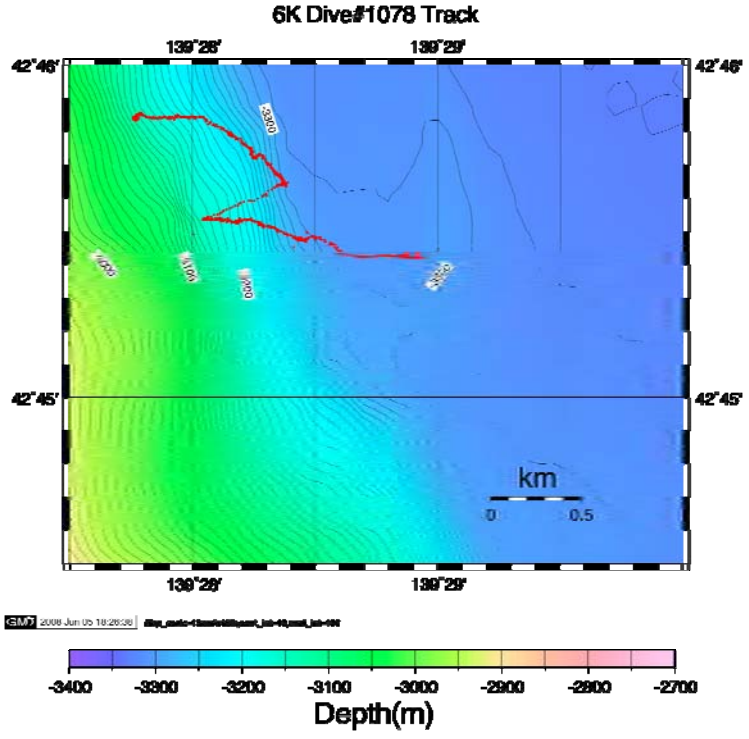
Depth(m)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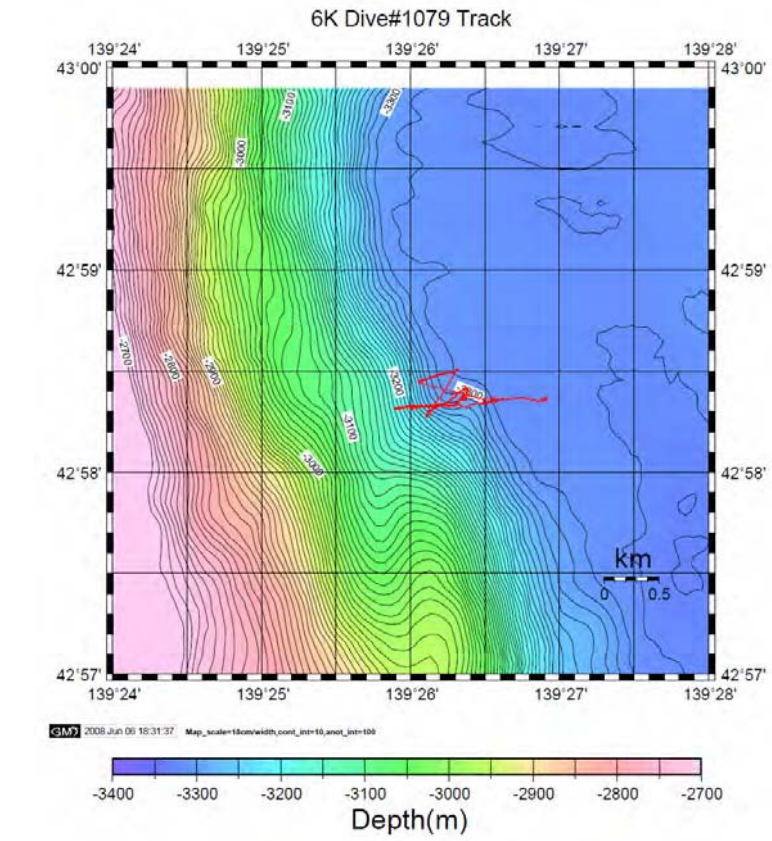
Depth(m)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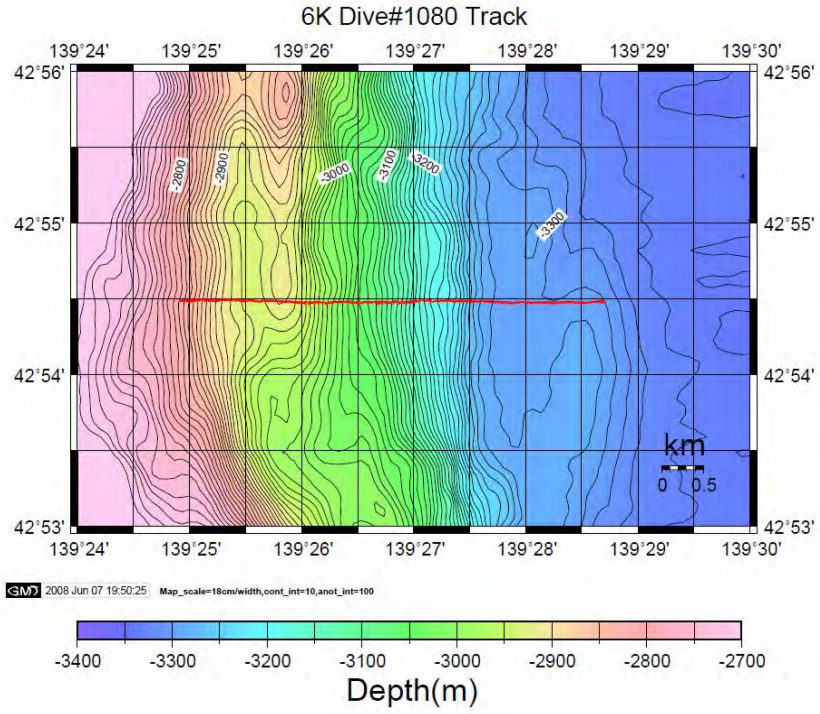
Depth(m)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km
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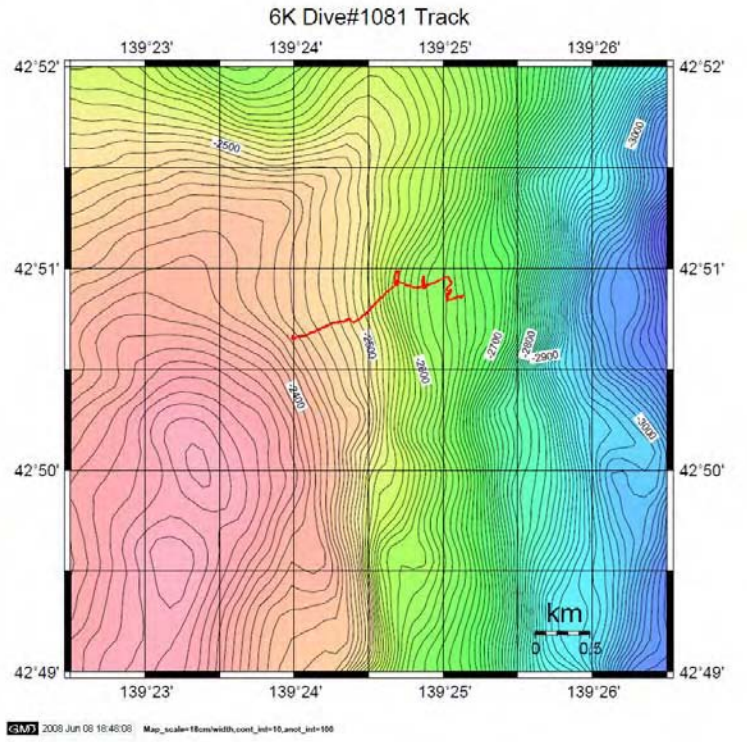
Depth(m)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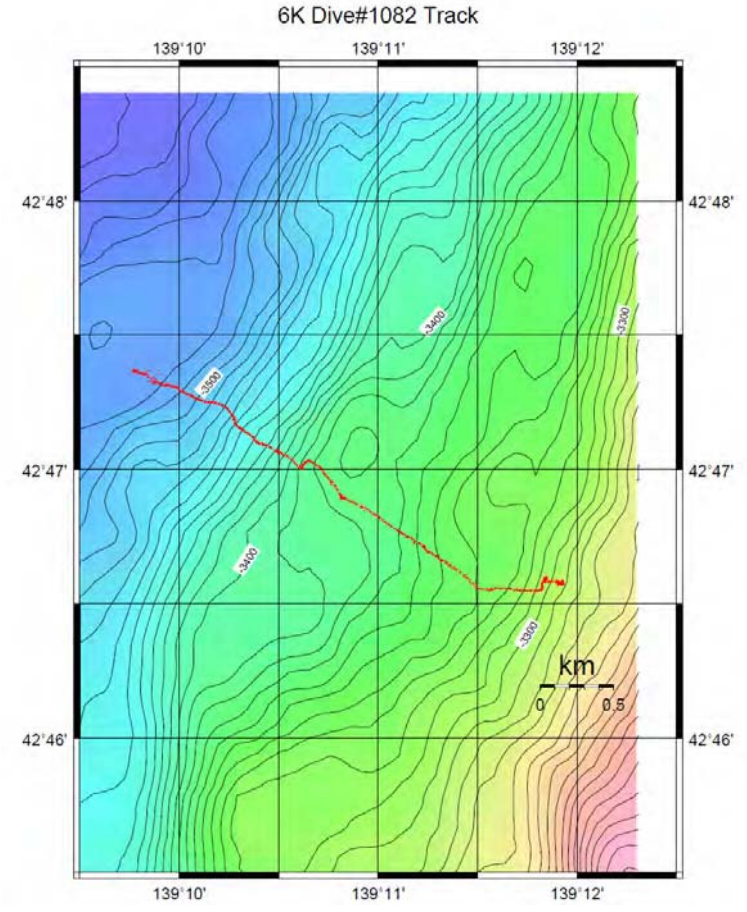
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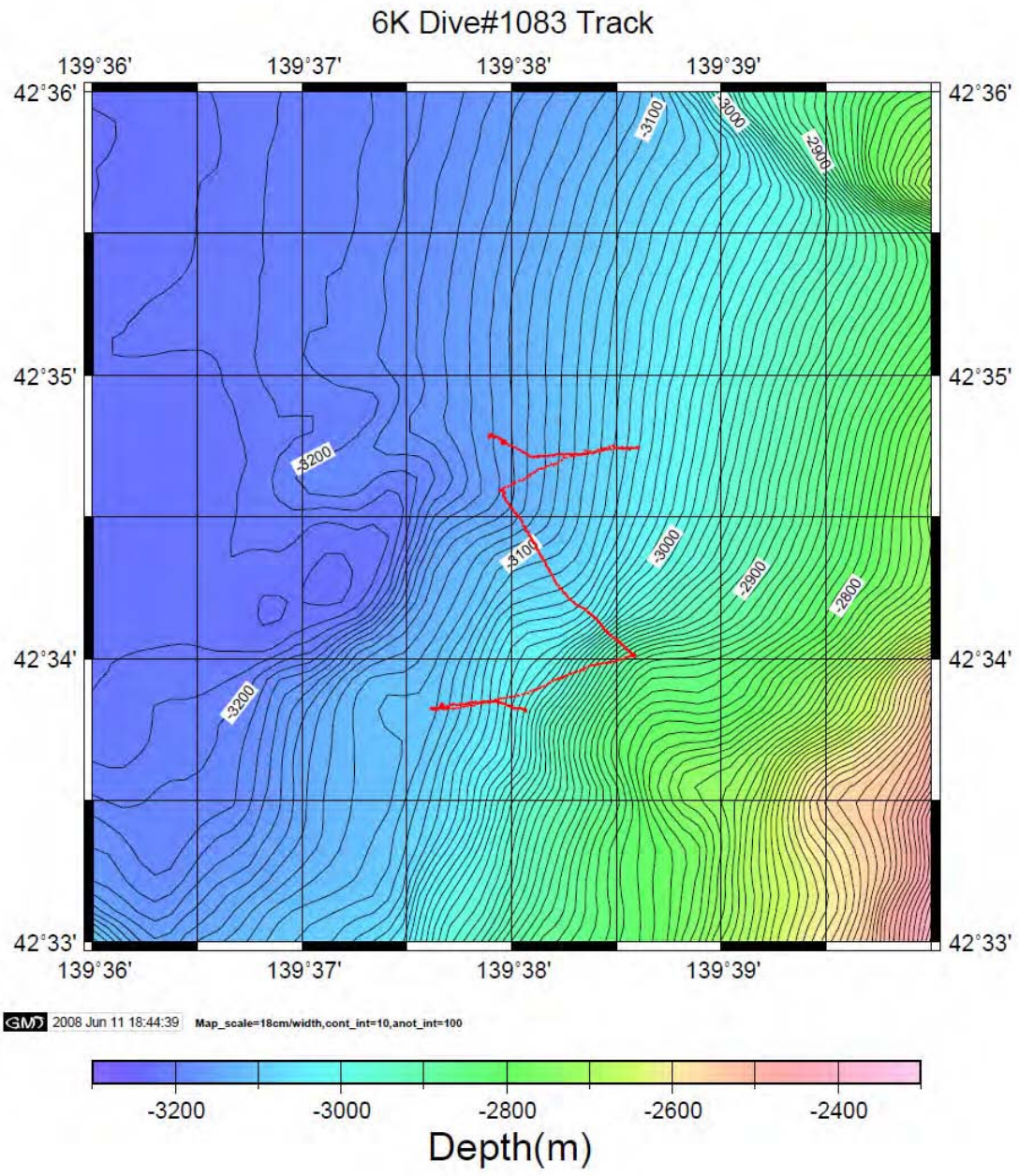
-3400
-3500
-3600
km
0
0.5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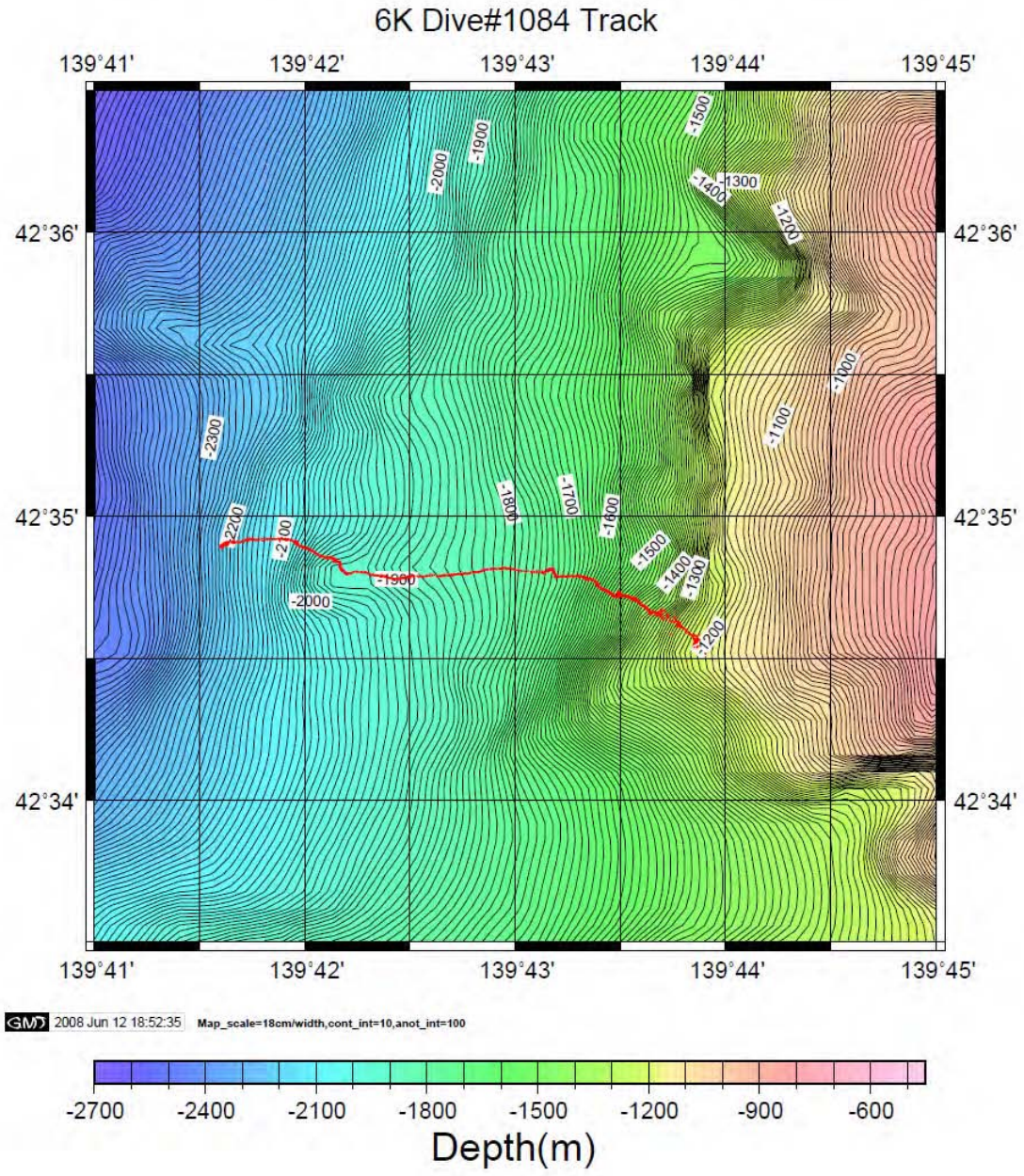
Depth(m)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42°35'
42°34'
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-2400
-2100
-1800
-1500
-1200
-900
-600
Depth(m)

PARTICIPANT LIST OF SCIENTIFIC PARTY

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Deputy Chief Scientist:	Masato Joshima	*2
Scientists:	Testuya Miwa	*3
	Taku Nemoto	*4
	Hajime Chiba	*5
Students:	Kanako Yoshida	*6
	Kyohei Matsumoto	*6
	Badalahu Bao	*6
Marine Tech.:	Satoshi Okada	*7

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*7 Nippon Marine Enterprise, Ltd.

Executive Summary

Cruise number: YK08-07
Ship name: R/V Yokosuka and S/V Shinkai 6500, JAMSTEC

Proposal number: S08-24
Scientific title: Three-dimensional configuration of earthquake faults concerning the recent great earthquakes -- Seafloor tectono-morphology of the eastern Amur Plate and its genesis

Chief Scientist: Akira Takeuchi (University of Toyama)
Representative of science party: Akira Takeuchi (University of Toyama)
Deputy Chief Scientist: Masato Joshima (Geol. Surv. Japan, AIST)

Cruise period and port calls: May 29-June 18, 2008 (Kurihama to Yokosuka, JAMSTEC)

Research Area: Northeastern margin of Japan Sea within the region enclosed by the following coordinates:

Surface survey: 41°10.0’N-43°30.0’N, 138°30.0’E-139°45.0’E; 2000～3600m.w.d.
Submersible dives : 42°30.0’N -43°10.0’N, 139°00.0’E -139°45.0’E; 2500～3350m.w.d.

Shinaki 6500 dive list

#1075: Masato Joshima / Lat. N42°42.5’ Lon. E139°30.4', 3323 m.w.d / Closer inspection of bottom ruptures formed at the 1993 Hokkaido Nansei-oki earthquake (1)

#1076: Taku Nemoto / Lan. N42°42.5' Lon. E139°30.4', 3323 m.w.d / Investigation of microbial mat in the tsunami source area of 1993 Hokkaido Nansei-oki earthquake

#1077: Tetsuya Miwa / Lat. N42°45.6' Lan. E139°28.9', 3327 m.w.d / Seabed ecological survey along the zone of earthquake rupture

#1078: Hajime Chima / Lat. N42°45.4' Lon. E139°28', 3322 m.w.d / Acoustic imaging of the bottom rupture zone of the 1993 Hokkaido Nansei-oki earthquake

#1079: Akira Takeuchi / Lat. N42°57.0' Lon. E139°27.8', 3333 m.w.d / Closer inspection of bottom ruptures formed at the 1993 Hokkaido Nansei-oki earthquake (2)

#1080: Masato Joshima / Lat. N42°53.64' Lon. E139°26.7', 3293 m.w.d / Closer inspection of bottom ruptures formed at the 1993 Hokkaido Nansei-oki earthquake (3)

#1081: Tetsuya Miwa / N42°53.64' E139°24.66', 2570.6 m.w.d / Investigation of bottom disturbance at around drill holes of ODP 796

#1082: Akira Takeuchi / Lat. N42°46.9' Lon. E139° 10.8', 3250 m.w.d / Investigation of bottom disturbance at around the epicenter of 1993 Hokkaido Nansei-oki earthquake

#1083: Hajime Chiba / Lat. N42°41.9' Lon. N42°41.9', 3145 m.w.d / Cold seepage and microbial mat at the bottom off Cape Motta (1)

#1084: Taku Nemoto / Lat. N42°41.9' Lon. E139°41.4', 3145 m.w.d / Cold seepage and microbial mat at the bottom off Cape Motta (2)

CONTENTS

Introductory Remarks

The purpose of the cruise R/V YOKOSUKA YK08-07 is to investigate seafloor geomorphology of the eastern Amur Plate and three-dimensional configuration of earthquake faults concerning the recent great earthquakes. The cruise carried out includes geological, chemical oceanography and biological surveys. The cruise was started from the port of Kurihama of Kanagawa prefecture in May 29, 2008, and sailed over the pacific and reached the southwest of Hokkaido in the Japan Sea. When finished the cruise came back in the harbor of Ominato of Aomori prefecture in June, 14, 2008. The research area was shown in the frontispiece figure (42º43ºN, 139º140ºE). This cruise conducted ten dive observations (1075-1084) by manned deep sea submarine vehicle Shinkai 6500 (whose maximum dive depth is 6500m in the sea). In this cruise scientists discovered many microbial (microbial) mats and other interesting things. For example, the dive survey 1079 discovered a super thick microbial mat (for about 2-3cm thick) in the depth of 3302m, which is very likely to include a new kind of microbial.

Acknowledgment

The shipboard scientific party would like to thank the operation team of the SHINKAI6500 and the crew of R/V YOKOSIKA for their skillful operation and excellent technical support during the cruise. The operating expenditure for the mode 2008 cruise was supported by Science and Technology Agency of Japan through the research project fund of JAMSTEC.

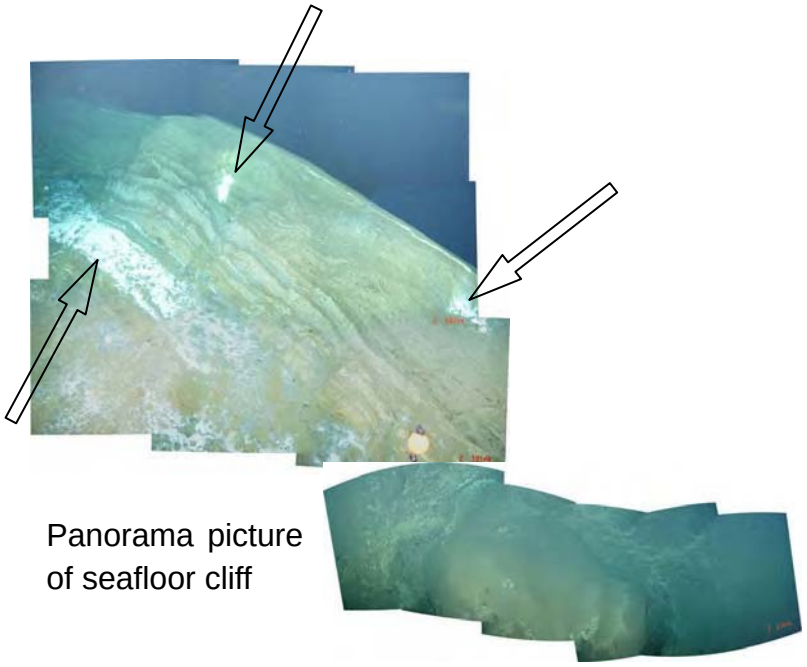
Dive Results

The submarine Shinkai6500 dives #1075, #1076, #1077, #1078, #1079, #1080, #1081 , #1082, #1083, #1084 were carried out in and around the Okushiri Ridge, southwest off Hokkaido, Japan Sea, during the period from 29 May 2008 to 14 June 2008.

1) Shinkai Dive #1075 (Observer: Masato Joshima, 2 June 2008, Monday)

The submersible dive started the observation from the flat seafloor to steep cliff along the west side of Shiribeshi trough, where is considered as an active fault activated by the 1993 Hokkaido Nansei-oki Earthquake. The purpose of this dive was centered by visual observation and sub bottom profiling by DAI-PACK.

The picture (left) in the next page shows a near perpendicular cliff, several meters in height, which is in front of the core sample site. The white spots in the wall surface of the cliff in picture were microbial mats and core sample was sampled under the cliff.



Panorama picture of seafloor cliff

However, there have seen some several meters elevation change, sand blow, color changed area, but the sedimentation was nearly parallel to the outer layer, so it can be considered as the influence of earthquake fault was not reached the outer layer of seafloor. When inclined to the foot of the cliff color changed area microbial bats were increased. And it seems white blocks dotted in slope collapse sediments were almost parallel to the outer layer. At the bottom of the cliff the sedimentations were no longer parallel, and fall downward of cliff, being influenced by the earthquake fault. When discovered steep slope, more than several meters in height, the dive first sampled water and mats, and then came back to the cliff. Five sub bottom profiles were performed at an interval of 100m under the cliff.

2) Shinkai Dive #1076 (Observer: Taku Nemoto, 3 June 2008, Tuesday)

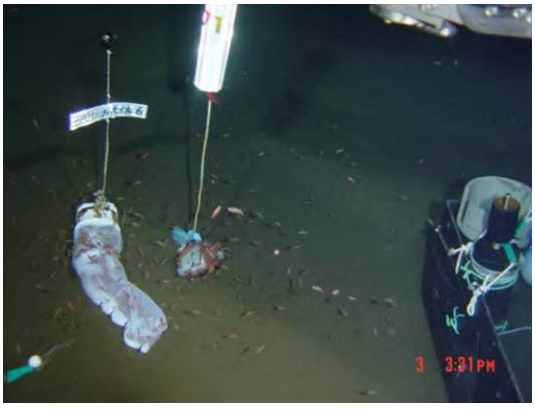
In this dive investigated the earthquake influence and organism on the east slope of Shiribeshi Trough southern part, which influenced by the Hokkaido Nansei-oki earthquake. The submersible landed at a depth of 3219 m and observed the bottom environment with sampling water, mud and creatures. At the lowest slope along the basin margin, the dive set a marker by a trap with bait. The dive climbed the slope to observe up to a depth of 3119m, then returned to the marker point and recovered the trap. In this area, the seabed was covered by very fine grained mud. Some black spots were observed at the west of the landed point, while rubbles of fragile mud and patch-shaped microbial mats were observed on the slope.

Characteristic photographs

Microbial mat and dark colored fringe (3,260 m)

Rubbles of fragile mud (3,250 m)

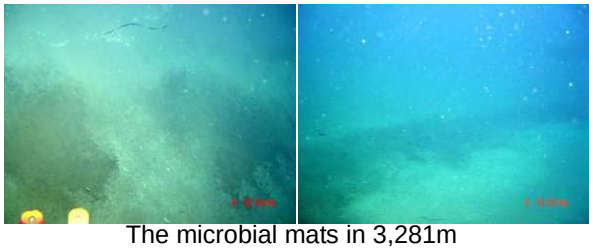
Creatures on the slope (3,119 m)



Shrimps by the marker with bait (3,271 m)

3) Shinkai Dive #1077 (Observer: Testuya Miwa, 4 June 2008, Wednesday)

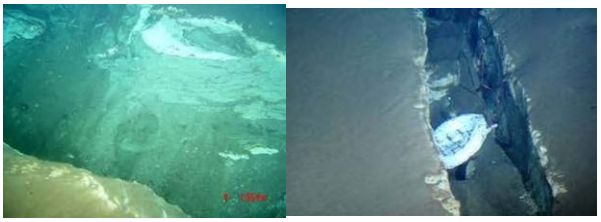
Geomorphology: The dive landed on a very soft and muddy flat (3292 m) of Shiribeshi Basin. Current was very weak and flew from north to south. With proceeding westward (270°), we found the first frontal slope with microbial mats. Along the slope bottom we found a huge microbial mat comprised of a dark colored core in center and surrounding white mat ring (3281m). There were at least three sites of microbial mats (3274m, 3277m and 3215m) across the belt zone. At this area of microbial mats the dive sampled water and mat. The recovered sample of about 5cm thick and dark colored reduction layer had slightly smelled like sulfide. Microbial mats lined basically in a trend of north-south direction almost parallel to the fault. With ascending from a depth of 3175 m three rows of north-south trending open cracks were found. The top open crack was very fresh and we could see the occurrence of strata very clearly. From 3113m, the slope became even steeper, and many outcrops were observed. The steep slope was continued up to 3095m, and at the top of there found large open cracks caused by landslide. And above it found even more small open cracks. Then the dive proceeded to observe small cracks (north- south trends) on the gentle slope. In the way also found many rubbles of fragile mud and left the bottom at a depth 2973m.



The microbial mats in 3,281m

Lightening creature

South-north Open cracks in 3175m



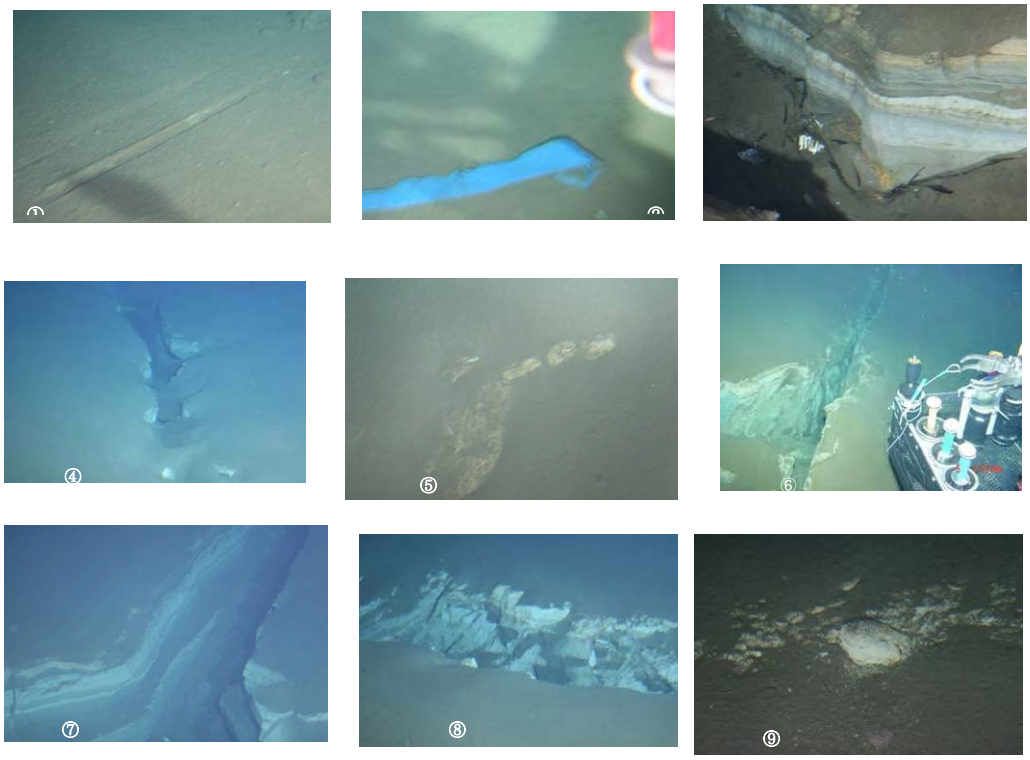
Near 3095m open crack considered as caused by Landslide and a garbage (balloon) in it

Biology: The living thing on the bottom immediately after the arrival was *Polynoidae* sp. and width prawns. Other living things were difficult to make judgment at a glanced. Moreover, the

density of the living thing was considerably low. The biota around the microorganism mat was so steady with the peripheral bottom. A white microbial mat was able to be confirmed on the surface of the sample. A lot of width prawns are instantaneously focused on the marker set up in 3,281m because it took the marker (No.72) with food. They were observed. A lot of small scallops (*Delectopecten randolphi*), the tube worm like kinds of mussel worm came to be observed from the place to the slope where the fissures had been observed. Moreover, a kind of pink colored cowfish (Opisthobanchia gen. st sp.) was observed, and sampled. The dive also sampled one of such cowfishes crowded to the corpse of the squid that had fallen on the sea bottom.

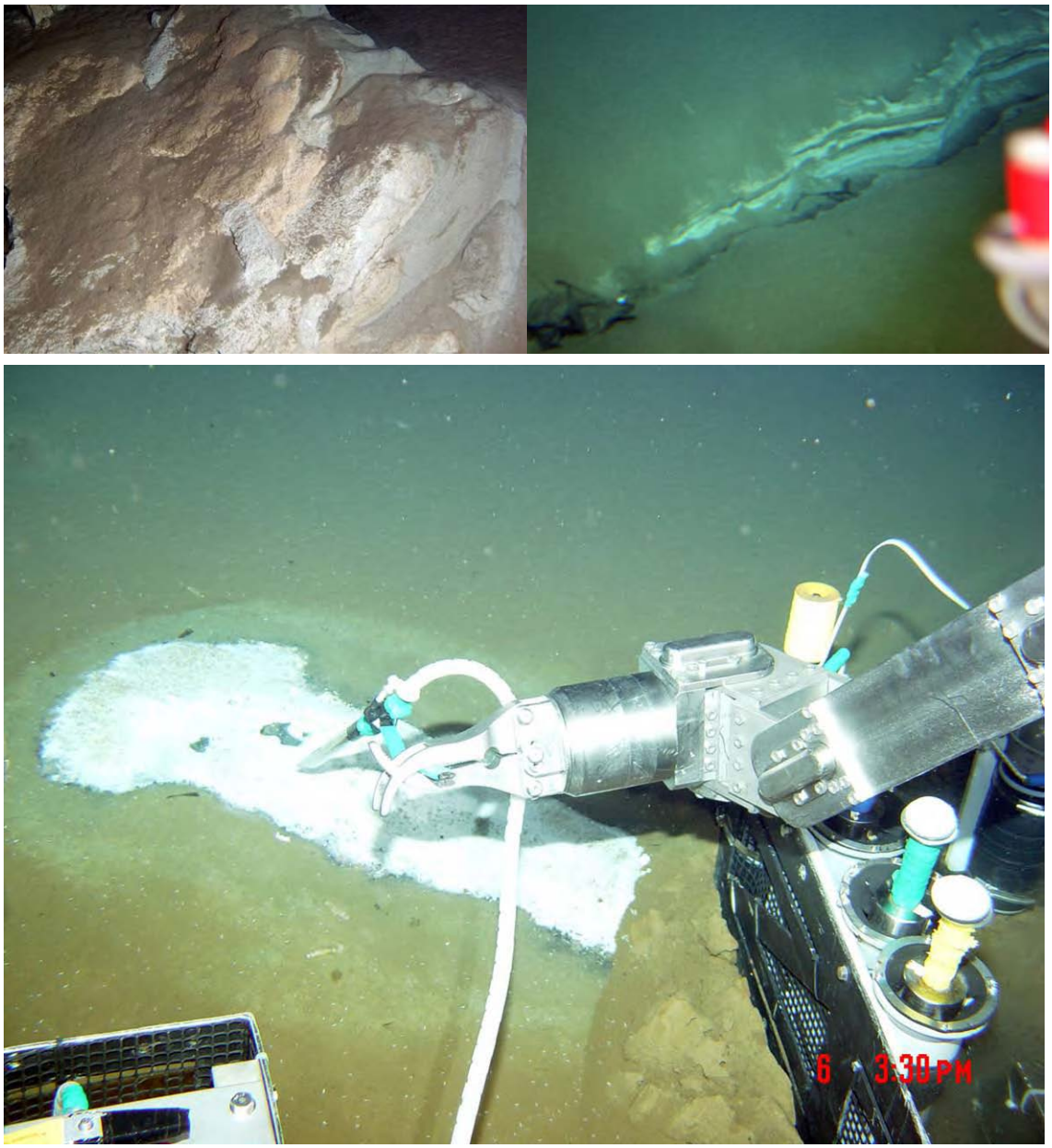
4) Shinkai Dive #1078 (Observer: Hajime Chiba; 5 June 2008, Thursday)

Geomorphology: The seafloor was almost flat and covered by fine grained soil and not by any big boulder. In picture ①, the trace of "Shinkai 6500" was seen clearly. This means that the current was very slow and very weak. In picture ②, a garbage likes blue sheet was confirmed as an artificial creature. This dive observed many fissures, and they were shown as below: Picture ③ depicts white strata under the surface brown layer. On this account, the white strata were seen on the crack-walls in many sites as shown in pictures ④ and ⑨, in the approach to the first frontal slope. The lower horizon of the brown outer layer has chaotic feature of folds and faults (picture ⑤). The researcher was able to confirm that regular stratum shape in were parallelism to cracks (picture ⑥～⑧) which in the approach to the second slope. Most of the fissures run along the contour line (picture ⑥), but the rests trend in an east-west direction. Their surface edges have few corners and sectional breaks, but brown colored soil was accumulated at the bottom of most cracks.



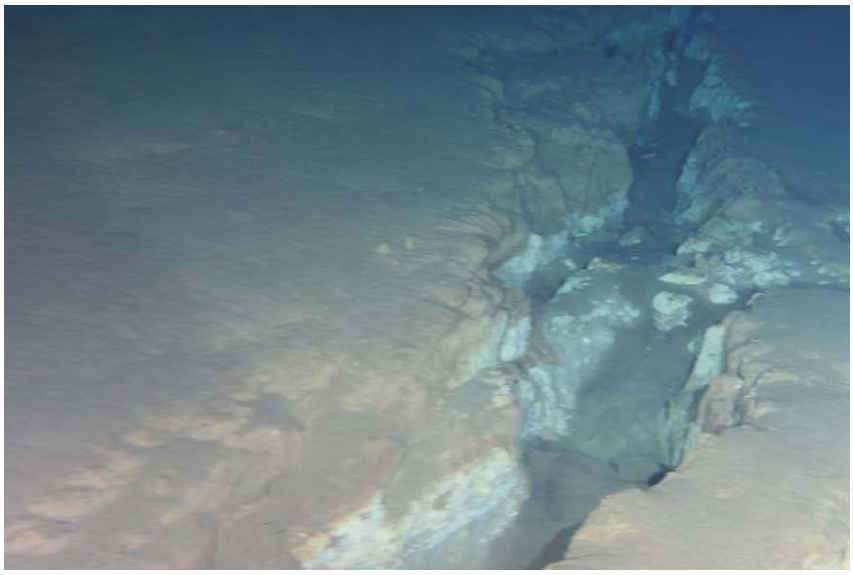
5) Shinkai Dive #1079 (Observer: Akira Takeuchi, 6 June 2008, Friday)

Because of the rainy weather the opening and shutting of submersible hatch was operated indoors. This dive was conducted at the north of the 1993 Hokkaido southwestern earthquake epicenter. The main purpose of this dive were eye-view observation and sub bottom profile of DAI-PACK to recognize to surface landslide and slope sedimentation and the change of seafloor backland in earthquake. However, it was different from the epicenter, and the phenomenon wasn't similar to seafloor surface fault. In addition, I observed a border of moving block and bedrock caused by the huge landslide. But the sedimentation was remarkable; it was not recognized as caused by resent earthquake like 1993's. From such a progress, came back to the thick microbial mat met at the beginning and sampled water and mud. This microbial mat is very high in viscosity and white like yogurt and the thickness is over 3mm and the sulfide layer looks black and thickness over 5cm because this microbial mat was significantly different from others met in former dive and that in Motta cape continental shelf, the possibility of new type of microbial mat and which include new kind of microbial was very high.



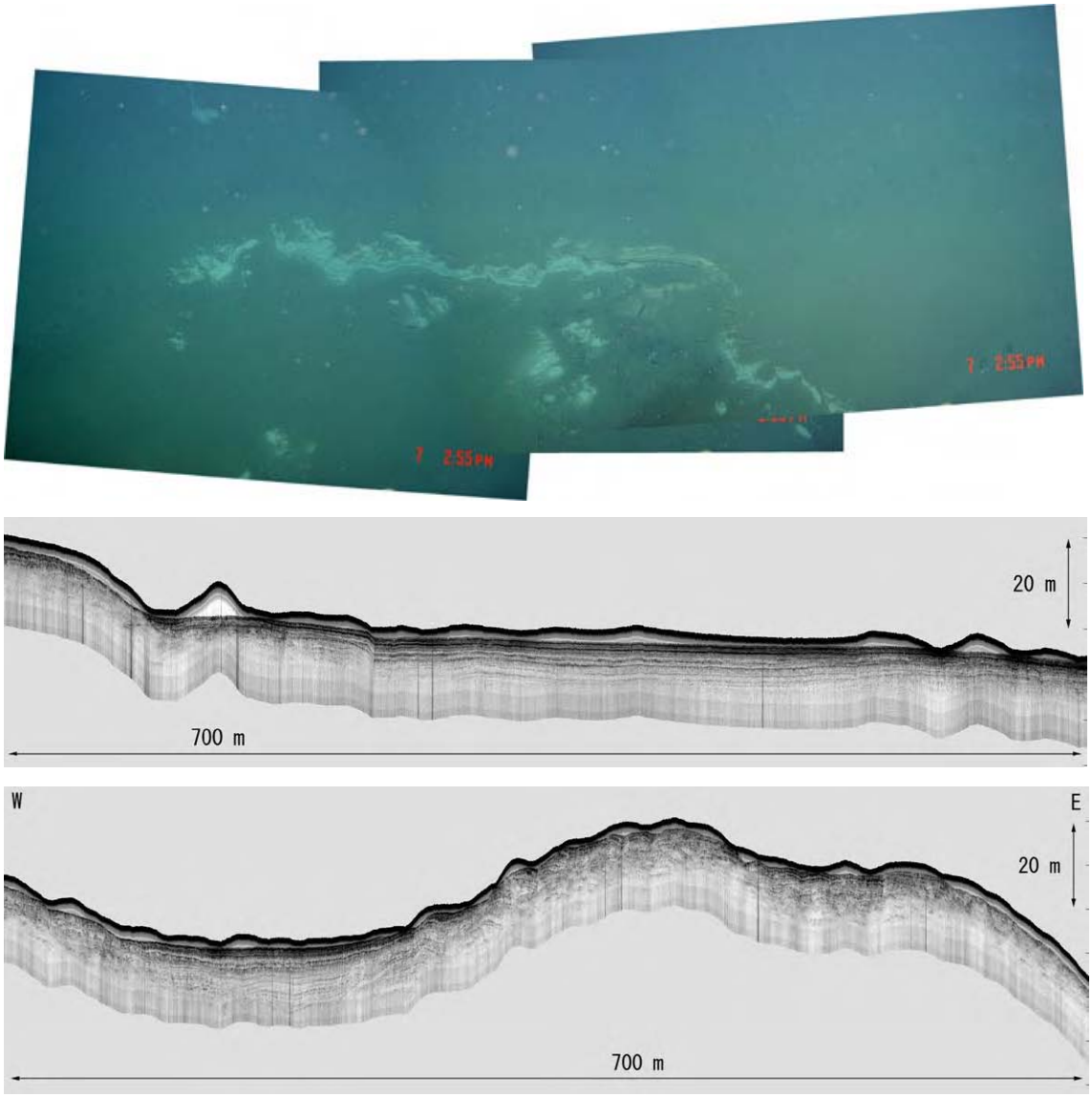
6) Shinkai Dive #1080 (Observer: Masato Joshima. 7 June 2008, Saturday)

This dive was carried out at a gentle slope to the north of the epicenter which was considered as had a slope collapse in earthquake. The main purpose of this dive was eye-view observation and sub bottom profile of DAI-PACK. Although it recognized that the surface landslide of slope sedimentation was the change caused by the earthquake, but there also have fissures appeared on the steep slope just at lift bottom site.



In the way, when crossing a ridge 20m high from the seafloor, discovered that something looks like black spot in the seafloor.

In addition scattered white block and stage whose height over several ten cm which were considered as caused by slope collapse were often seen. The state of the change of sedimentation under the cliff and around the ridge‘s seafloor surface sedimentation’s state were shown as example. Generally at the swelling of seafloor where the sediment was very thin, and occasionally we can see it rises from bottom to upward along the slope. On the contrary in the part of dent most outer layer‘s thickness was thickens at the center.



Sub bottom profile of seafloor

7) Shinkai Dive #1081 (Observer: Tetsuya Miwa, 8 June 2008, Sunday)

Object: the ODP796 drilling hole was the first place where methane hydrate was confirmed in Japan in 1989, and then the 1993 earthquake happened to be generated. In this time search for the drilling hole and investigate around the drilling hole what had happened and the dive also include the topographical survey of neighborhood area. Geographic characteristic: It is said that the drilling hole is at the depth 2621.6m or 2570.6m. Therefore was carried out along the contour line 2621.6m and 2570.7m and performed neighboring observation. For look for the 2621.6m contour line goes from the bottom of the east slope to west but could not found it. On the way to west at 2621.6m we found four sites which have geographic up and down. at most west point of 2621.6m contour line found object fallen from ship was scattered. Particularly when found a pipe recognized that it fallen from the drilling ship. However could not found

the drilling hole around (we recognized sand blow). At the depth 2570.6m on slope found the drilled hole larger than 1 m. Water sampled here. We could not find methane hydrate or carbonate here. It seems that the water was getting out from the hole. On the flat place around the drilling hole the dive found cracks which are considered as caused by earthquake. The cracks almost run in a northwest to southeast trend. Some sites also have wet perpendicular. The two open cracks wear microbial mats.

Drill hole at 2,571m
ODP796 (1989)

Drill hole at 2,571m

Open cracks with microbial mats

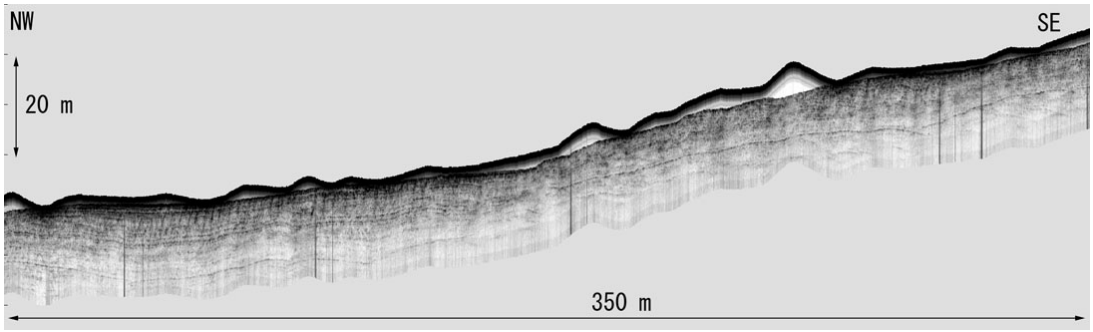
8) Shinkai Dive #1082 (Observer: Akira Takeuchi, 9 June 9 2008, Monday)

This dive was carried out at the very epicenter of 1993 M7.8 Hokkaido Nansei-oki Earthquake. In the same area a deep tow camera inquiry (DT-5C) was carried out by JAMSTEC just after the earthquake was happened. From the picture of this area know that the change of bedrock caused by earthquake was most significantly. We have visited here again and observed temporal changes for 15 years. The east slope of the ridge where the where the earthquake fault was discovered and take a compared observation around found that trenches berried by debris blow and dust of cloud which caused by earthquake slope collapse, this sediment was accumulated in 15 years or rather 1 year just after earthquake.

The sub bottom profiling (SBP) data by DAI-PACK could illustrate faults and folds of bedrock under the seafloor for about 20m. The fold was thick in synclinal part and thin in anticline part, which is correlative to the fault cliff observed on the bottom. From the data of SBP imaging coseismic displacement of the bedrock was significant by a 2-3 m at the shallower half of horizon, while the deeper was not so disturbed.

On the other hand, this dive also discovered only one site of microbial mat with a small fault (at

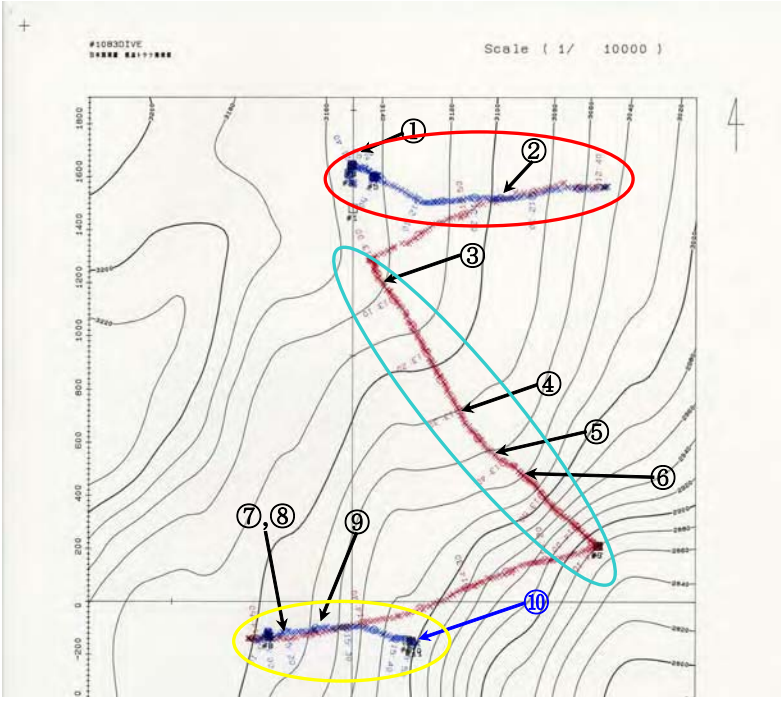
a 3300m gentle slope, before left bottom). It means clearly that the microbial mats were only distributed in places where groundwater seepage runs along the active fault.



A profile at the epicenter

9) Shinkai Dive #1083 (Observer: Hajime Chiba , the slope off Motta Cape)

At first, during the approach to the first slope (red oval in the Map), it was clarified by scoop sampling that the bottom was composed of fine grained gravel covered by a thin layer of the brownish ooze. Then shingle and boulders [photo ①] increased in number. As the dive ascent the slope, the of several tens centimeter sized boulders became outstanding [photo ②]. In the approach (blue oval) to the second slope, the situation was the same as the slope marked by the red oval about 3,050-3,080m; [photo ③, ④]. With approaching a ridge, however, the lithology was suddenly changed into mudstone [photo ⑤], and a sheer part was seen in spots [photo ⑥]. During the third approach to about 3,050-3.080m (yellow oval), variety of boulders in size [photo ⑦, ⑧] lay scattered. The bottom of leaving became the mudstone layer [photo ⑨] afterwards. A pinkish sea cucumber was observed surrounded by tube-worm like kinds of mussel worm on muddy bottom [photo ⑩].

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Summary and Conclusion

Earthquake Geology:

(1)Sub-bottom profiler made clear that the active fault along the west margin of Shiribeshi trough is a low-angle reverse fault, which inclines to the Okushiri ridge, and that the unit vertical displacement was about 2.0 m. Moreover, underground deformation corresponds with distribution of tectonic features in the bottom geomorphology, such as sand-blow traces, auto-brecciations, and microbial mats due to cold seepages.

(2) Sea bottom of the very epicenter of the 1993 Hokkaido Nansei-oki earthquake on the west side slope of the Okushiri Ridge was composed of semi-consolidated sedimentary layers, which has been damaged remarkably by high-speed destruction in situ, 'auto-brecciation', as occurred in the zone along the surface earthquake fault where large-scale landslides and slope collapses had also occurred on the east slope of the Ridge.

(3)Temporal changes in the co-seismic disturbance of the sea bottom, 15 years aging since the earthquake were observed. The fundamental data for paleoseismological age-determination were obtained.

Deep-sea ecosystems

The relation between a microbial mat and an active fault became clear. That is, microbe mats would not be distributed everywhere in the Japan Sea bottom but along with the earthquake faults as was observed in the source area of the 1993 Hokkaido nansei-oki earthquake. Remarkable microbial mats were formed and sustained along the boundary fault with the sedimentary flat of the Shiribeshi trough.

Such an east-west asymmetry clearly indicates a west-dipping reverse faulting for the earthquake source fault. Moreover, the linear zonal arrangement of cold seepages and microbial mats along the source fault suggests that (a) this sub-bottom active fault serves as a gush passage of the groundwater to cultivate microbes and also that (b) the deeper fluid might participate in earthquake generation.

(1) At the basin bottom (3300 m.w.d) and surrounding, the organisms mainly composed of amphipods and polynoids show that biological density is not so high. On the flank of the Okushiri ridge, the shallower the dive ascent, the more benthics were seen. As for small scallop *Delectopecten randolphi*, larger individuals are distributed particularly in the shallower slope. Swimming organisms such as fish and jellyfish were not observed there.

(2) As for biota, in contrast to the basin floor, more biological on the ridge slope, although variety in type is not so wide. There was no significant difference in the density of organisms between the east flank and the west slope of Okushiri Ridge.

(3) The cruise collected large amounts of samples such as small bivalve-shells, sea slugs

(*nudibranchia*), internal organs of polynoids, and many shells of small scallop. The former two might be described as new species.

(4) Number of dead squid falling from the shallow water was observed feeding benthic organisms.

(5) Biota in the water depth larger than 2500 m.w.d is monotonous while the diversity of biota in shallower waters less than 2300 m.w.d were recognized as the abrupt emergence of fish and crabs. It is determined that this change cannot be attributed to water temperature because of its constancy (0.2 ~ 0.3 °C). The water pressure distribution, as well as the abundance ratio of the food and ocean currents, etc., could explain as the biological factors of the abrupt change in biota in the Japan Sea. Contrarily, low diversity of life in the Japan Sea due to its obstructive tendency may help to follow up certain deep-sea organisms and species, and give rise to a good model to investigate the dependence of pressure.

Earthquake damage of ODP Hole 796

The discovered hole-A of ODP 796, excavated four years before the earthquake, located in the source region of the 1993 earthquake, was unhurt for appearance. The hole-B may have collapsed in case of the same earthquake because of its location on the mass-wasted slope. It is possible that the strong ground motion is controlled to be suppressed due to the volcanic basement of sedimentary layers, which is as shallow as illustrated by the seismic reflection profiles.

Ocean chemistry

Focusing on the Okushiri ridge and the Shiribeshi trough, geochemical samples were taken from deepest water, bottom water, and sediment pore water under a variety of geologic conditions. We expect the continued elucidation of the factors of perennial change in marine environment of the sites of cold seepage and surroundings as well as habitat conditions of microbial mats.

Concluding remarks

1. The submersible dives visited the epicenter of the 1993 Hokkaido Nansei-oki earthquake on the west side slope of the Okushiri ridge for the first time. Sea bottom composed of semi-consolidated sedimentary layers has been damaged remarkably by high-speed destruction in situ, that is, ‘auto-brecciation’.

Utilizing the sub bottom profiler and side scan sonar, we found that the underground shape of Shiribeshi western fault was reverse fault inclined to Okushiri ridge, also recognized micro tectonic geomorphology, sand blow, in-situ collapse and microbial mats.

2. As for the paleoseismology, bedrock was able to recognize the secular variation of 25 years after earthquake. Basic data for judging whether an activity feature of fault is old and new were collected. Close relationship between the microbial mat and active fault was recognized because microbial mats located along 1993 earthquake fault, indicating that active fault has been the passage of spring water which feeds microbe. Moreover, the zonal arrangement of cold seepages and microbial mats along the source fault suggests that the fluid took part in the earthquake occurrence.
Large-scale landslides and slope collapses had also occurred on the east slope of the same ridge. Remarkable microbial mats were formed along the boundary fault with the sedimentary flat of the Shiribeshi trough. Such an east-west asymmetricity clearly indicates a west-dipping reverse faulting for the earthquake source fault.

3. The discovered hole-A of ODP796, excavated four years before the earthquake, located in the source region of the 1993 earthquake, was unhurt for appearance. The hole-B may have collapsed in case of the same earthquake because of its location on the mass-wasted slope. It is possible that the strong ground motion is controlled to be suppressed due to the volcanic basement of sedimentary layers, which is so shallow as illustrated by the seismic reflection profiles.

4. About the Motta cape offing microbial mat (3M site: Motta Microbial Mat site), dive acquired sub bottom profiler data. Whereas the wide area geographic characteristic, there has some differentiation in 3M site that because from the around of Motta cape continental shelf to Shiribeshi trough where turbidities has been formed along which methane gas seeps. Although a moving model and a spring-water model along the trough’s eastern strata were discussed, a “volcanic spring water way” model form Kariba-Motta was most likely to be accepted.

Appendices

Cruise/Dive operation log

SHINKAI 6500 Dive #1075 **Observer:Johshima (AIST)** **2008/6/2**

Chief-pilot: Sasaki

Co-pilot: **page:1/2**

Okushiri Ridge **Ueki**

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
10	2		0			195	-24	Vent open, Start of #1075 Dive
10	21	11	843		133	212	-39	
10	27	27	1112		119	213	-13	
10	36	11	1521		132	233	-18	
11	6	2	2790		29	260	630	
11	27	3	3277		87	249	630	trim completing
11	35	11	3297	5	279	210	600	arrive the bottom, Mud
11	41	0	3297	2	253	310	640	Sampling the push core(blue)
11	45	0	3297	-	253	310	640	Sampling the MBARI(yellow)
12	1	50	3255		252	314	701	
12	4	40	3297	2	271	303	646	Running start
12	6	2	3289	4	271	299	581	Sampling the NISKIN(red)
12	28	29	3282	2	261	210	-190	Rolling boulder?
12	58	19	3272	1	270	178	-510	something
12	40	10	3268	2	271	170	-510	Microbial mat
12	41	43	3261	2	271	170	-530	Talues, microbial mat, outcrop
12	43	43	3260	4	14	170	-540	Microbial mat comfirmed
12	45	30	3260	4	14	170	-540	Head north
12	49	56	3251	2	2	-	-577	Heading
12	53	44	3254	2	1			Abandon sampling
12	54	40	3254	2	34			Many debris

12	56	0	3256	2	5	170	-570	Microbial mat
12	59	40	3269	2	342	291	-589	Sampling NISKIN(green)
13	1	8	3270	3	340			Sea cucumber?
13	5	20	3270	-	340	310	-610	Sampling the push core(yellow)
13	9	10	3270	-	340	310	-610	Sampling the MBARI(black)
13	13	45	3270	2	340	320	-640	Head east
13	16	15	3268	4	64	312	-631	
13	17	15	3274	2	90	320	-630	Head 90 degree
13	33	6	3291	1	65	265	-34	sand blow?
13	36	28	3290	2	129	264	70	white something
13	42	40	3987	3	359	200	100	Head north
13	46	17	3290	1	1	320	140	
13	49	57	3292	1	1	409	172	Two black somethigs
13	52	17	3292	4	270	440	190	Head 270 degree
13	57	27	3292	1	272	450	-190	
14	0	0	3288	3	272	356	-303	sand blow
14	9	10	3282	3	281	500	-560	
14	14	40	3277	3	281	540	-550	cliff, head north
14	17	0	3281	3	0	609	-581	Rolling boulder
14	19	0	3280	3	0	585	-534	artificial something?
14	22	10	3279	2	0	620	-530	Head 90 degree
14	24	55	3280	2	90	620	-530	Head 90 degree
14	29	59	3284	1	323	664	-402	Discolored belt observed
14	35	30	3285	2	244	680	-410	Running along the belt, black somethig?
14	38	44	3282	1	351	657	-488	Observation finished, running east
14	41	10	3284	3	91	654	-479	Crack north south strike
14	45	10	3285	2	89	640	-395	Discolored patch
14	48	40	3277	3	91	630	-340	
14	55	21	3294	2	92	630	-170	
15	5	15	3297	1	60	600	80	

15	14	15	3299	2	308	700	60	Head 270 degree
15	16	35	3300	1	271	771	71	
15	34	40	3293	2	283	810	-320	Sampling the NISKIN(blue)
15	36	0	3291	2	331	810	-320	Put buck Side scan sonar
15	39	13	3284	3	348	810	-320	Sampling the push core(green)
15	42	13	3284	2	349	810	-320	Sampling the MBARI(red)
15	51	44	3284	2	350	810	-320	Leave bottom
17	3							Surfaced

Observer:Nemoto

(Shin-Enoshima Aqu.) **2008/6/3**

SHINKAI 6500 Dive #1076

Chief-pilot: Ohno

Co-pilot: **page:1/1**

Okushiri Ridge **Saitoh**

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	17	56	3219	571	198	-847	45	going down
11	31	0	3276	5	93	-888	46	arrive the bottom
11	33	50	3276	3	100	-890	40	change the head east
11	37	18	3275	3	270	-900	16	head 270 degree
11	44	14	3272	2	268	-930	-120	check the position
11	56	46	3271	2	4	-870	-290	check the position
12	8		3271	3	40	-820	-250	get the life into No.4 canister
12	17		3272	3	341	-820	-250	check the position
12	20	48	3266	5	269	-820	-216	observation
12	29		3260	2	270	-860	-550	Microbial mat(like a dome)
12	44	59				-900	-700	check the position
	48					-900	-870	Microbial mat
12	59	48				-902	-860	Start using MT Core Sampler
13	12					-902	-860	Finish using MT Core Sampler
13	13					-905	-887	Microbial mat,slope
13	23	26	3226	1	259	-950	-1000	check the position
13	27		3225	3	282	-907	-1090	check the position
13	38				342	-855	-1130	change the head
13	41		3223	2	341	-770	-1160	check the position
13	49		3210	1	341	-550	-1250	check the position
13	53		3190	3	341	-400	-1300	check the position
13	55	5	3178	3	341	-355	-1310	slope
13	59		3161	4	341	-300	-1330	check the position

14	3	6	3155	1	341	-277	-1346	cliff
14	6	6	3155	4	360	-268	-1326	get the rock with life
14	22		3119	2	287	-250	-1400	Sampling the NISKIN bottole(red)
14	33		3119	1	344	-256	-1414	get the life into No.5 canister
14	35		3115		112	-266	-1340	change the head 110 degree
14	59		3268			-900	-320	landing bottom again
15	3	53	3268	5	41	-900	-320	change the head 41 degree
15	11	42	3271	2	41	-870	-270	return to start point
15	14	57	3270	1	41	-860	-360	returning to start point
15	16	21	3271	1	41	-860	-260	sampling NISKIN green
15	21	45	3272	3	330	-860	-260	sampling the MBARI yellow
15	24	25	3272	3	330	-860	-260	sampling the MBARI red
15	27	49	3272	3	330	-830	-235	recall Marker (fish food)
15	35	39	3272	3	350	-830	-230	shrimp,recovered the trap
15	45	50	3272	3	348	-830	-230	sampling the MBARI black

SHINKAI 6500 Dive #1077

Observer:Miwa (JAMSTEC)

Chief-pilot: Chida

Co-pilot: Chiba

2008/6/4

Okushiri Ridge

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	32		3292	3	358	294	925	arrive the bottom,Mud
11	37		3297	2		290	920	Sampling the MBARI(black)
11	40		3291	1	280	296	890	head 280 degree
11	45		3291	2	281	290	870	check the position
11	46		3291	1	289	297	835	trace of sand blow
11	48		3291	1	284	304	801	small white patches, polychaeta?
11	51		3292	1	286	300	780	check the position
11	54		3292	1	287	318	727	microbial mat? Mad stone?
11	56		3291	1	286	320	690	check the position
11	57		3292	4	283	312	667	wire?
11	59		3291	2	279	312	659	blue rubbish?
12	2		3290	2	282	304	627	can
	3		3285	3	280	300	630	check the position
	4		3281	5	277	296	620	black discolored area
	7		3284	3	295	295	618	No.1 canister finished
	9		3285	2	306	298	615	microbial mat? Mad stone?
	13		3283	2	298	328	613	Sampling the NISKIN(red)
	19		3284	2	306	332	632	Sampling the MBARI(yellow)
	20		3284	2	300	332	627	the life comfirmed, polycheata?
	24		3284	2	322	320	620	set the marker No.72

	28		3284	2	322	330	630	head 280 degree
	32		3281	2	283	321	617	
	36		3274	1	284	320	560	check the position
	38		3277	2	282	323	587	two black somethings
	42		3277	2	281	340	490	discolored area comfirmed
	44		3271	3	279	338	475	white something
	48		3252	2	282	350	430	check the position
	54		3230	2	277	345	363	outcrop?
	57		3213	2	276	360	335	check the position
13	6		3177	2	272	321	229	Crack north south strike
	11		3179	3	293	320	215	Cnidaria in crack
	15		3177	2	274	324	202	heading 270 degree, running
	22		3161	3	271	310	140	Crack
	24		3160	3	274	300	135	Cnidaria? tube worms?
	31		3160	3	294	300	135	get the mud by scoop, box(No.1)
	35		3159	2	274	300	130	heading 270 degree, running
	45		3123	3	278	294	-2	outcrop
	47		3110	3	277	280	-20	up the sharp slope
	52		3096	2	272	270	-50	many cracks
	59		3059	2	274	257	-106	three somethings square shaped
14	5		3056	1	272	240	-160	check the position
	9		3051	2	308	240	-200	discolored area comfirmed
14	21		3045	2	292	250	-240	Landing, get the mud by scoop
	23		3039	3	280	250	-250	head 280 degree
	36		3017	0	282	250	-320	check the position
	49		3012	3	302	240	-350	get the life into the No.3 canister

	51		3011	3	280			head 280 degree
15	7		3001	2	292	240	-400	get the mud & life by MT core
	20		2988	2	283	240	-510	check the position
	38		2978	3	313	220	-560	sampling the NISIKIN(green)
	46		2979	3	306	225	-572	sampling the MBARI(red)
	51		2972	3	299	220	-560	leave bottom

SHINKAI 6500 Dive #1078

Observer:Chiba (Toyama Maritime Tec. college)

Chief-pilot: Sasaki

Co-pilot: Saitoh

2008/6/5

Okushiri Ridge

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	30		3287	2	130	250	1250	Arrive the bottom, Mud
	40		3285	3	115	230	1256	Head 270 degree
	42		3283	4	271			Start running
	46		3290	5	269	230	1190	Sampling the NISKIN(blue)
	53		3290	2	258			Sampling the push core(blue)
	56		3290	-	258			Sampling the MBARI(black)
12	7		3290	1	258			Head 270 degree
	10		3291	3	270	230	1000	Check the position
	13		3286	4	280	230	900	Check the position
	16		3286	4	306	270	800	Check the position
	19		3292	4	306	320	720	Check the position
	26		3284	3	297	320	625	No.72 marker comfirmed
	42		3275	2	291	330	570	Check the position. Collision on bottom
	45		3270	2	291	370	480	Discolored area, microbial mat
	49		3251	3	291	390	396	Scale worms
	52		3237	2	290	406	376	Outcrop
	55		3229	3	290	414	367	Outcrop

	57		3221	3	290	420	350	Check the position
13	0		3205	2	290	435	320	Rolling boulder
	4		3187	2	285	430	260	Crack
	7		3186	3	334	425	250	Collision? Cloud of dust
	8		3187	3	334	471	257	Crack north south strike
	11		3187	3	308	418	252	Crack north south strike
	14		3182	2	292	421	243	Start running, head 290 degree
	20		3180	2	292	423	168	Rolling boulder
	24		3178	3	297	434	149	Discolored area
	26		3177	1	294	430	160	Discolored area, outcrop
	29		3167	3	270	435	140	Rolling boulder
	31		3161	3	271	428	114	Rolling boulders
	33		3155	1	273	442	73	Outcrop
	36		3155	1	296	440	70	Crack
	40		3149	7	61	435	61	head 60 degree
	45		3162	45	61	530	280	Check the position
	49		3191	100	61	630	480	Check the position
14	4		3297	1	311	680	490	Check the position
	6		3289	2	311	693	470	Scale worms
	8		3285	1	310	690	460	Check the position
	9		3283	1	310	716	446	Scale worms
	11		3281	2	310	733	430	Discolored area, Rolling boulder
	14		3277	2	310	760	400	Check the position
	19		3275	2	310	790	370	Check the position
	28		3253	2	310	810	330	head 310 degree

14	38		3233	3	290	850	300	crack
	40		3216	2	311	910	220	crack
	44		3218	3	322	900	222	stop,octopus legs
	57		3214	2	310	920	190	head 310 degree
15	1		3211	2	301	960	110	Check the position
	4		3215	3	260	1000	60	Head 260 degree
	7		3198	3	281	1004	-7	Outcrop
	10		3184	3	281	1010	-30	Check the position
	14		3166	2	279	1011	-80	Rolling boulder
	15		3160	4	281	1010	-90	Check the position

SHINKAI 6500 Dive #1079

Observer:Takeuchi (Univ. of Toyama)

2008/6/6

Chief-pilot: Ohno

Co-pilot: Ueki

page:1/2

Okushiri Ridge

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	30		3302	7	327	97	1220	Sampling the NISKIN (blue)
	34		3302	7	316	120	1250	Arrive the bottom,Mud
	37		3302	7	316	120	1250	Sampling the MBARI(yellow)
	40		3302	7	317	120	1250	Sampling the push core(yellow)
	44		3300	2	271	101	1215	Head 270 degree
	46		3300	2	270	92	1162	Body of squid
	49		3300	2	270	110	1090	Check the position
	54		3299	2	270	110	890	Check the position
	59		3300	1	266	110	780	white microbial mats
12	4		3298	1	269	105	744	fissure
	4	39	3294	2	270	100	731	slope
	7		3284	2	270	72	700	rock
	9		3279	3	269	80	700	Check the position
	11		3270		270	80	680	mudstone
12	12		3265		270	70	650	cliff
	14		3258	2	269	66	582	fissure
	17		3255	1	270	70	570	Check the position

	21		3263	3	269	70	440	fissure
	25		3267		270	60	300	dark colored patches
	25	20	3266	3	270	50	280	Check the position
	28		3258	3	269	48	238	microbial mats
	31		3251	2	269	44	199	black colored something
	31	51	3253	1				microbial mats
	33		3246	6	270	43	172	cliff,microbial mats,outcrop
	38	50	3221	1	270	50	100	Check the position
	45		3201	3	267	40	20	Mad stone or Microbial mat
	48	0	3195	2	269	50	0	Check the position
	50	28	3184	2	269	40	53	Mad stone or Microbial mat
	52	30	3169	2	269	40	-90	Check the position
	54	40	3161	2	267	40	-120	crack
	55	56	3155	6	266			Change the corce to head 80.Run to next point (X=200 Y=400)
13	3	41	3182	50	81	70	110	Check the position High speed sailing
	7	32	3200	71	81	70	300	Check the position. Running now
	11	4	3249	17	83	70	400	Stop running
	13	48	3261	3	32	76	407	Change the corce to head 40.
	17	23	3264	2	29	111	458	Identified crack
	21	38	3267	1	61	112	469	Out crop
	23	47	3266	2	32	121	478	Out crop

	27	30	3268	2	141	148	489	Rift
	32	32	3270	2	159	159	475	Microbial mats and Rift
	36	25	3263	2	149	150	480	Finish the watch of floor structure
	38		3258	3	6	105	494	Turn to north, start the running
13	42	47	3272	3	3	180	510	Check the position.
	28	4	3283	6	296	210	510	Water sampling Niskin (green)
	53	4	3283	4	296	209	597	Sampling tube(green) and MBARI core(red)
55	55	4	3283	4	296	209	597	Start running for Head 240 degree
	58		3281	3	241	188	449	Rift
	0	26	3283	2	240	170	440	Check the position.
	1	33	3283	1	240	139	411	Unidentified polychaeta
	5		3271	3	248	100	360	Check the position.
	6	50	3270	3	261	70	319	Head 260 degree
	9	31	3266	2	260	60	280	Check the position.

SHINKAI 6500 Dive #1080 **Observer:Johshima (AIST)** **2008/6/7**

Chief-pilot: Chida

Co-pilot: **page:1/2**

Okushiri Ridge **Chiba**

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	36		3286					Sampled water (NISKIN red)
	36		3286	1	158	-40	2280	Arrived at bottom, mud
	38		3286	1	158			Sampled mud (MBARI red). Got muddy.
	46		3286	2	128	-30	2298	Sampled mud (push core red)
	49		3284	2	270	-28	2306	Head 270 degree
	55		3279	2	272	-40	2140	Check the position
	57		3277	3	272	-40	2109	Something, scale worm?
	59		3277	2	272	-40	2040	Litter(plastic bag)
12	9		3285	2	272	-40	1840	Check the position
	13		3285	2	272	-40	1729	White small samothings
	14		3287	1	272	-40	1698	Black something, tube worm?
	17		3287	1	272	-40	1628	Scale worm?
	20		3286	1	272	-40	1570	Seaweed
	24		3283	4	272	-43	1439	Got muddy
	28		3282	1	272	-40	1334	Seaweed
	29		3282	2	272	-40	1330	Check the position
	39		3280	2	272	-50	1050	Check the position

	44		3277	1	274	-30	945	Seaweed
	45		3270	7	274	-30	940	Small discolored area
	48		3272	4	274	-31	871	slope
	50		3263	3	273	-20	860	Small microbial-mat
	56		3246	5	273	-30	720	Trace of sand blow, rolling boulder
13	0		3235	2	271	-19	633	Branch?
	3		3219	3	272	-24	577	Rolling boulders
	6		3209	3	273	-26	509	Rolling boulder
	8		3199	2	272	-24	443	Rolling boulders
	9		3197	3	273	-20	450	Outcrop
	12		3191	2	273	-26	351	go faster
	16		3182	3	273	-30	234	Check the position
	20		3172	5	273	-30	170	Rolling boulders
	22		3158	3	272	-20	90	Check the position
	26		3144	5	273	-30	0	Check the position
	34		3104	4	273	-30	-90	small outcrops
	38		3102	3	272	-50	-250	rolling boulders
	42		3078	3	273	-40	-320	rolling boulders
	45		3068	4	273	-47	-373	rolling pebbles
	48		3059	2	273	-60	-432	dark colored patches
	50		3057	2	273	-30	-460	fissures with dark colored

								patches
	54		3054	1	273	-36	-610	Check the position
	58		3039	7	273	-44	-679	Check the position
14	2		3029	4	273	-43	-765	mudstone outcrop
	4		3011	4	273	-34	-837	sand blow
14	5	42	3004	4	273	-35	-875	Outcrop
	11		2990	5	273	-43	-1009	Rolling boulder, outcrop
	12		2985	6	273	-44	-1029	Rolling boulder
	14		2973	4	273	-41	-1078	Outcrop
	17		2960	4	273	-39	-1165	Rolling boulder, outcrop
	19		2950	6	273	-40	-1200	Check the position
	21		2944	3	273	-34	-1246	Rolling boulder, outcrop
	22		2943	2	273	-62	-1274	Outcrop
	25		2931	3	273	-43	-1317	Rolling boulders
	26		2922	3	273	-50	-1346	Rolling boulder

SHINKAI 6500 Dive #1081

Observer:Miwa (JAMSTEC)

Chief-pilot: Sasaki

Okushiri Ridge

Co-pilot: Saitoh

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	15		2634	2	14	677	722	Sampled water (Niskin green)
	19		2637	2	331	680	720	Arrived at bottom, mud
	26		2637	3	332	670	720	Sampled mud (MBARI yellow)
	36		2637	3	270	660	680	go ahead to 270 degree with using slarp gun (canister 1)
	40		2625	2	271	650	640	Check the position
	45		2623	2	4	643	594	Head north, start running
	48		2622	2	338	670	590	Mud stone outcrop
	50		2622	0	313	699	588	Mud stone outcrop, rolling boulder
	53		2622	3	69	691	591	Rolling boulder
	54		2623	2	34	700	590	Event mark No.1? Search the north side
12	1		2623	2	315	730	610	Observe the object like a chimney. Rolling boulder, check the position
	5		2621	2	323	721	582	Fissure
	8		2623	1	27	760	590	Check the position
	10		2624	2	337	790	620	Check the position
	13		2622	2	335	810	610	Check the position
	16		268	2	270	850	580	Check the position, driftwood

	19		2618	2	267	820	530	Check the position, rolling boulder, small fissure?
	24		2621	2	276	783	443	Fissure north south strike
	25		2621	3	275	790	440	Check the position
	27		2624	1	265	773	403	Rolling boulder
	30		2623	2	301	756	386	Artificial object
	32		2620	2	285	750	380	Chain drop? Check the position
	37		2622	2	1	780	360	Check the position, rolling boulder
	40		2622	3	350	790	965	Rolling boulder?
	43		2622	3	0	797	359	Fissures?
	45		2623	1	4	810	360	Check the position
	49		2623	3	180	843	367	Head south
	52		2622	1	196	800	370	Check the position
	54		2618	4	277	769	376	Head West
	57		2618	3	276	770	380	Check the position outcrop of mudstone
13	1		6203	1	286	750	290	fissure east west strike
	3		2601	1	293	767	241	outcroop
	5		2596	2	293	770	230	check the position, Upwaed slope
	7		2507	2	296	770	200	Check the position, outcrop
	10		2584	3	300	797	153	outcroop
	11		2574	2	301	800	150	Bivalve?
	14		2566	2	306	811	118	Head West
	15		2563	2	305	825	102	Head north
	19		2563	2	24	880	110	Check the position
	22		2573	2	188	903	131	running along Depth 2571m contour line

	25		2571	3	187	860	130	Check the position, outcrop of mud stone
	27		2572	3	221	830	130	Check the position
13	32		2572	3	315	290	120	Hole a
	40		2569	1	327	799	106	Observe the hole
14	3		2569	3	340	790	110	Sampled water from the hole (Bag4,NISKIN red)
	8		2569	3	341	790	120	set the marker74 near the hole
	14		2569	3	341	800	120	Small pectens
	21		2568	3	240	790	120	head 240 degree
	27		2538	5	243	720	50	check the position
	32		2514	2	241	630	-50	check the position
	42		2498	3	242	550	-130	check the position
	47		2496	1	237	500	-190	check the position
	52		2483	3	260	450	-230	check the position
	57		2478	2	328	440	-290	check the position
15	0		2477	2	260	460	-310	head 240 degree
	8		2471	2	277	440	-360	check the position
	22		2454	2	260	390	-530	got the scale worm into No.4 canister
	30		2447	3	260	360	-610	check the position
	36		2439	0	260	330	-670	changed canister No.5
	42		2438	2	270	300	-750	changed canister No.6
	49		2433	2	271	290	-800	stopped moving
16	0		2433	2	279	290	-830	sampled mud(MT core,MBARI red)
	2		2432	2	279	290	-830	leave the bottom

SHINKAI 6500 Dive #1082

Observer:Takeuchi (Univ. of Toyama)

2008/6/9

Chief-pilot: Chida

Co-pilot:

Okushiri Ridge

Ueki

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	31		3509	2	152	1044	-1400	Sampled water (NISIKIN blue)
	34		3511	2	147	1010	-1400	Arrived at bottom, mud
	40		3511	5	117	1050	-1400	Sampled mud (MBARI yellow, short blue)
	43		3511	5	120	1050	-1400	Head toward 120 degree
	48		3509	3	122	1020	-1320	Check the position
	53		3512	7	122	1000	-1280	Check the position
	59	3	3507	3	123	950	-1200	Check the position
12	3		3499	3	122	950	-1157	dome
	8		3495	1	123	930	-1100	Check the position
	14		3492	9	122	880	-1030	Check the position
	19		3487	3	122	860	-970	white colored something
	21		3481	4	123	850	-960	Check the position
	26		3469	6	123	837	-875	outcrop of mudstone
	29		3470	1	123	835	-843	dark colored area
	30	49	3469	1	123	820	-820	Check the position
	35		3463	1	130	800	-770	Check the position, outcrop
	37		3460	1	153	780	-750	Head toward 150 degree
	40		3454	2	150	730	-720	fissure
	44		3446	2	150	693	-710	sea animals?
	47		3440	2	149	680	-710	check the position

	49		3436	2	130	656	-675	Head toward 130 degree
	50		3437	2	130	652	-665	fissure
	53		3430	1	128	640	-640	check the position
13	0		3420	3	129	550	-550	Check the position
	4		3416	3	142	540	-510	rolling boulders
	10		3413	1	122	520	-490	check the position
	15		3405	4	56	482	-405	artificial object?
	21		3394	5	123	470	-370	Check the position
	27		3377	2	127	389	-256	fissure
	29		3374	4	72	403	-237	rolling boulders
	31		3377	2	105	411	-238	rolling boulders
	32		3376	2	65	419	-227	Fissure, rolling boulders
	35		3375	2	103	429	-209	Outcrop of mudstone
	36		3373	3	124	430	-194	Outcrop of mudstone
	37		3371	3	117	430	-200	Check the position
	39		3368	2	123	410	-167	Fissure
	40		3365	3	122	400	-159	fissures
	41		3363	4	121	400	-150	Check the position
	44		3361	2	141	322	-81	Head toward 140 degree
	47		3357	5	141	300	-60	Check the position
	51		3361	2	146	220	0	Check the position
	54		3362	1	171	192	17	Sampled water (NISIKIN red)
13	57		3364	-	154	170	20	Arrived at the bottom. Scale worm?
	59							Sampled mud(MBARI red)
14	0							Sampled mud(short green)
	3							Set the marker #75

	7		3363	1	122	169	40	Head toward 120 degree, start running
	15		3362	2	122	70	230	Check the position
	16		3359	3	130	56	258	Head toward 130 degree
	24		3356	1	132	-50	410	Check the position
	30		3339	2	131	-130	530	Check the position
	41		3332	2	132	-250	700	Check the position
	50		3326	2	132	-380	890	Check the position
	52		3324	1	100	-450	960	Head toward 100 degree
	56		3322	3	111	-460	1047	Rolling boulders
15	0		3318	2	102	-449	1117	Rolling boulders
	1		3315	1	102	-450	1140	Check the position
	5		3308	3	102	-458	1238	Outcrop of mudstone
	10		3295	2	104	-460	1330	Check the position, Outcrop of mudstone
	15		3289	2	24	-432	1394	Many outcrop of mudstone
	22		3287	1	212	-370	1430	Check the position
	25		3266	2	101	-400	1437	Head toward 100 degree, start running
	30		3282	2	102	-410	1500	Check the position

SHINKAI 6500 Dive #1083

Observer:Chiba (Toyama Maritime Tec. College)

Chief-pilot: Ohno

Co-pilot: Chiba

2008/6/11

Shiribeshi Traf

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	22							Sampled water (NISKIN blue)
	24		3144	3	118	1630	-6	Arrived at bottom, mud
	30		3144	3	119	1650	0	Sampled mud (MBARI black, short green)
	37		3143	0	118	1650	-6	Sampled rock (Box1)
	42		3143	3	119			Rolling boulders, finish observation
	43		3142	2	118	1631	13	Head toward 120 degree
	45		3139	2	126	1630	50	Rolling boulders, gradual slope
	48		3138	3	123	1612	76	Dark colored area, yellow colored sediment
	49		3138	3	119	1608	85	Rocks, pecten
	52		3137	2	105	1600	80	Opistobranchia gen. et sp.
12	0				102	1600	80	Sampled the life by scoop (Box4)
	4		3134	2	122	1593	86	Head toward 120 degree
	8		3125	1	122	1550	200	Check the position, rolling boulder

	10		3122	1	91	1550	200	Head toward 90 degree
	14		3116	2	91	1505	331	Rolling boulders
	15		3111	4	91	1510	340	Check the position
	16		3109	2	90	1508	376	Rolling boulder
	18		3106	2	91	1509	404	Rolling boulders
	20		3097	3	91	1520	470	Check the position
	23	9	3093	2	89	1519	535	Outcrop
	23	23	3092	2	83	1519	543	Outcrop
	25		3089	2	93	1516	565	Outcrop of mudstone
	27		3084	2	93	1519	600	Outcrops
	29	21	3077	1	91	1532	658	Dark colored area
	29	53	3074	1	91	1530	660	Check the position
	32		3066	2	91	1549	761	Rolling boulders
	34		3058	2	91	1559	839	Rolling boulders
	37		3049	2	91	1550	910	Check the position
	41		3034	22	261	1570	890	Head toward 260 degree, back to point(x=1300, y=100)
	48		3068	14	251	1510	530	Check the position
	51		3105	4	240	1450	410	Check the position, outcrop
	54		3112	6	239	1400	280	Check the position
	56		3125	5	239	1350	210	Check the position

	59		3133	5	239	1300	100	Check the position
13	1		3141	1	152	1289	68	Head toward 150 degree
	2		3140	2	152	1274	86	Seaweed? Rolling boulders
	3		3140	1	151	1254	79	Rolling boulder
	5		3138	1	151	1214	97	Rolling boulders
	6		3138	1	151	1199	114	White something, rock?
	8		3135	2	152	1169	137	Rolling boulders
	10		3130	2	151	1140	160	Check the position
	12		3122	1	151	1091	197	Rolling boulders
13	18		3102	2	151	958	265	Rolling boulders
	20		3095	1	151	930	290	Check the position
	30		3070	1	152	730	400	Check the position, rolling boulder
	40		3042	1	141	520	580	Check the position
	41		3037	2	142	512	615	Outcrops
	43		3031	2	142	492	638	Outcrops
	44		3022	2	141	467	654	Outcrops
	50		2987	1	141	400	720	Check the position
	51		2982	2	141	393	733	Outcrop
	55		2952	2	142	330	790	Check the position

SHINKAI 6500 Dive #1084

Observer:Nemoto (Shin-Enoshima Aqu.)

2008/6/12

Chief-pilot: Sasaki

Co-pilot: Saitoh

Shiribeshi Trough

Time(LCL) hh|mm|ss			Dep. (m)	Alt. (m)	Head (Deg)	Pos. Xm	Pos. Ym	Observation
11	12	29	2213	2	55	161	-1900	Chinoecetes japonicus
	14	26	2212	1	102	173	-1913	Chinoecetes japonicus
	15	27	2211	1	104	167	-1912	Sea anemone on the rock
	16		2212	1	103	160	1910	Arrived at bottom
	23	7	2211		47	170	-1911	Squid
	39		2200	1	190	190	-1880	Sea anemone
	47		2200	1	182	195	-1900	Got the crab into No.5 canister
	52		2191	9	156	190	-1880	Head toward 90 degree
11	57		2179	8	92	205	-1836	check the position
11	59		2156	2	97	200	-1780	rolling boulders
12	2		2138	9	117	213	-1740	rolling boulders
	5	44	2133	2	96	219	-1717	crab
	9		2110	2	97	220	-1580	check the position
	14		2075	3	115	218	-1482	rolling boulders crab
	18		2063	2	124	200	-1426	Sampled water (NISKIN green)
	22		2063	2	157	203	-1427	Sampled mud (MBARI yellow)
	30		2018	5	126	160	-1370	check the position
	32		2005	4	127	157	-1360	crab
	41		1937	4	127	100	-1230	check the position
	45		1916	4	172	90	-1180	check the position
	52		1908	3	129	75	-1160	sampled a fish Zoarcidae gen.et sp.

	57		1893	3	143	14	-1128	check the position
13	0	44	1832	2	175	3	-1100	check the position
	2	59	1891	1	104	0	-1100	Head toward 90 degree
	9		1900	2	112	0	-940	check the position
	12	18	1888	3	113	-23	-842	Litter
	13		1884	2	105	-31	-819	Two crabs (*Chinoecetes japonicus*)
	15	39	1890	3	97	-40	-760	Check the position
	17		1882	2	99	-30	-735	branch, fish Zoarcidae gen.et sp.
	19	16	1869	2	99	-25	-700	Two crabs (*Chinoecetes japonicus*)
	19	52	1866	3	99	-27	-685	Two crabs be internecine
	21	20	1860	3	94	-10	-660	Check the position
	24	54	1860	1	91	-19	-510	Crab
	29	12	1846	1	91	-9	-397	Black something and jellyfish?
	30		1844	4	91	-10	-390	Check the position
	31	35	1838	3	91	-4	-349	White something
	33	50	1828	2	91	2	-291	Rock, fish
	35		1823	0	91	10	-240	Check the position. Crab
	37	30	1814	2	91	21	-188	Crab
	39	49	1804	2	92	28	-137	Three fish Zoarcidae gen.et sp.
	40		1800	3	91	40	-120	Check the position
	41	25	1795	2	89	29	-98	Outcrop, rolling boulder
13	47	31	1767	3	96	10	40	Check the position. Rock
	50	17	1752	3	96	20	190	Crab, Check the position.
	54	26	1742	2	105	22	223	Cloud of dust
	56		1739	3	105	25	229	Small black something, fish?
	57	5	1736	2	125	26	238	Crab
	58	58	1733	2	155	22	246	Rolling boulder, crab

14	0	28	1733	2	171	14	251	Zoarcidae gen.et sp.
	2	17	1732	2	155	6	250	Two fish Zoarcidae gen.et sp.
	3	50	1732	2	155	1	249	Small something, shrimp?
	6		1729	2	168	-13	261	Got two fish(Zoarcidae gen.et sp.) and a shrimp into No.3 canister
	7	30	1728	3	158	10	250	Check the position
	9		1719	2	92	-26	279	cliff, crab
	11	33	1710	3	92	-21	316	Rock
	13	29	1697	1	92	-21	367	White something, artificial object?
	15	32	1683	2	92	-20	410	Check the position
	16	21	1675	4	92	-23	421	Outcrops
	17	15	1668	3	92	-27	449	Slope be sharply, crabs
	18	30	1660	3	88	-35	465	Boulders
	19		1655	6	94	-32	460	Fish? Dumpling fish?
	19	58	1653	7	98	-36	466	Zoarcidae gen.et sp.
	22	0	1642	3	90	-40	470	Check the position. Outcrop, white fish
	24	49	1642	4	68	-35	468	White something, purple something
	29	25	1641	4	94			Red shrimp
	29	48						Got two lives into No.3 canister
	30					-40	470	Check the position
	32	7	1633	3	108	-45	496	Wood
	33		1613	3	122			Head toward 110 degree, start running
	35	36	1605	5				Massive mudstone
	36		1605	5	140	-64	534	Conglomerate
	38		1599	3	144	-74	527	Fish, Liparis sp.
	41		1577	3	140	-70	530	Got the Liparis sp. into No.3 canister

	56		1483	2	121	-140	670	Arrived at bottom
	57		1478	1	91	-150	670	Sampled water (NISKIN red)
15	5	57	1473	2	168	-131	681	Red shrimp
	6	40	1473	3	148	-134	674	Chinoecetes japonicus
	9	7	1473	4	137	-134	680	Sampled mud (MBARI red)
	12		1468	2	137	-133	682	Head toward 135 degree, start running
	15	15	1454	3	118	-150	700	Mudstone, white lives
	21	40	1426	2	127	-155	740	Jellyfish
	24	33	1420	2	101	-167	766	Mudstone, Cloud of dust
	33		1420	2	110	-170	770	Sampled two rocks into No.1 box
	36		1418	2	142	-162	770	Fish, Liparis sp.?

Data List

In this cruise we collected data as bellow:

1. Topography map of survey area was formatted and saved as **.grd (in GRD file and PostScript file).
2. Route map of each dive was saved as Dive#(dive number)_(dive date) respectively with CTD of the dive area (in text file and excel file). The event in the dive was recorded in LIST file in the folder.
3. Submersible photos of this cruise:
   Camera photos were saved in *.jpg file respectively.
4. Gravity and magnetics data were named as *SOJ and SOQ* respectively into saved in the *SOJQ_Data* folder.
5. Snap shots: Interesting photos taken by the researchers onboard were collected and saved in the *Camera_Photo* folder.
6. Onboard quick reports by the researchers were saved in the *Cruise_Report* folder.
7. Metadata sheets.
8. Related past dive map was saved in the folder *Past Dive_Map* which include Shinkai6500 dive #265 , #266, #278 , #279.
9. Photos of core samples was saved in the folder *Chemical Sample*.
10. DAI-PACKdata was saved in the *DAI-PACKdata* folder.
11. Digest Video of each dive was saved in the *Digest Video* folder.
12. The other related documents of this cruise were saved in the *H20 日本海よこすか* folder.
13. The description of the dive while the dive was saved in the DiveLog_YK0807 file.
14. Video of the ten dives were recorded in both DVD and High Vision Tape respectively.

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