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KR12-01 Cruise Report

Diving research using ROV *Kaiko 7000II* at the Nansei Shoto Trench

Jan. 07, 2012-Jan. 21,2012

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

Contents

Abstract

Large accumulations of organic materials on the deep-sea bottom (such as plants and wood remains or carcasses of large marine mammals) produce reducing environments and create biodiversity hotspots and habitats sustaining specific organisms (Smith & Baco 2003, Smith 2006). Such reducing environments are thought to be important for dispersal of organisms inhabiting earth-driven reducing environments such as hydrothermal vents and hydrocarbon seeps as well as for evolution of these animals, especially chemo-symbiotic invertebrates (Smith et al., 1989; Distel et al., 2000; Fujiwara et al., 2010; Shinozaki et al., 2010). However, understanding of biological communities surrounding the biogenic reducing substrates is quite limited because of its rareness of discovery in deep sea.

Therefore, we have deployed some biogenic substrates including terrestrial plants, whale vertebrae and land animal bones at 6 depths in the Nansei Shoto Trench in 2008 using the ROV *Hyper-Dolphin* and R/V *Natsushima* for understanding of biodiversity, succession and food-web structures. We have also deployed a mid-water mooring system for testing a hypothesis of larval dispersal in the deep sea in 2010 using R/V *Natsushima*.

During the KR12-01 cruise, 9 ROV dives were conducted using ROV *Kaiko 7000II* at depths of 500m, 1,001m, 2,997m and 4,964m and the mooring system was retrieved using R/V *Kairei*. A new morphotype of *Osedax* polychaetes and fungal ascomata were discovered from a bone and a wood log, respectively at a depth of 500m. A large shark devouring fresh whale vertebrae was recorded using a time-lapse video camera at the same depth. No invertebrate endemic to reducing environments was found from the biogenic substrates deployed at depths from 1,000m to 4,964m. Additionally, two possible new species of vesicomyid clams were discovered from seeps and xenophyophores were collected from soft sediments in the 5,000m site. The mooring experiments showed no evidence to test the hypothesis of larval dispersal.

1 Participants aboard

・Chief scientist: Yoshihiro FUJIWARA [JAMSTEC]

・Representative of the science party [Affiliation]: Florence PRADILLON [JAMSTEC]

Yoshihisa SHIRAYAMA [JAMSTEC]

・Onboard scientists

Masaru Kawato [JAMSTEC]

Norio Miyamoto [JAMSTEC]

Masashi Tsuchiya [JAMSTEC]

Atsushi Nagahori [JAMSTEC]

Ayami Ikenobe [JAMSTEC]

Atsushi Nishimoto [Kyoto University]

Masahiro Suzuki [Toho University]

Masahiro Ichimura [Toho University]

Ryuta Yoshida [University of the Ryukyus]

Daisuke Uyeno [University of the Ryukyus]

Kentaro Amemiya [Tokyo Sea Life Park]

Ryousuke Komi [Tokyo Sea Life Park]

Takuya Onodera [Nippon Marine Enterprises]

2. Proposals

This proposal is part of a long-term study focused on the effect of depth on colonization and degradation processes of biogenic substrates. The general goal is to gain information on the colonization and time persistence of substrates, and how these processes may vary with depth. We aim at describing general patterns of species diversity and identifying depth distribution range of species that are more specifically involved in substrate degradation (Osedax worms for bones, wood-boring bivalves for wood) or that are associated with chemo-autotrophic symbionts using sulfide from substrate degradation. We also measure persistence time-interval of each substrate on the seafloor and evaluate the role of the colonizers in the degradation processes.

3. Dive survey results

3-1. Dive list

Dive # Date	Main purposes	Site	Landing Leaving bottom	Latitude (N)	Longitude (E)	Depth (m)
#528	Deployment of time-lapse	500m site2,3	12:47	24-45.0565′N	125-45.0191′E	497
2012/1/12	camera, retrieval of cow bones		15:50	24-45.0029′N	125-45.0495′E	501
#529	Retrieval of whale bone, TP & KC,	3000m site	10:33	24-50.1501′N	126-08.0910′E	2,978
2012/1/13	sediment sampling		13:42	24-50.1501′N	126-08.0910′E	2,978
#530	Retrieval of whale bone & KC,	5000m site	10:37	24-54.5337′N	126-21.7625′E	5,017
2012/1/14	sediment sampling		13:39	24-54.5586′N	126-21.7271′E	4,963
#531	Retrieval of whale bone & KC,	2000m site	10:08	24-31.3130′N	126-09.9134′E	1,988
2012/1/15	sediment sampling		14:36	24-31.3578′N	126-09.8199′E	1,977
#532	Retrieval of time-laplse camera	500m site3	8:50	24-45.0670′N	125-44.9888′E	496
2012/1/16			9:27	24-45.0577′N	125-45.0163′E	498
#533	Retrieval of KC, TP, cow & pig	1000m site	9:39	24-54.3199′N	125-21.5311′E	1,002
2012/1/17	bones, sediment & biological		15:00	24-45.0577′N	125-45.0163′E	994
#534	Sampling of foraminifera &	5000m site	10:28	23-54.3199′N	126-21.5311′E	4,916
2012/1/18	vesicomyids		13:45	23-54.4448′N	126-21.6250′E	4,927
#535	Retrieval of whale bone, sediment	1000m site	9:39	24-35.0246′N	125-45.5509′E	1,003
2012/1/19	and biological sampling		15:08	24-35.1613′N	125-45.5845′E	1,001
#536	Retrieval of TP, observation of	500m site1&3	9:29	22-44.9806N	125-45.0029E	500
2012/1/20	whale bones, biological sampling		14:56	24-44.9780N	125-45.0547E	503

3-2. Preliminary results (each researcher in charge)

Preliminary Results of the ROV Kaiko 7000II Dive #528

Date: January 12, 2012

Site: 500m site2 & site3 in Nansei Shoto Trench

Landing: Time: 12:47, Lat: 24 ° 45.0625 ' N, Long: 125 ° 45.0140 ' E, Depth: 496 m (WGS84)

Leaving: Time: 15:49, Lat: 24°45.0029 ' N, Long: 125°45.0945 ' E, Depth: 501m (WGS84)

Chief observer: Yoshihiro FUJIWARA (JAMSTEC)

Main purpose: Deployment of a time-lapse camera system at the front of whale vertebrae

Payload equipments:

1. Time-lapse video camera system	1
2. Suction sampler & single canister	1
3. Large sample box	1
4. KC canister	2
5. DO meter	1
6. REDOX meter	1

Dive summary

Three vertebrae of a Baird's beaked whale with 1000 kg of sinkers were deployed at a depth of 497 m by free fall directly from R/V *Kairei* just before this dive. A time-lapse video camera system was deployed about 3 meters away from the bones. One cow bone frame (deployed in 2010) and two KCs (deployed in 2009 and 2010) were retrieved at site 2. Many *Osedax* polychaetes and small mytilids inhabited the cow bones.

Preliminary Results of the ROV Kaiko 7000II Dive #529

Date: January 13, 2012

Site: 3000m site in Nansei Shoto Trench

Landing: Time: 10:33, Lat: 23 ° 50.1501 ' N, Long: 126 ° 08.0910 ' E, Depth: 2978 m (WGS84)

Leaving: Time: 13:42, Lat: 23°50.1501 ' N, Long: 126°08.0910 ' E, Depth: 2978m (WGS84)

Chief observer: Masaru KAWATO (JAMSTEC)

Main purpose: Retrieval of a whale vertebra and TP

Payload equipments:

1. KC	3
2. Suction sampler & single canister	1
3. Large sample box	1

4. Sample bag 1
5. DO meter 1
6. MBARI cores (small) 3

Dive summary

Three KCs (KC13, KC15 and KC17) were deployed at a depth of 2978m in front of wood logs and TPs deployed in 2008. One TP (TP14; deployed in 2008) was retrieved. MBARI core sampling was done just under the TP14. One whale vertebra (B09) was retrieved in the large sample box. MBARI core sampling was done just under the B09. A sponge was collected. MBARI core sampling as control was done about 5 meters away from deployments. Small gastropods were collected just under the whale vertebra using suction sampler. No whale-fall endemic species such as *Osedax* polychaetes were observed on the surface of the whale bone B09.

Preliminary results of the ROV Kaiko7000II Dive #530

Date: January 14, 2012

Site: 5000m site in the Nansei Shoto Trench

Depth: 4863-5017m

***Landing* (Lat., Long., Time, Depth):** 23°54.5243'N, 126°21.7625'E, 10:37, 5017m

***Leaving* (Lat., Long., Time, Depth):** 23°54.5586N, 126°21.7271'E, 13:39, 4963m

Chief observer: Masashi Tsuchiya (JAMSTEC)

Purpose:

1) Observation and retrieval of whale bones deployed during NT08-12
2) Observation of TP deployed during NT08-12
2) Observation and retrieval of KC deployed during YK09-04

Payload equipment:

Large sampling box, sampling bag, canister for KC, MBARI corer (regular), MBARI corer (large), Suction sampler & single canister, DO meter, Cutter

Dive summary

One whalebone (B05: deployed in 2008) and one Kyoto cedar (KC73: deployed in 2009) were retrieved at 23°54.5723'N, 126°21.7309'E (4974m) and 23°54.5586'N, 126°21.7271'E (4964m) respectively. MBARI cores were retrieved just under the whalebone (MBARI-White) and from 1 m away from KC as a control (MBARI-Red). Munidopsis, Gastropods and polychaetes inhabited on/around the whalebones.

Preliminary Results of the ROV Kaiko 7000II Dive #531

Date: January 15, 2012

Site: 2000m site in Nansei Shoto Trench

Landing: Time: 10:08, Lat: 24 ° 31.3130 ' N, Long: 126 ° 09.9134 ' E, Depth: 1988 m (WGS84)

Leaving: Time: 14:36, Lat: 24°31.3578 ' N, Long: 126°49.8199 ' E, Depth: 1977m (WGS84)

Chief observer: Kentaro AMEMIYA (Tokyo Sea Life Park)

Main purpose: Recover of Chemicoli, deploy of KC and sampling of sediments by MBARI core.

Payload equipments:

1. KC	3
2. Large sample box	1
3. Bag	1
4. MBARI	3
5. Suction sampler	1
6. DO meter	1

Dive summary

Three KC were deployed at the site. Three chemicoli (deployed in 2010) were retrieved from the site. One of vertebrae of a Baird's beaked whale (B-14, deployed in 2010) was retrieved from the site. A sediment was sampled under B-14 and 2.5m away from the whale bones by MBARI core sampler.

<u>Preliminary results of the ROV Kaiko7000II Dive #532</u>

Date: January 16, 2012

Site: 500m site in the Nansei Shoto Trench

Depth: 495-498m

***Landing* (Lat., Long., Time, Depth):** 24°45.0670 ' N, 125°44.9888 ' E, 8:50, 495m

***Leaving* (Lat., Long., Time, Depth):** 24°45.0577 ' N, 125°45.0163 ' E, 9:26, 498m

Chief observer: Norio Miyamoto (JAMSTEC)

Purpose:

1) Observation of whale bones deployed during this cruise

2) Retrieval of a time-lapse camera deployed during 7K#528

Payload equipment:

Large sampling box, sampling bag, canister for KC, Suction sampler & single canister, DO meter, Redox sensor

Dive summary

The purposes of the Kaiko 7000II #532 dive were to investigate the colonization of organisms on biogenic substrates and to reveal the earliest scavengers of whole bones

set on a sea floor. The dive was planned to 1) collect some kinds of woods deployed in a few years ago and 2) retrieve the camera system deployed in the #528 dive. Because a weather forecast said that the sea condition of the dive area would be bad, we only retrieved the camera system and left the bottom.

Preliminary results of the ROV Kaiko7000II Dive #533

Date: January 17, 2012

Site: 1000m site in the Nansei Shoto Trench

Depth: 994-1,002 24°35.0159N, 125°45.5217E

Landing **(Lat., Long., Time, Depth):** 24°35.0159'N, 125°45.5217'E, 9:39, 1,002m

Leaving **(Lat., Long., Time, Depth):** 15:00, 995m

Chief observer: Atsushi Nishimoto (Kyoto University)

Purpose:

1) Observation of whale bone deployed during NT08-12
2) Observation and retrieval of cow & pig bones deployed during NT10-07
3) Observation and retrieval of TP deployed during NT08-12
4) Observation and retrieval of KC deployed during NT10-07

Payload equipment:

Large sampling box, sampling bag, canister for KC, Suction sampler & single canister, DO meter, Redox sensor, MBARI corer (regular)

Dive summary

A set of cow & pig bones (FL05: deployed in 2010), a set of oak & coconuts (TP07: deployed in 2008) and one cedar (KC09: deployed in 2010) were retrieved at 1,000m site (24°35.0061'N, 125°45.5008'E (1,002m)). MBARI cores were retrieved just under the whale bone (B11: deployed in 2008) (MBARI-Red) and 1 m away from the whale bone as a control (MBARI-Green). After these operations, we carried out background fauna sampling. One natural wood sample was also retrieved at 24°35.2398'N, 125°45.5407'E(998m)

Preliminary results of the ROV Kaiko7000II Dive #534

Date: January 18, 2012

Site: 5,000 m site in the Nansei Shoto Trench

Depth: 4893-4927 m

Landing **(Lat., Long., Time, Depth):** 23°54.3199N, 126°21.5311E, 10:28, 4,916 m

Leaving **(Lat., Long., Time, Depth):** 23°54.4452N, 126°21.6481E, 13:45, 4,927 m

Chief observer: Daisuke Uyeno (University of the Ryukyus)

Purpose:

1) Sampling of xenophyophore

2) Sampling of vesicomyid clams

***Payload equipment*:**

Large sampling box, retainer for KC, MBARI corer, marker, suction sampler & single canister, "Kumade" sampler, DO meter

Dive summary

The Dive #534 was conducted to search and collect xenophyophores and vesicomyid clams from the site around 5,000 m depth. During this survey, the colonized xenophyophores and vesicomyids were observed and were collected by the MBARI cores and the suction sampler. The obtained specimens will be provided to further research.

Preliminary Results of the ROV Kaiko 7000II Dive #535

Date: January 19, 2012

Site: 1000m site in Nansei Shoto Trench

Landing: Time: 9:39, Lat: 24°35.0246 N, Long: 125°45.5509 E, Depth: 1003m

Leaving: Time: 15:08, Lat:24°35.1613N, Long:125 °45.5845E, Depth: 1001m

Chief observer: Ryousuke Komi (TOKYO SEA LIFE PARK)

Main purpose: One whalebone (B08: deployed in 2008) were retrieved. And deep sea creatures were observated and collected while navigating.

Payload equipments:

1. Large sample box 1
2. KC canister 2
3. MBARIcore(small) 3
4. Suction sampler & single canister 1
5. DO meter 1
6. REDOX meter 1

Dive summary

One whalebone was retreated at 24°35.0137'N, 125°45.4988'E (1001m). MBARI core was retrieved just under the whalebone (MBARI-Red). Then deep sea creatures were observed and collected appropriately while navigating and observing a sea floor.
Zoantharia sp., Crinoidea sp.and Hexactinellida sp. were collected by Manipulato. A kind of jellyfish and Megalodicopia hians were collected by MABRI core. Then Notacanthidae sp., Macrouridae sp., Galatheidae sp. were collected by Suction sampler.

Preliminary results of the ROV Kaiko7000II Dive #536

***Date*: January 20, 2012**

***Site*: 500m site in the Nansei Shoto Trench**

***Depth*: 497-500m**

***Landing* (Lat., Long., Time, Depth): 24°44.9805 ' N, 125°45.0029 ' E, 9:29, 500m**

***Leaving* (Lat., Long., Time, Depth): 24°44.9780 ' N, 125°45.057 ' E, 14:57, 497m**

***Chief observer*: Atsushi Nagahori (JAMSTEC)**

***Purpose*:**

1) Observation of wood log and TP deployed during NT08-12

2) Observation of whale bones deployed during this cruise and biological sampling

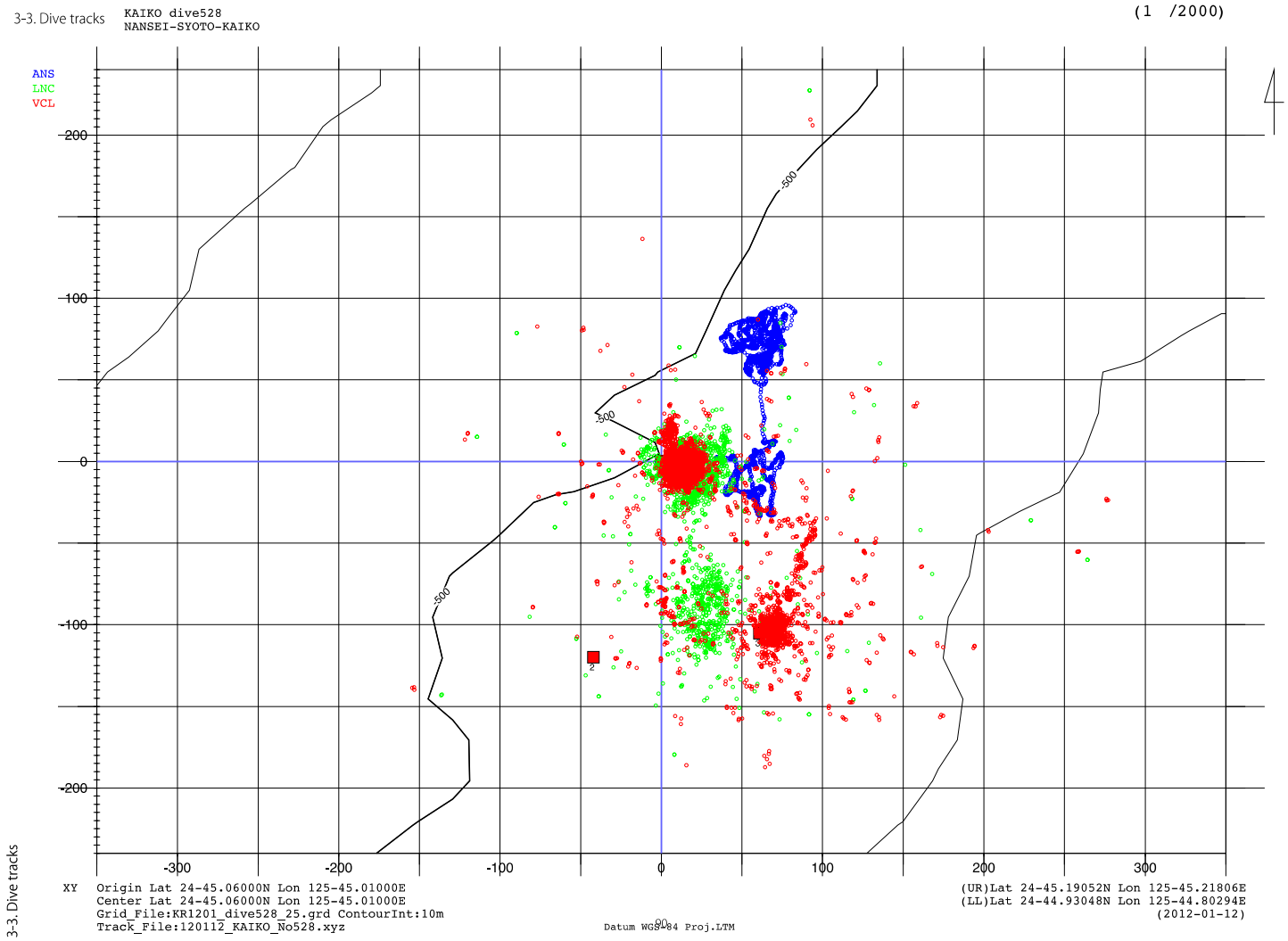
***Payload equipment*:**

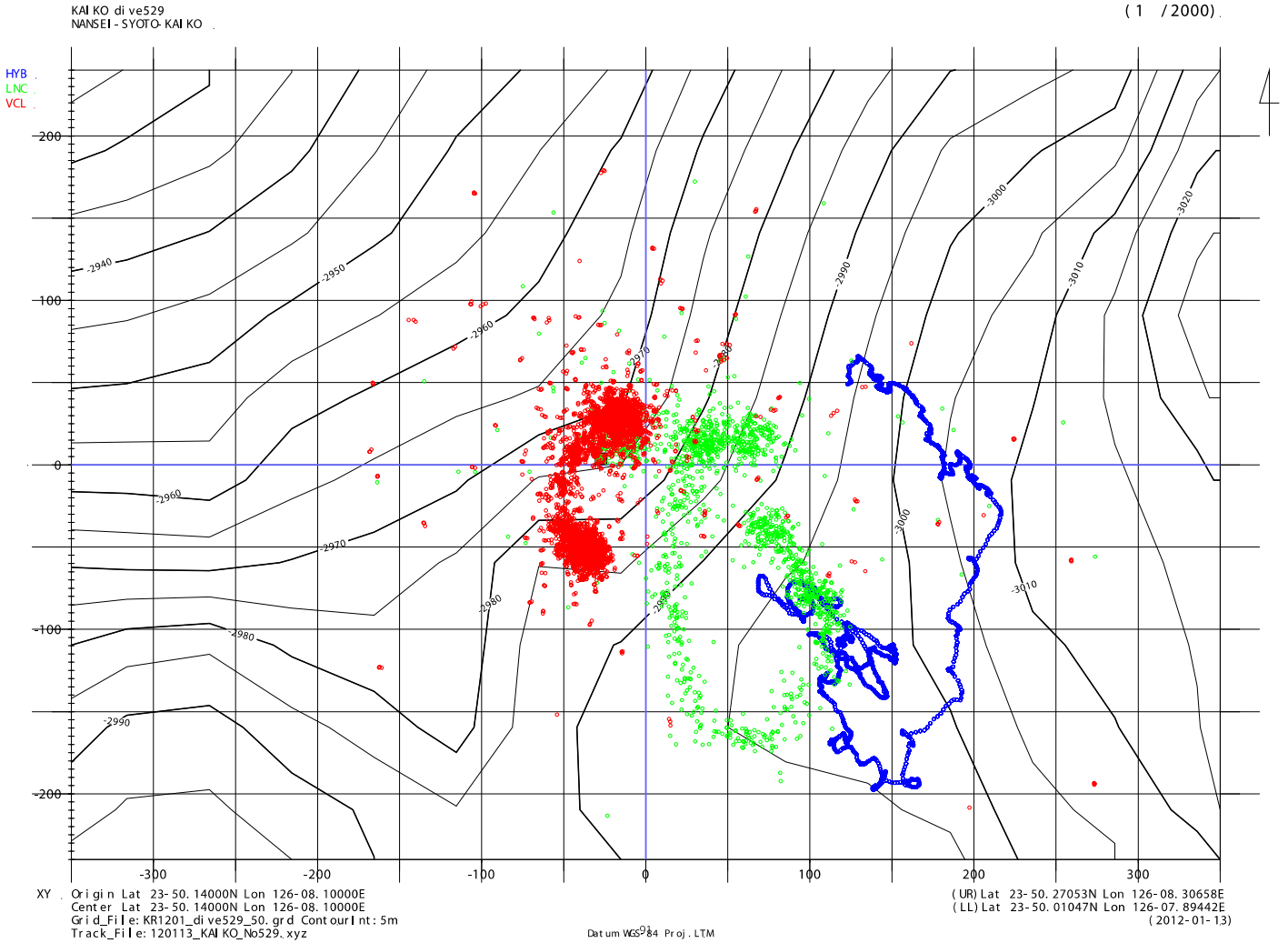
Large sampling box, retainer of KC, suction sampler and single canister, DO meter, REODOX sensor, marker

Dive summary

TP06 set in 2008 at 24°44.995 ' N, 125°44.985 ' E (500m) was retrieved. Three whale bones with 1000kg of sinker deployed were observed at 24°45.0593 ' N, 125°45.0244 ' E (497m). Maker buoy was set on the sinker. Paguridaes, Gastropods, soft coral, Sepiolida and some species of fishes inhabited on/around the installations.

3-3. Dive tracks (Onodera)

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-2960
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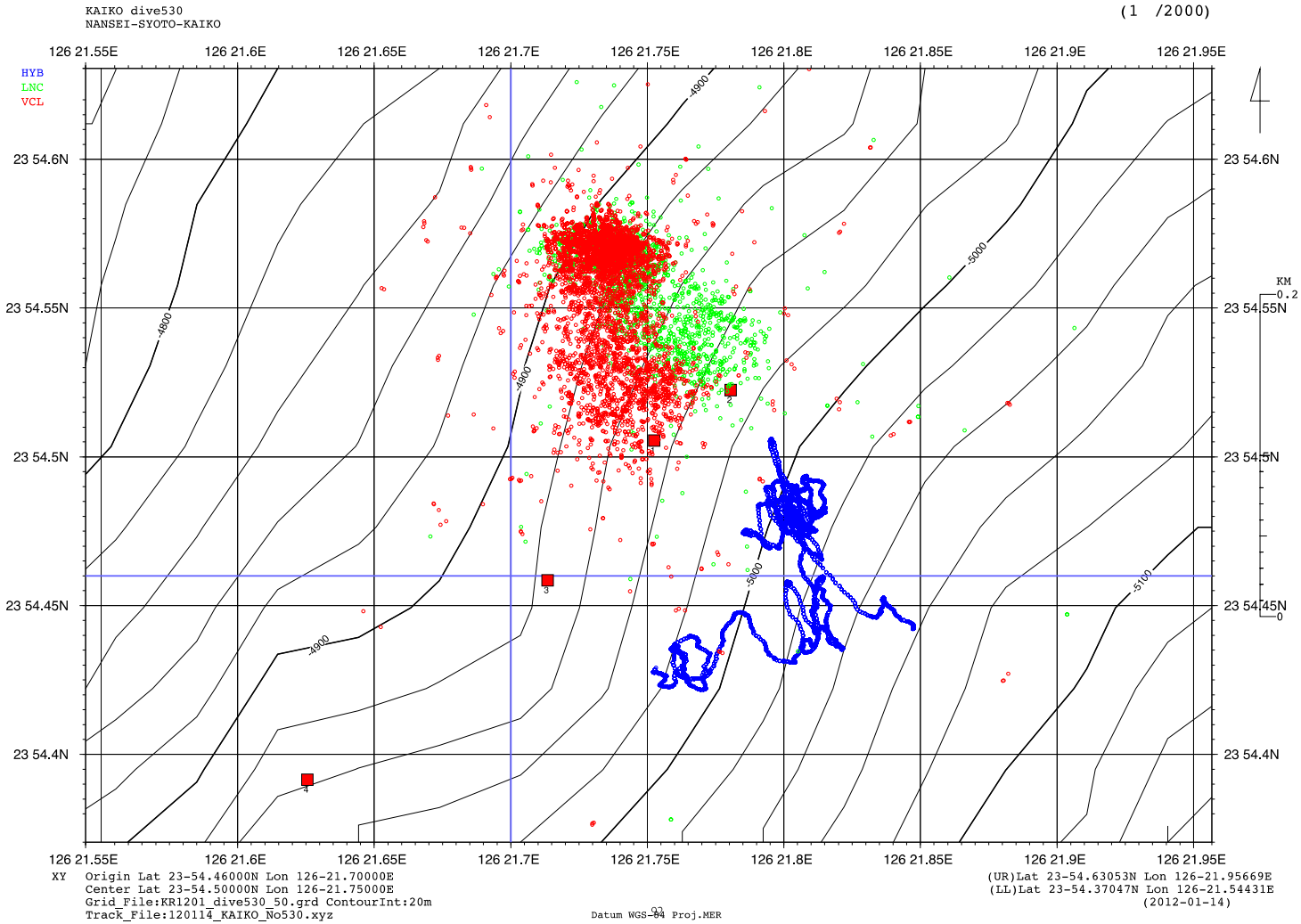
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126 21.85E
126 21.9E
126 21.95E
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23 54.55N
23 54.5N
23 54.45N
23 54.4N
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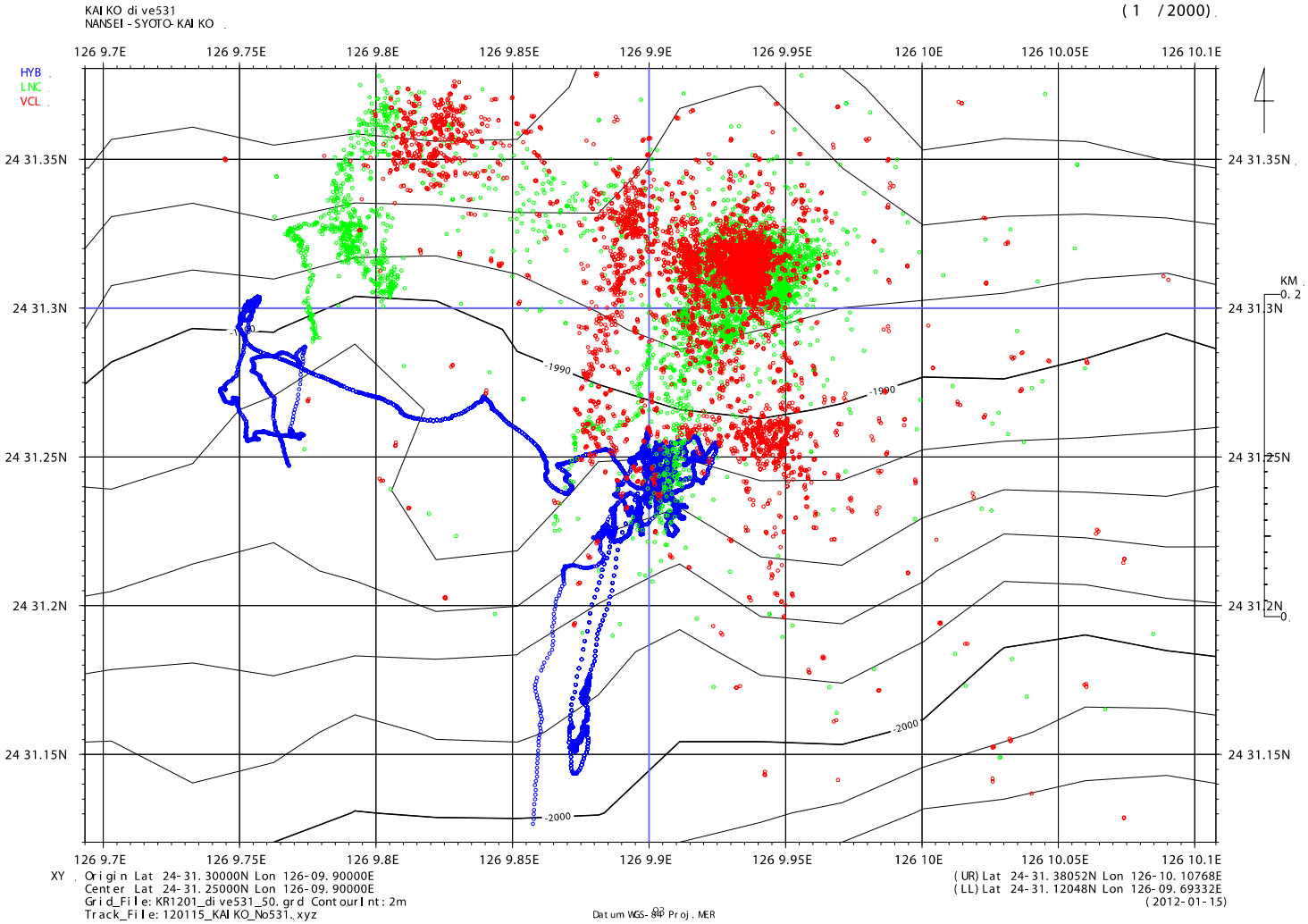
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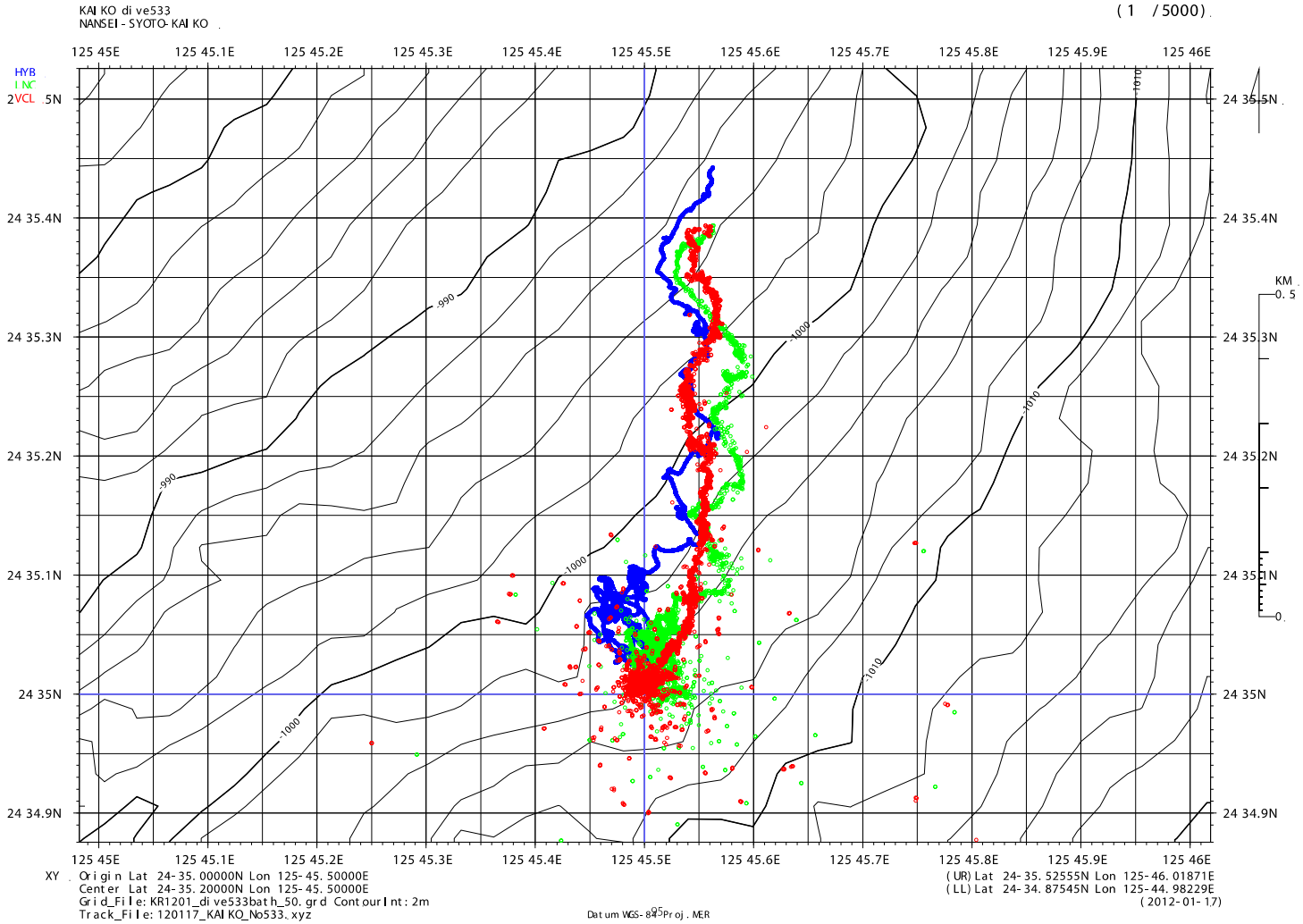
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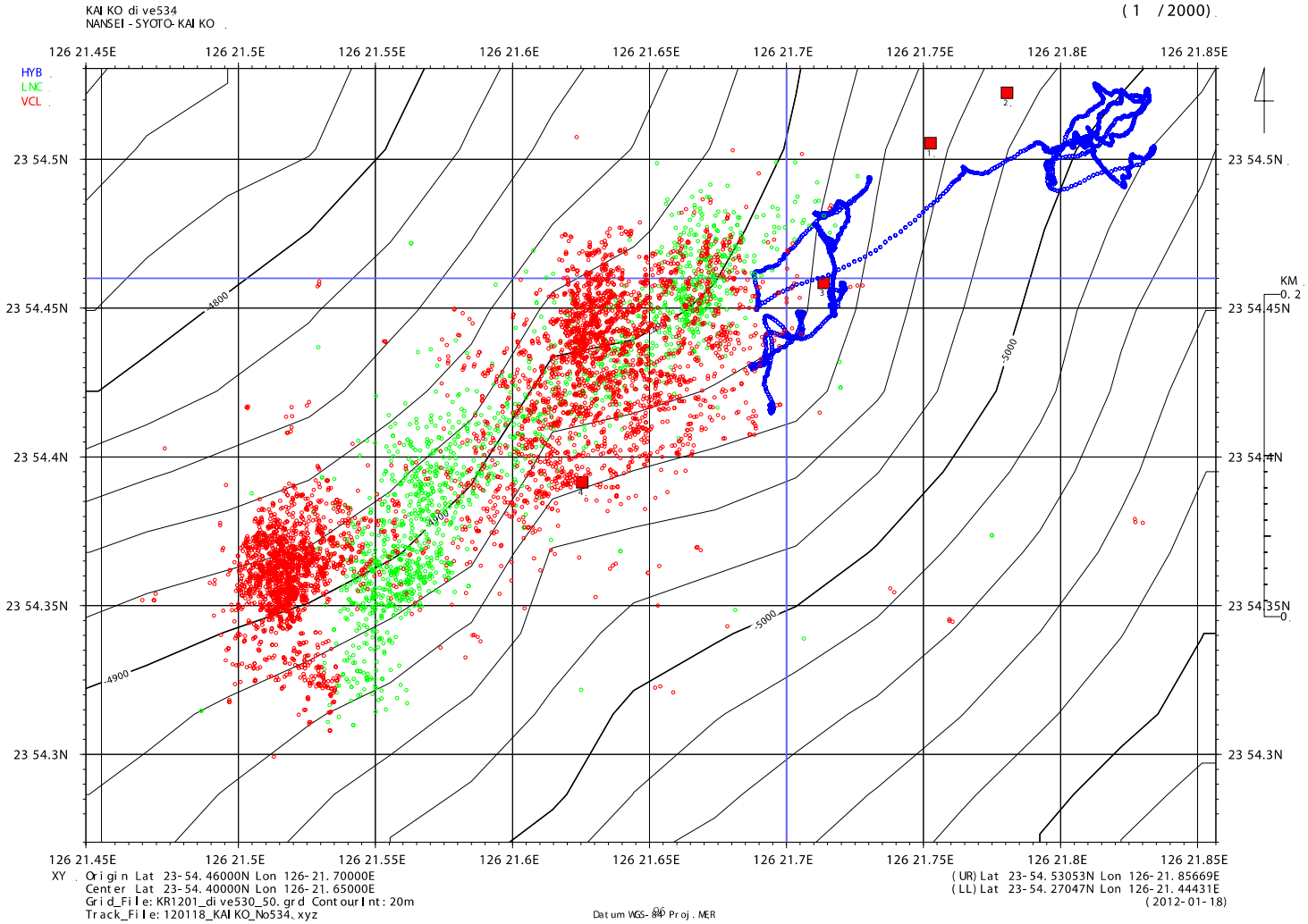
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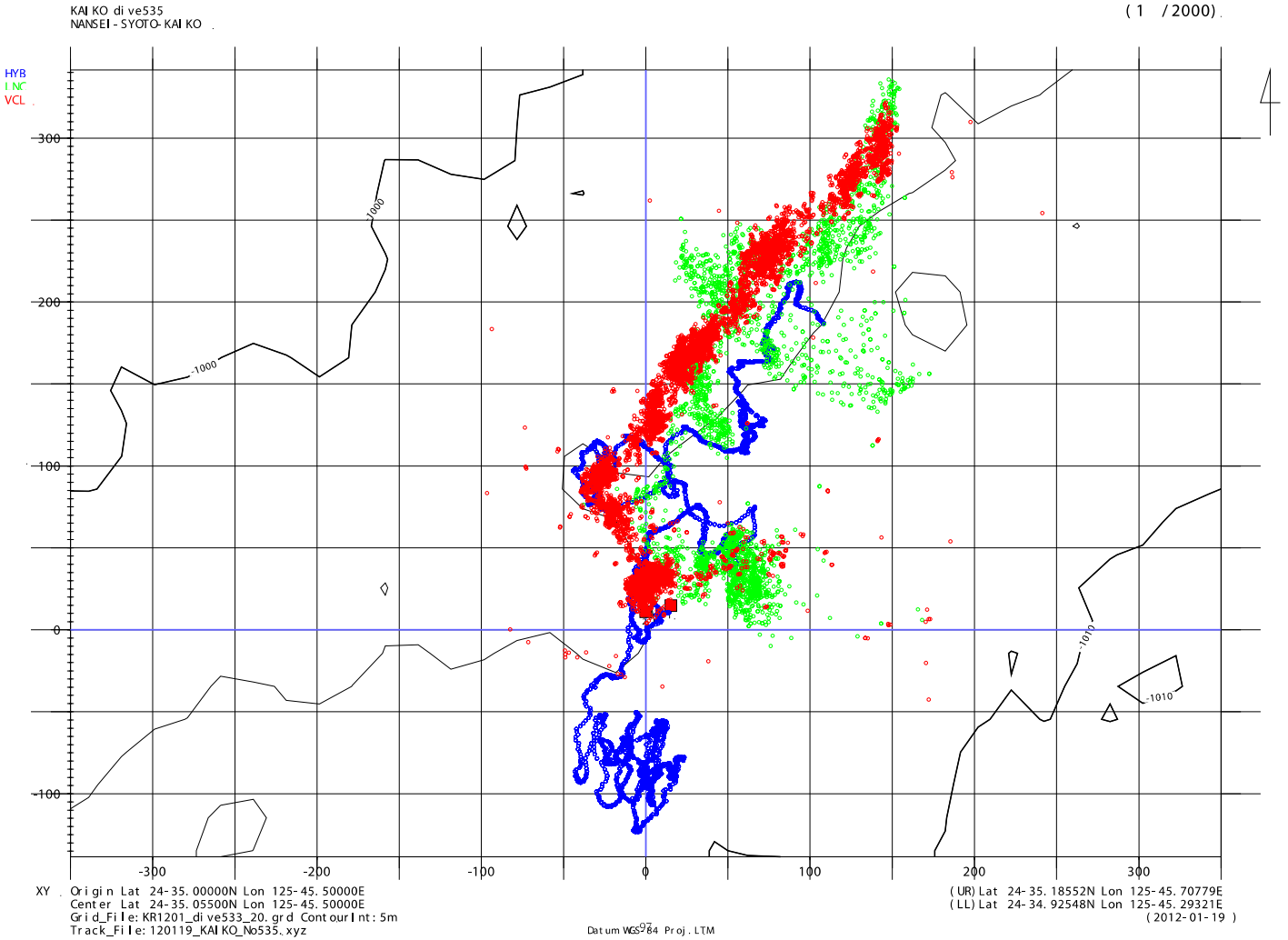
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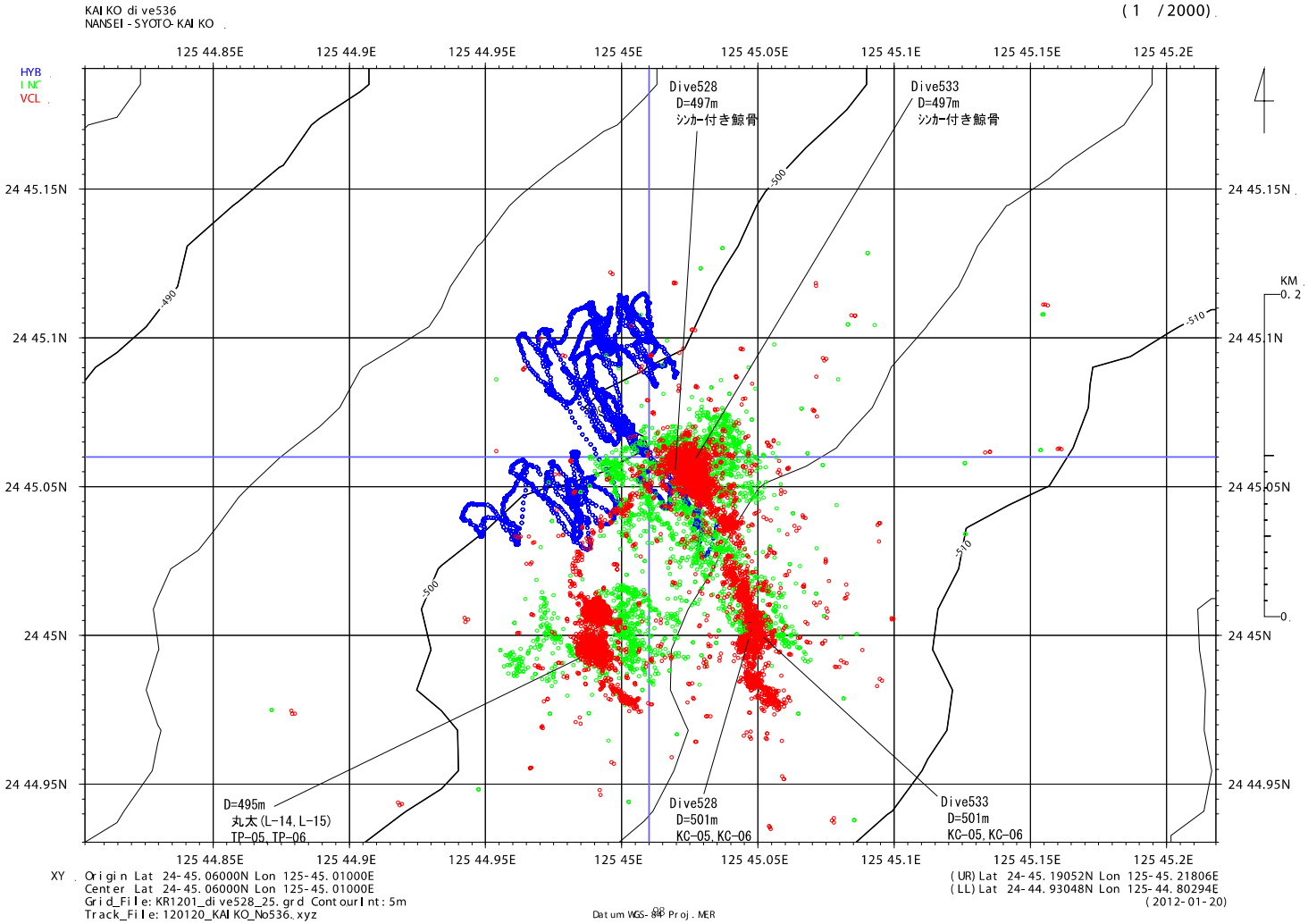
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-500
-510
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Datum WGS-84 Proj. MER

4. Deep-sea mooring of bones

A deep-sea mooring system of bones (Fig. 4-1) was deployed on April 26, 2010 during the NT10-07 cruise (24 ° 23.820 ’ N, 126 ° 15.635 ’ E, 2106m). Two cow bones were set in a 30L Niskin bottle at a height of 1000m from the bottom. The system was retrieved on January 10, 2012. The bones looked intact and harbored no benthic invertebrates.

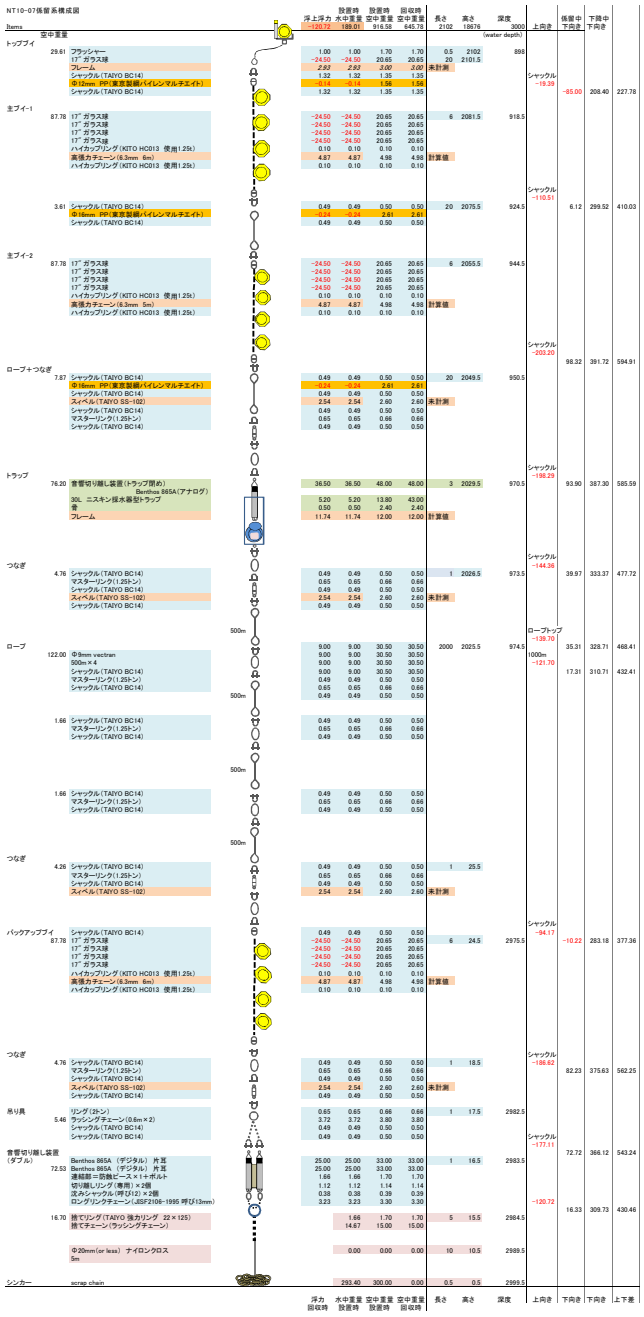


Fig. 4-1. Deep-sea mooring system of bones deployed during NT10-07

5. Time-lapse filming of whale vertebrae

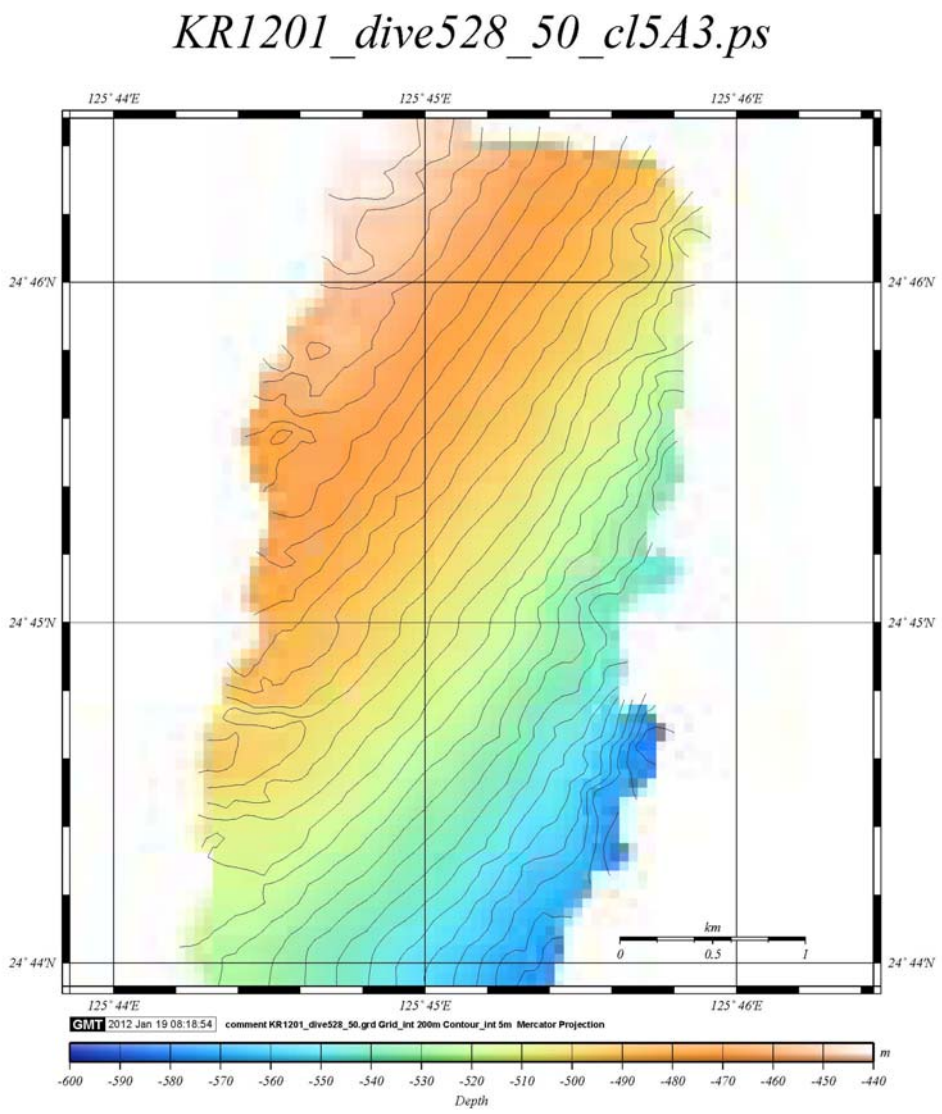
To observe scavengers around whale carcasses, whale vertebrae (Fig. 5-1) and a time-lapse video camera system (Fig. 5-2) were deployed at a depth of 500m in the Nansei Shoto Trench on January 12, 2012 (Fig. 5-3). The camera system took video clips for 1 minute every 8 minutes and the total clip length was about 300 minutes. The camera system was retrieved using the ROV *Kaiko 7000II* on January 16, 2012. Many sharks were recorded on many video clips but the density was varied between the clips.

Fig. 5-1. Whale vertebrae deployed during this cruise.

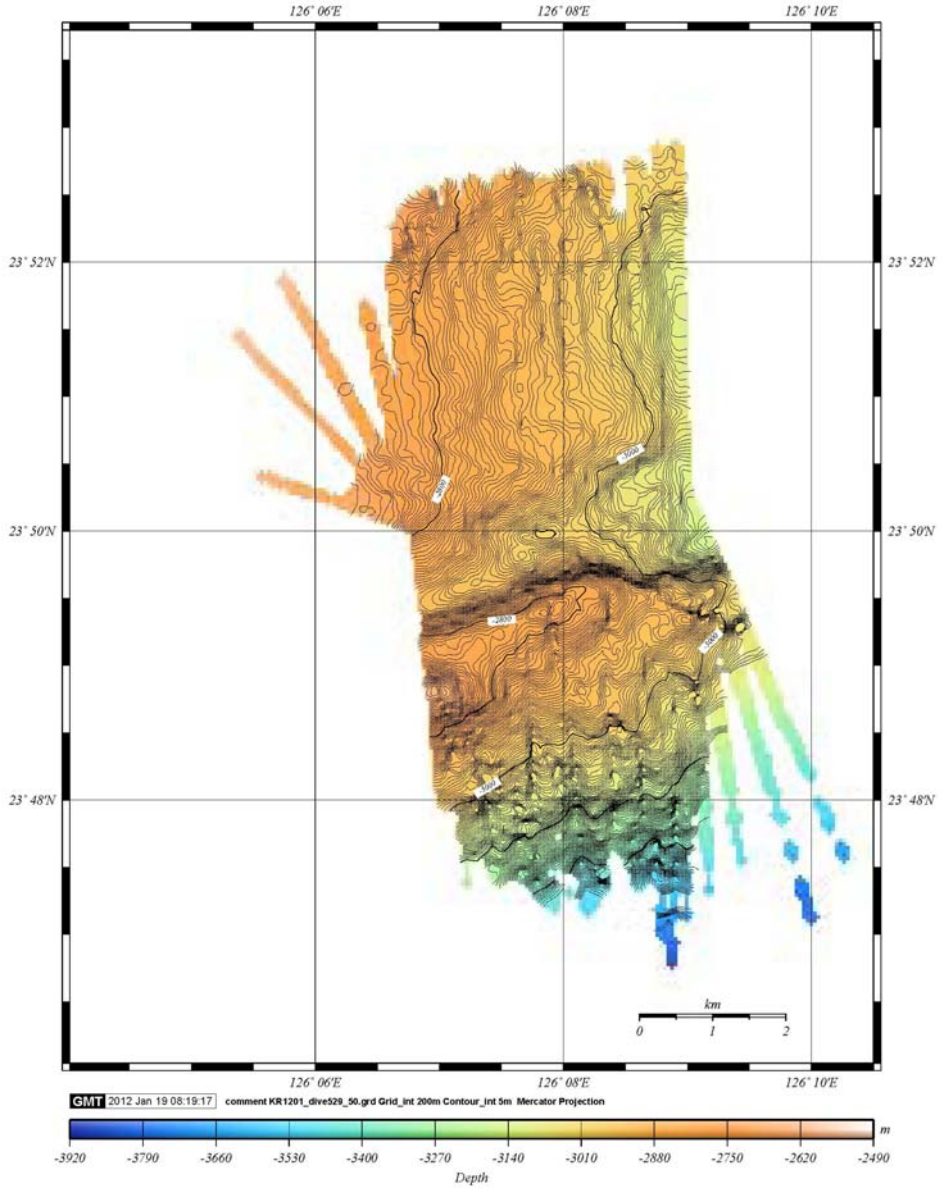
Fig. 5-2. A time-lapse video camera system

Fig. 5-3. A time-lapse video camera system deployed beside the whale vertebrae.

6. Geophysical survey results



KR1201_dive529_50_cl5A3.ps



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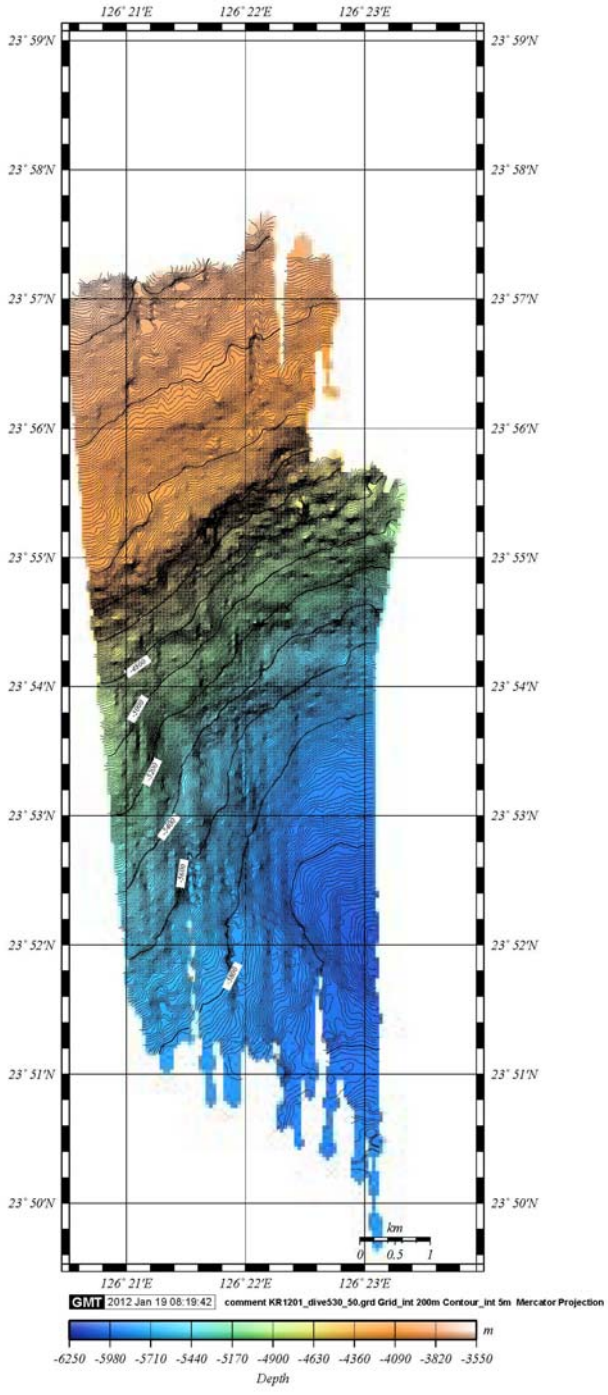
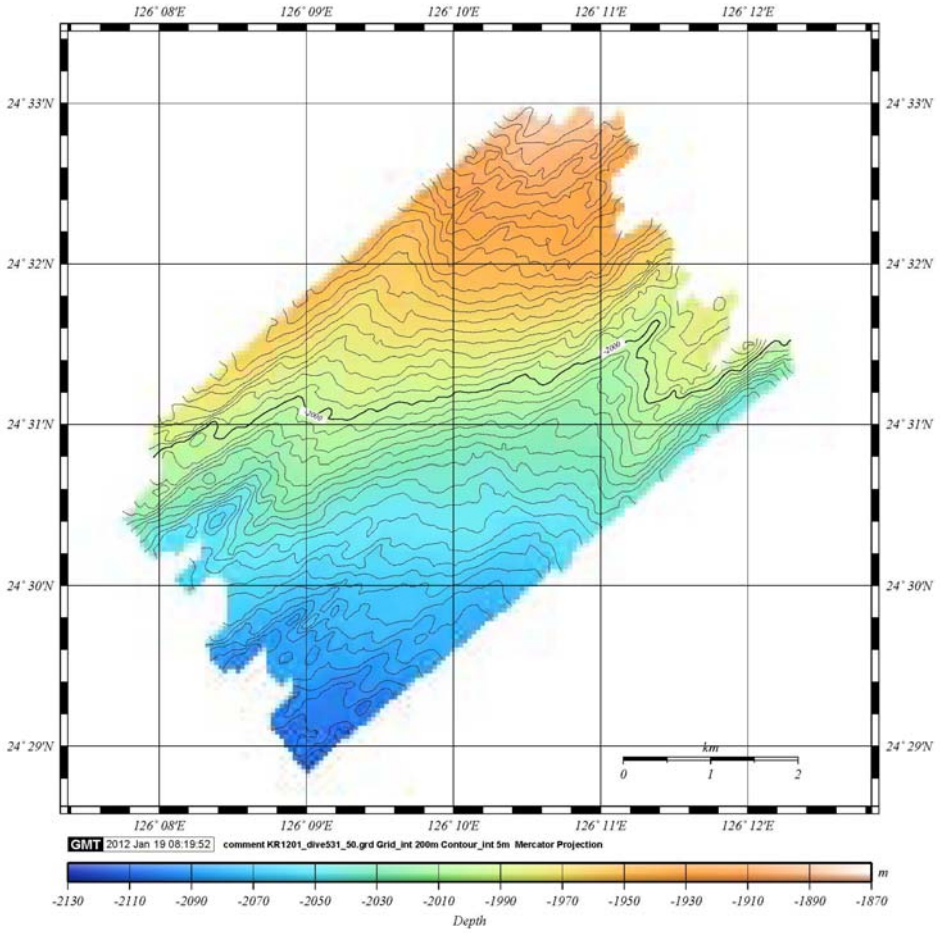
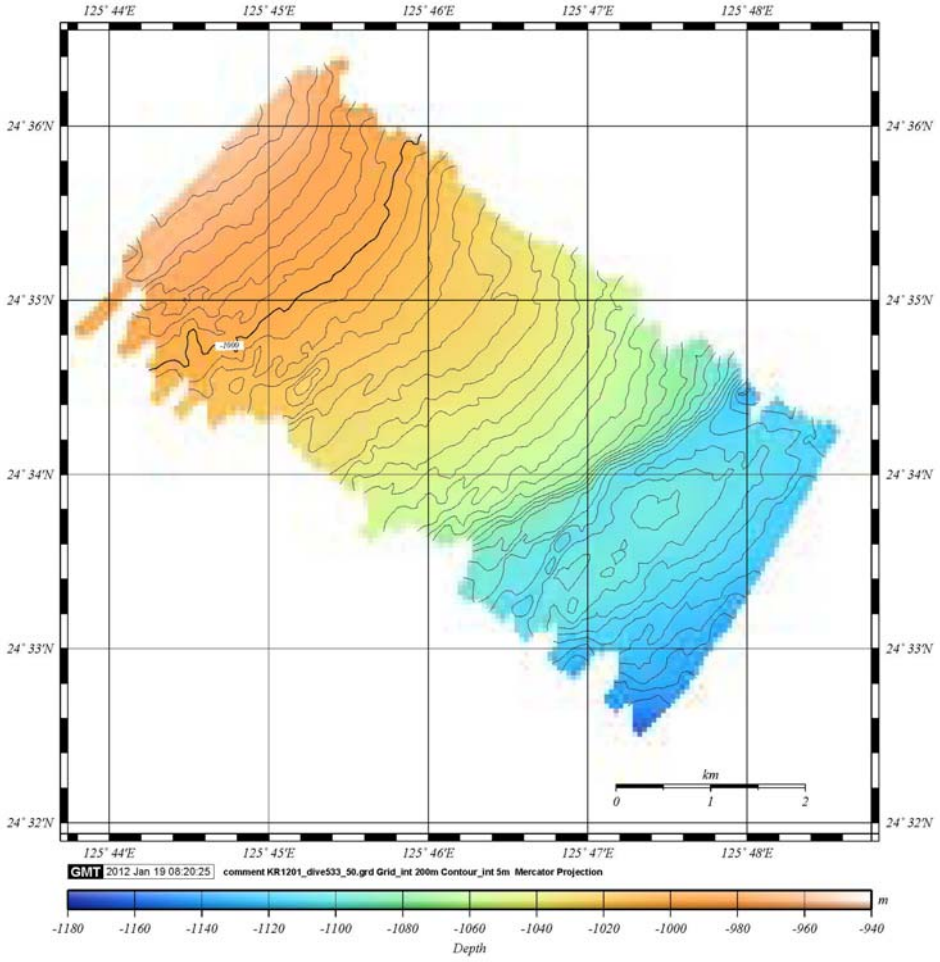


KR1201_dive531_50_cl5A3.ps

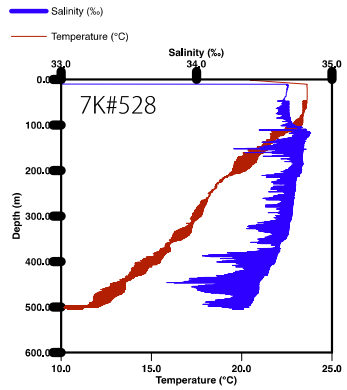


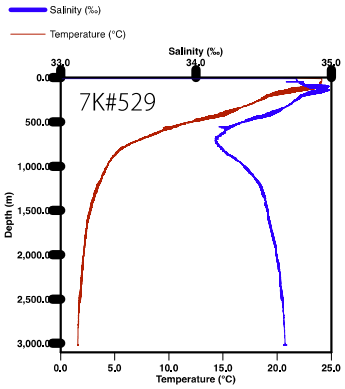
KR1201_dive533_50_cl5A3.ps

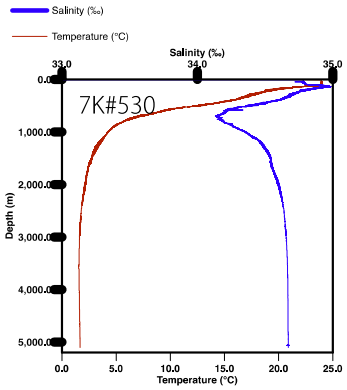


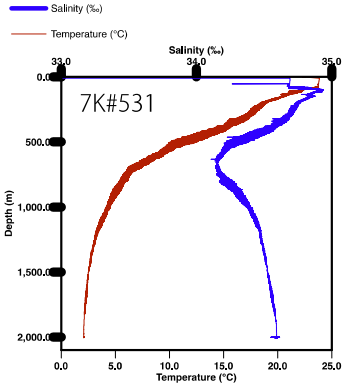
Appendix

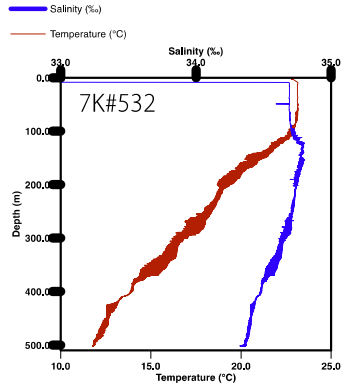
I. CTD/DO data

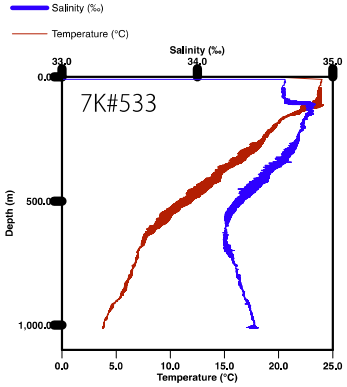


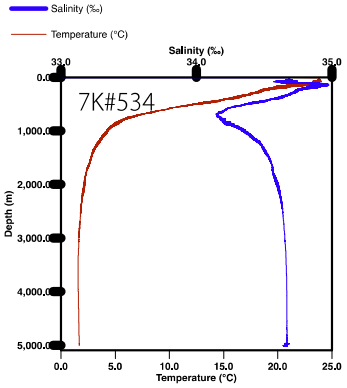


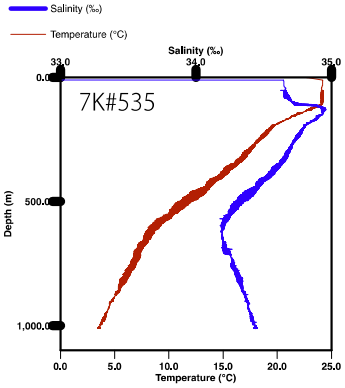


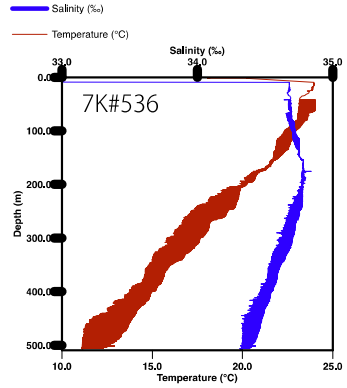




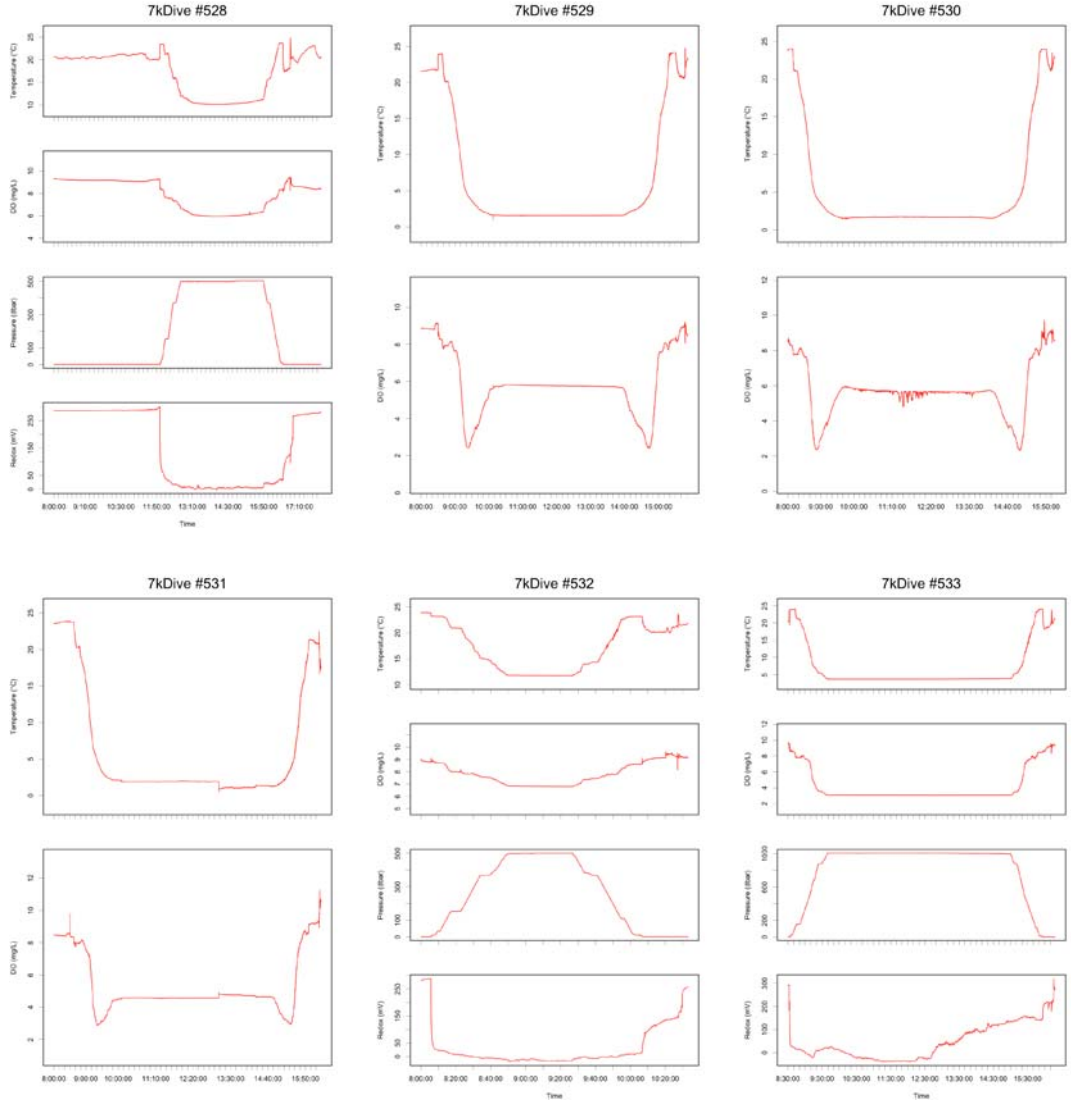


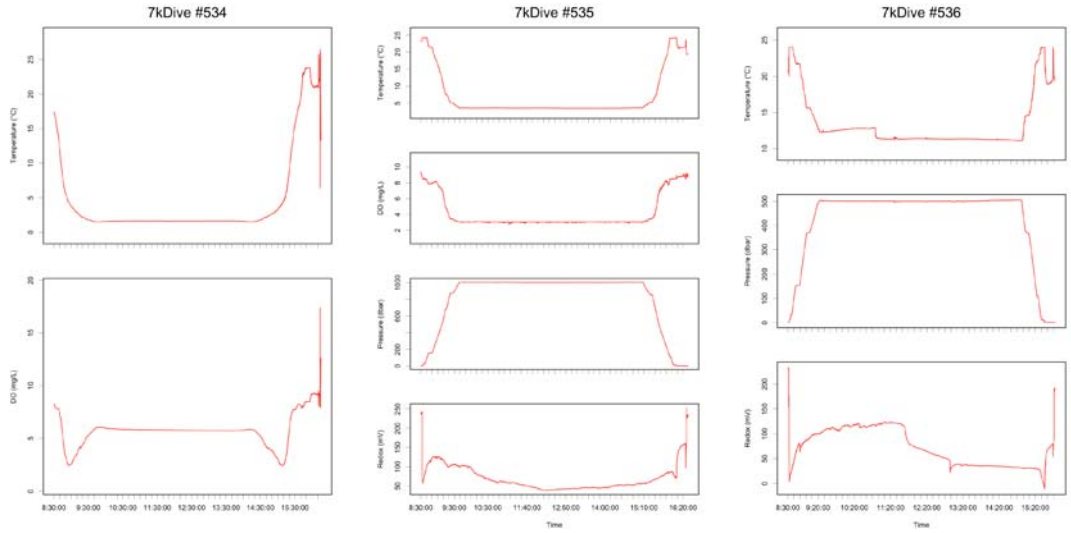




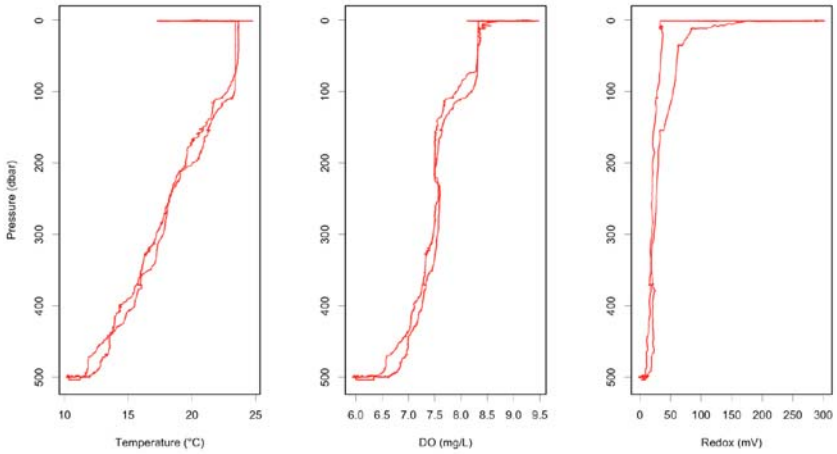


II. Redox & DO data

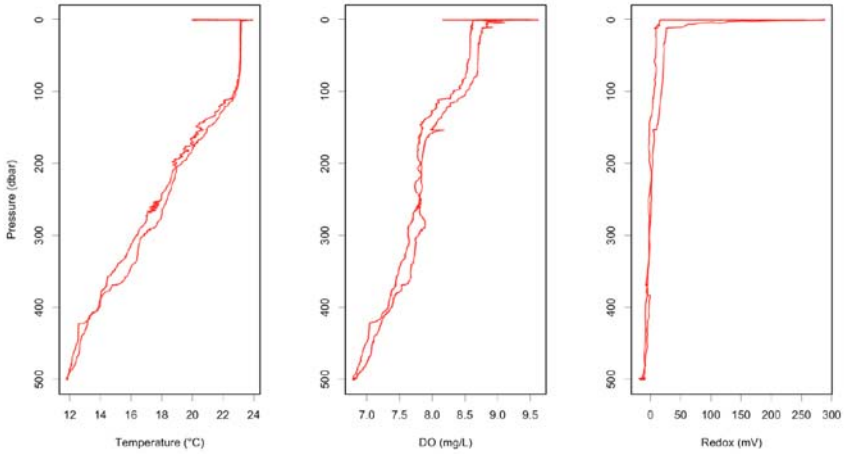



7kDive #534
7kDive #535
7kDive #536
Temperature (°C)
DO (mg/L)
Pressure (dbar)
Redox (mV)
Time

7kDive #528



7kDive #532



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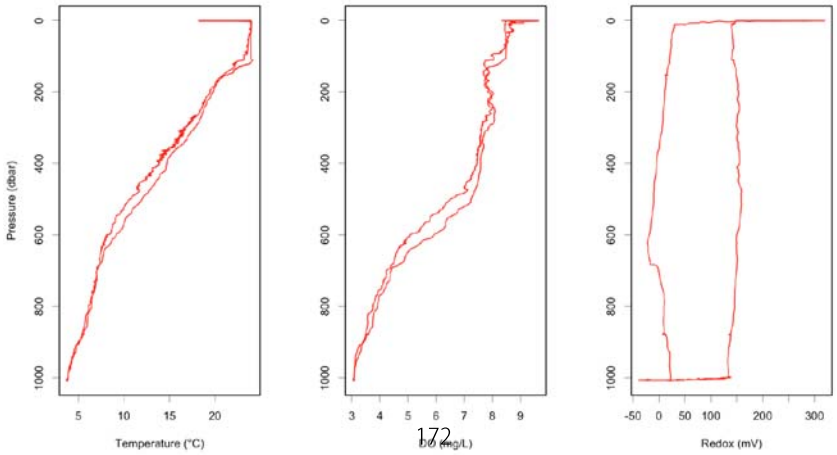

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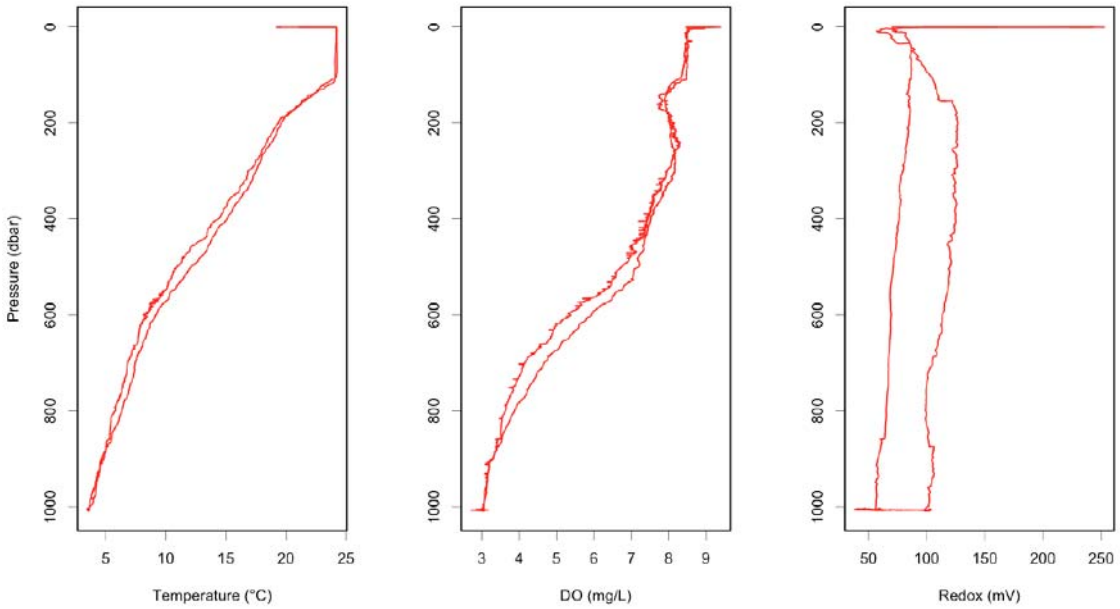

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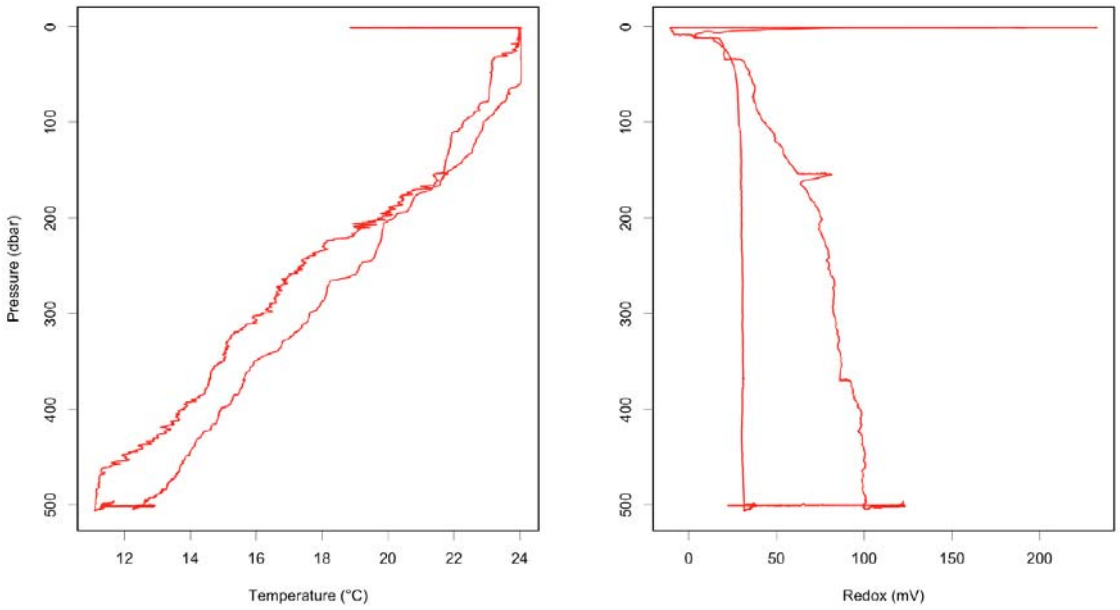


III. XBT profiles

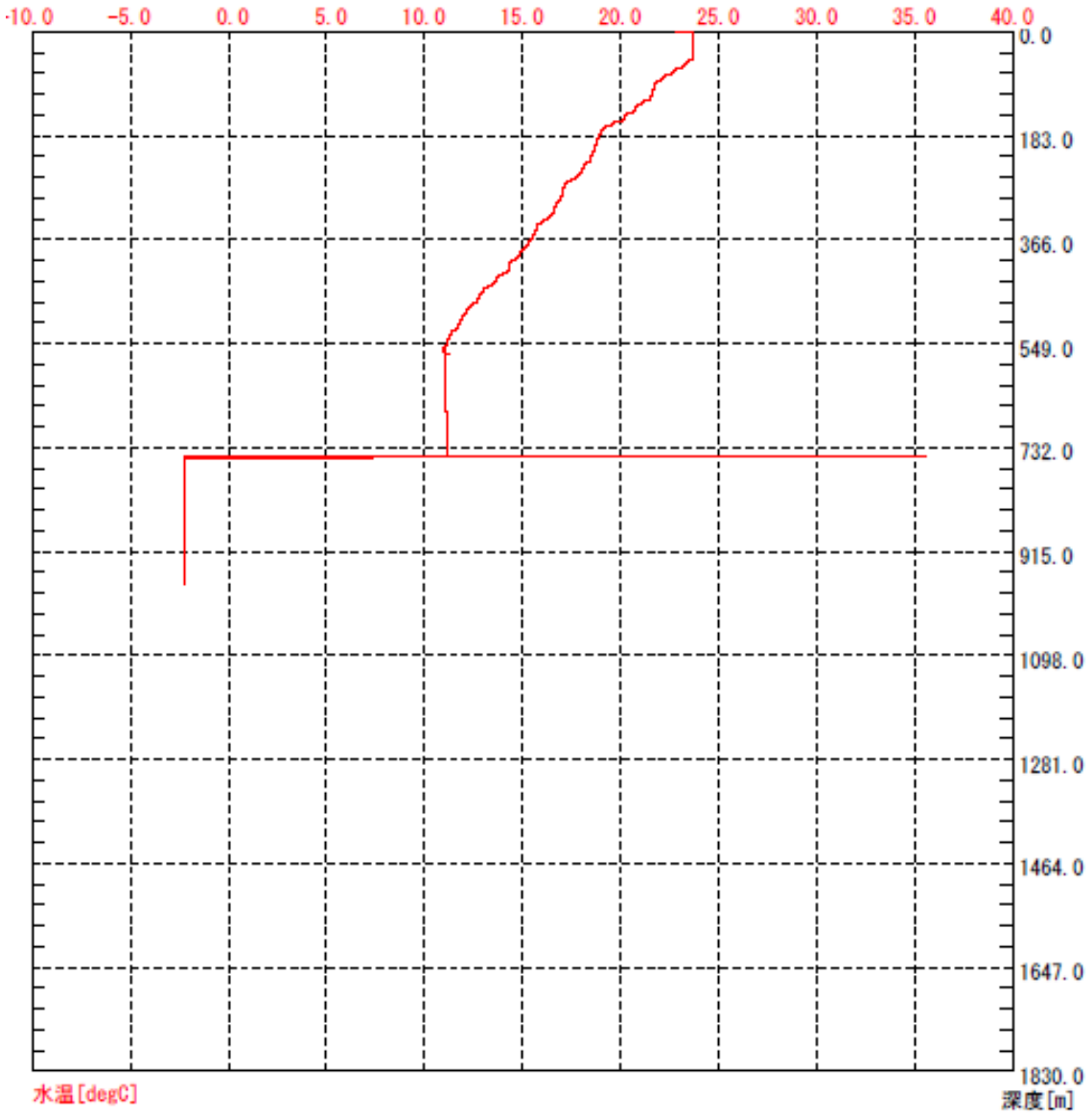
TSK XBT/XCTD-SYSTEM TS-MK130 Tsurumi-Seiki CO.,Ltd (Ver.1.00)

データパス名 : c:¥MK-130L¥data¥
データ名 : BT-014120120111
データナンバ : 0141
日付 : 2012/01/11
時刻 : 23:49:30
緯度 : 24-43.9921N
経度 : 125-44.8035E

ディバイス名 : XBT
プローブタイプ : T05
深度係数 a : 6.828
深度係数 b : -1.82
最大深度(m) : 1830
データ数 : 976

BATHYプローブ : 231
BATHY処理器 : 46
深度ステップ : 1m

TSK XBT/XCTD-SYSTEM TS-MK130 -鉛直分布図印刷- (Ver.1.00)



TSK XBT/XCTD-SYSTEM TS-MK130 Tsurumi-Seiki CO.,Ltd (Ver.1.00)

データパス名 : c:¥MK-130L¥data¥
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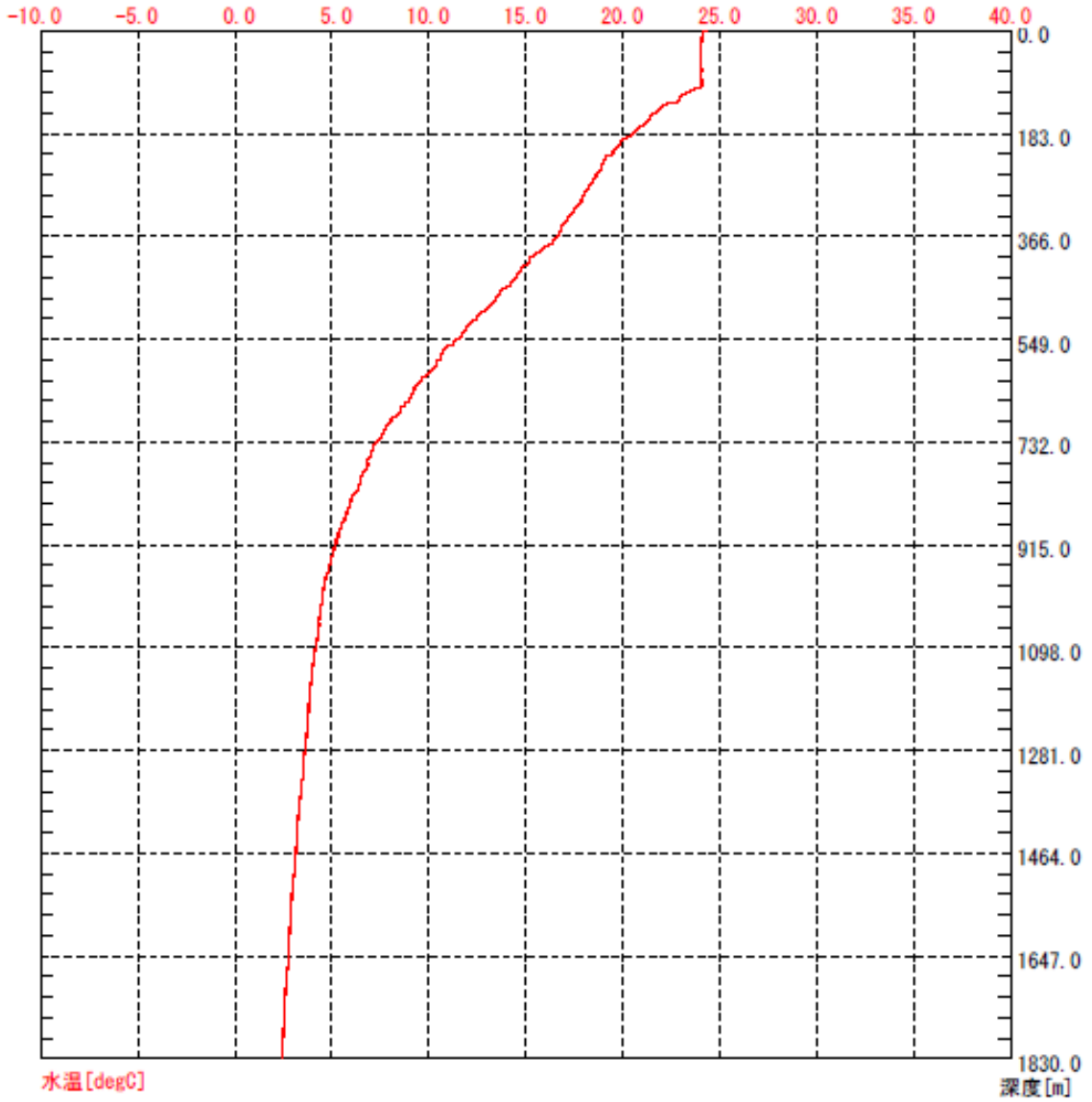
データナンバ : 0143
日付 : 2012/01/12
時刻 : 21:25:01
緯度 : 23-50.4986N
経度 : 126-07.8066E

ディバイス名 : XBT
プローブタイプ : T05
深度係数 a : 6.828
深度係数 b : -1.82
最大深度(m) : 1830
データ数 : 1831

BATHYプローブ : 231
BATHY処理器 : 46
深度ステップ : 1m

TSK XBT/XCTD-SYSTEM TS-MK130 -鉛直分布図印刷- (Ver.1.00)



TSK XBT/XCTD-SYSTEM TS-MK130 Tsurumi-Seiki CO.,Ltd (Ver.1.00)

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データナンバ : 0144
日付 : 2012/01/14
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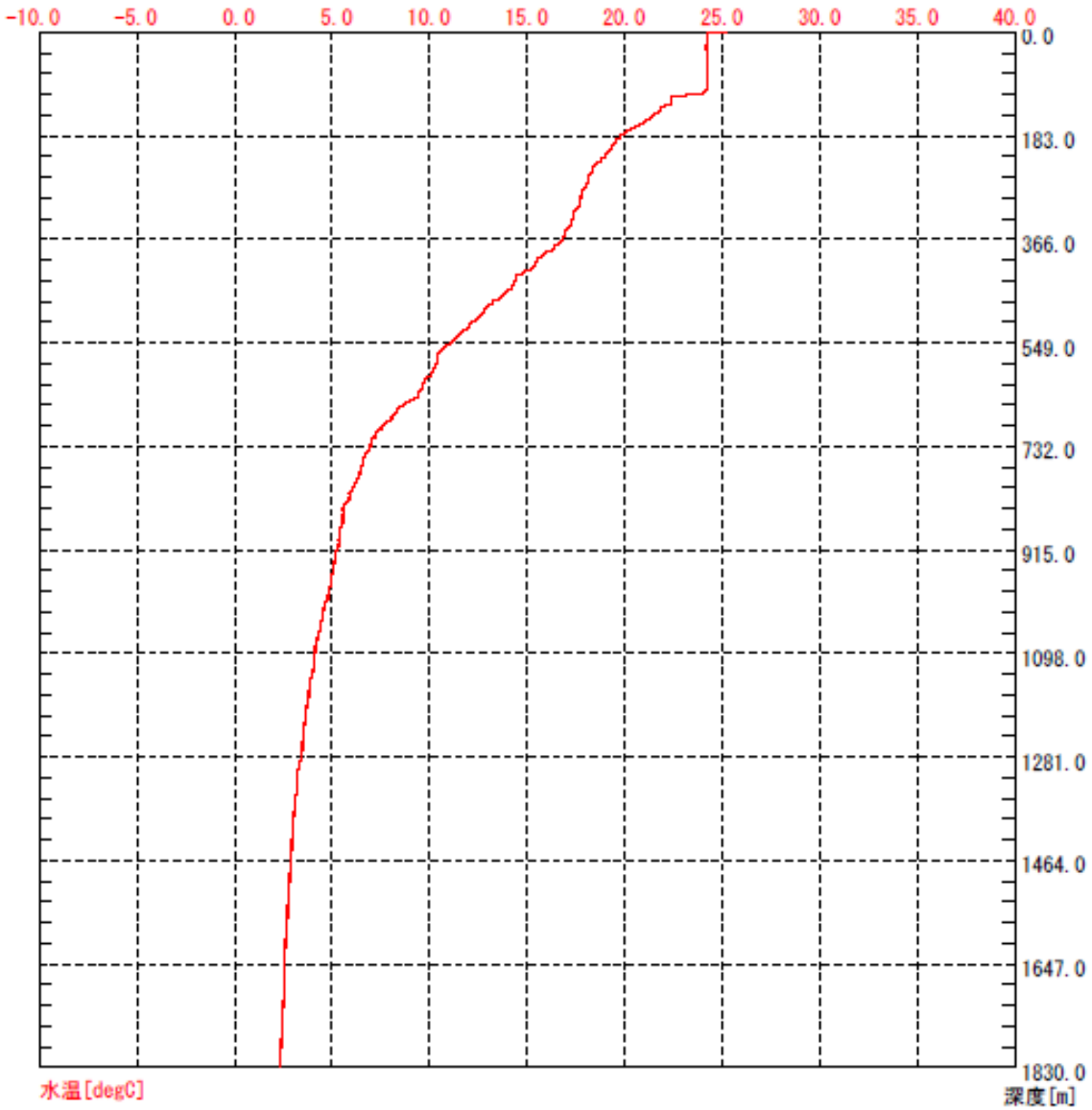
ディバイス名 : XBT
プローブタイプ : T05
深度係数 a : 6.828
深度係数 b : -1.82
最大深度(m) : 1830
データ数 : 1831

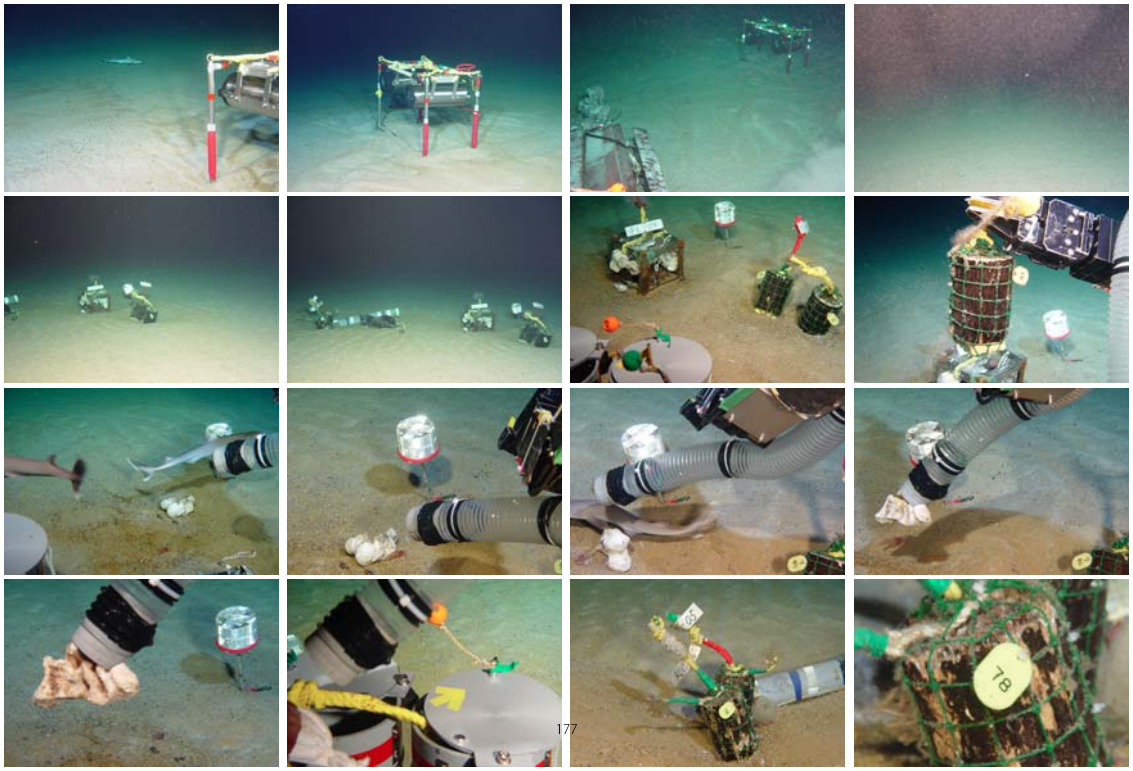
BATHYプローブ : 231
BATHY処理器 : 46
深度ステップ : 1m

TSK XBT/XCTD-SYSTEM TS-MK130 -鉛直分布図印刷- (Ver.1.00)

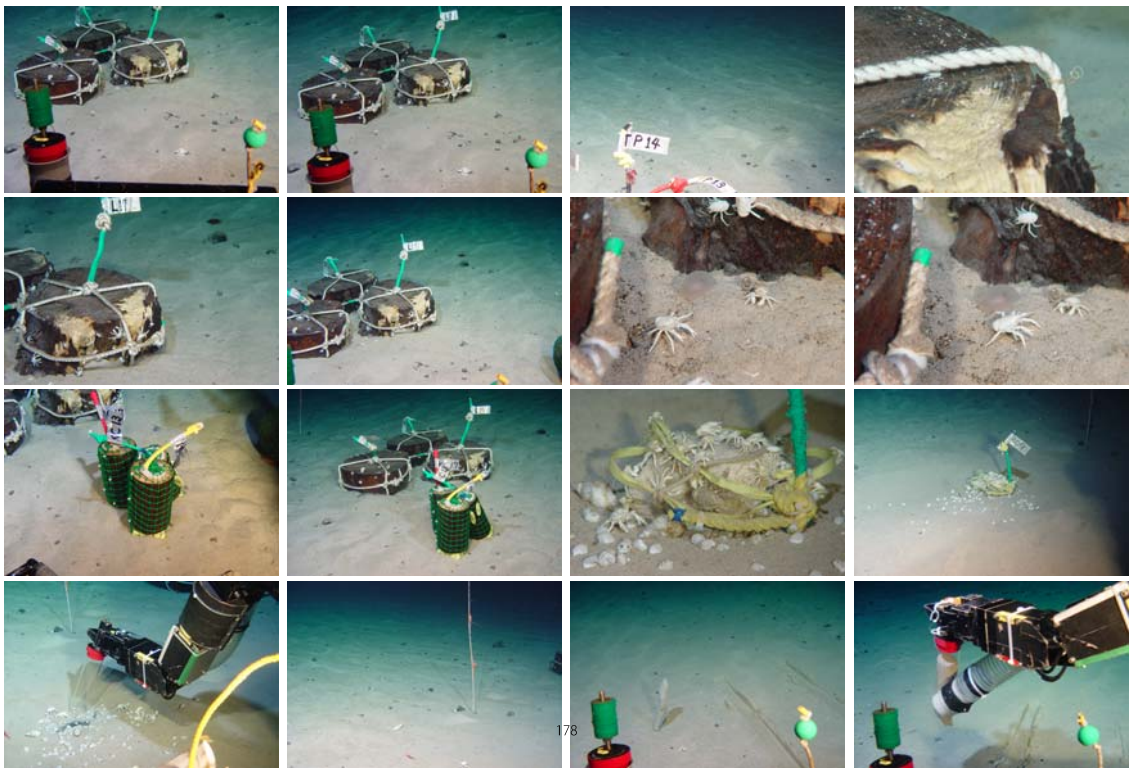


IV. Still images from each dive

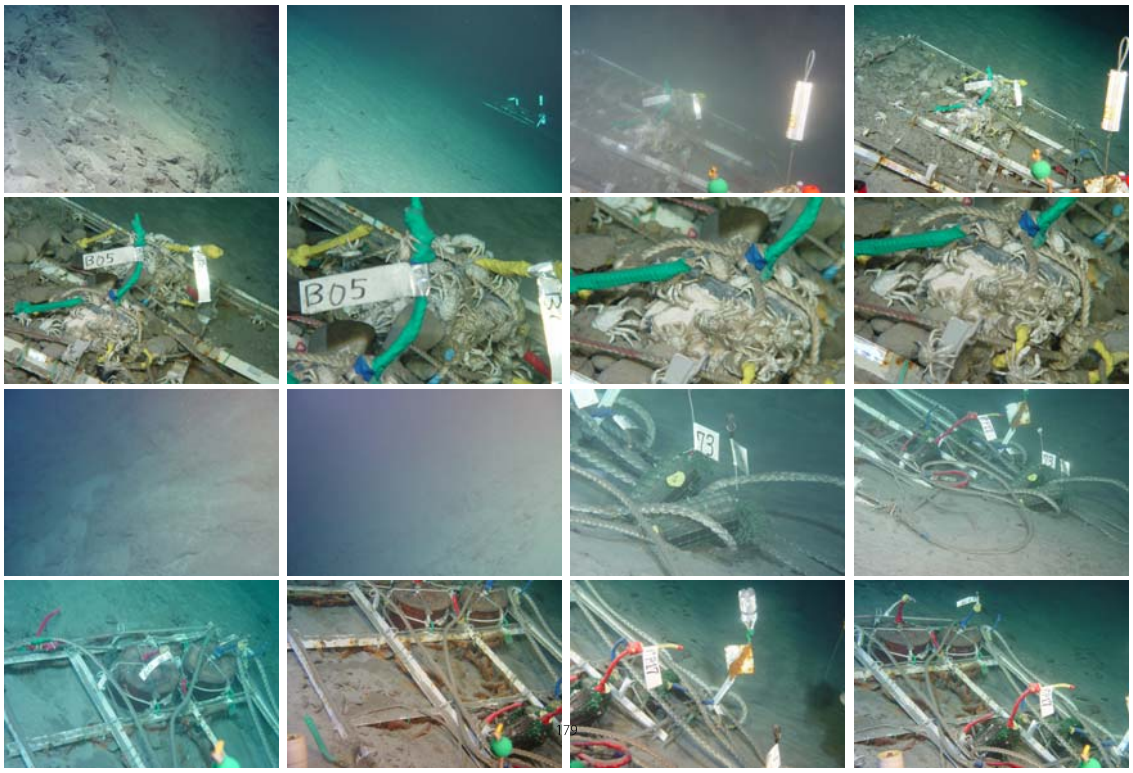
VI. Still images from each dive-7K528-500m



VI. Still images from each dive-7K529-3000m



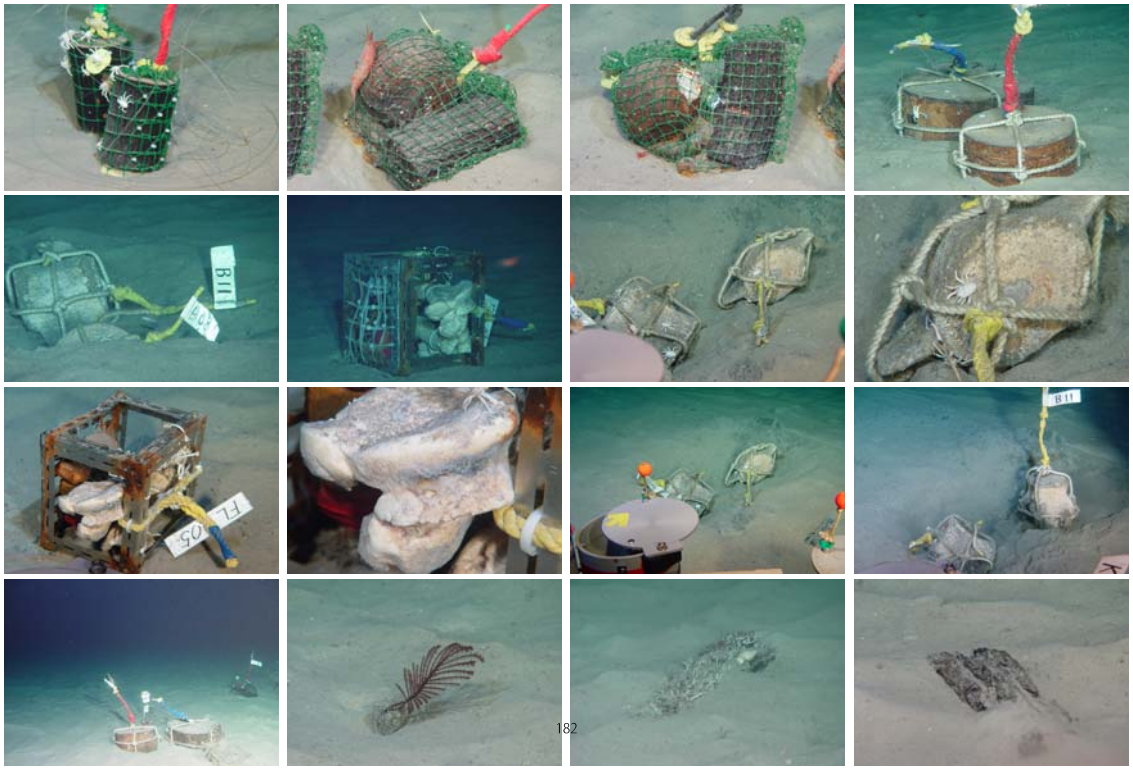
VI. Still images from each dive-7K530-5000m



VI. Still images from each dive-7K531-2000m

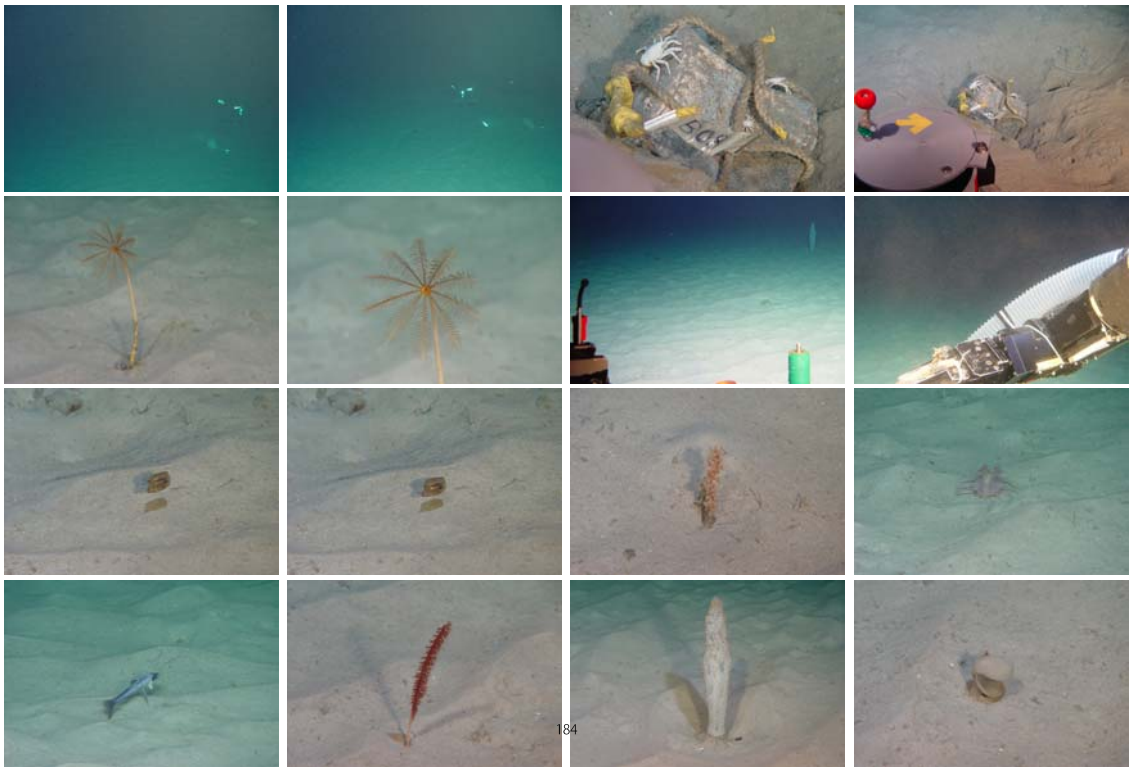
VI. Still images from each dive-7K532-500m

VI. Still images from each dive-7K533-1000m



VI. Still images from each dive-7K534-5000m

VI. Still images from each dive-7K535-1000m



VI. Still images from each dive-7K536-500m

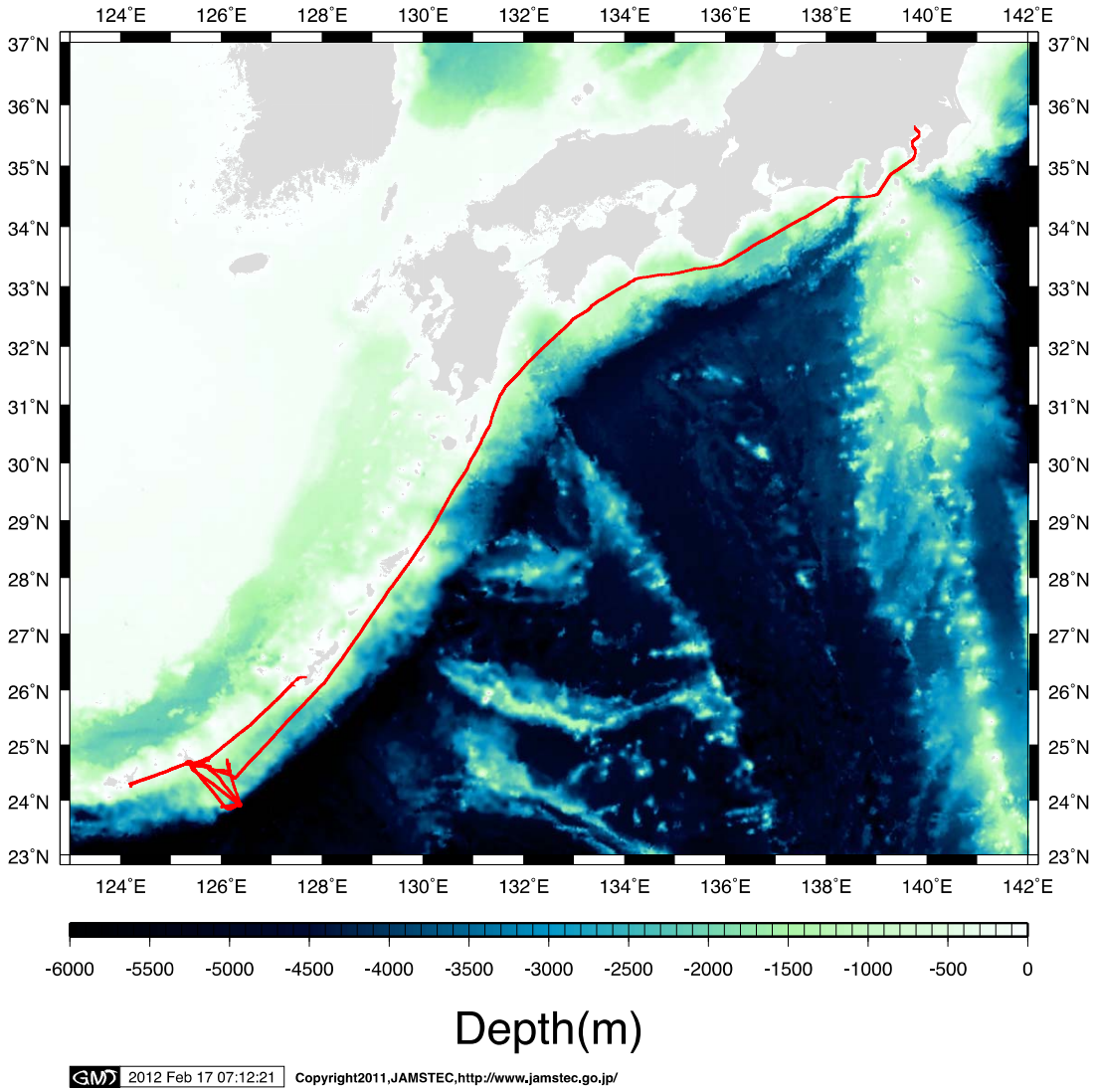
V. Shipboard log & ship track

Date	Time	Description	Remark	Position/Weather/Wind/Sea condition (Noon)
07,Jan,12	9:00	On bording Kairei		1/7 12:00 (LST)
	9:30	Scientists meeting		35-22.9N, 139-42.4E
	10:00	Let go shore line and left Keihin Ko for		fine but cloudy
		NANSEI SHOTO TRENCH resarch area		North-5(fresh breeze)
	13:30-14:00	On bord education and training		3(sea slight)
	14:00-14:30	Breifing from KAIKO TEAM		0(No swell)
	16:40-17:00	KONPIRA SANPAI		Visibly:8
08,Jan,12	8:30-10:00	Scientists meeting		1/8 12:00 (LST)
				32-53.9N, 133-45.9E
				fine but cloudy
				NW-4(moderate breeze)
				3(sea slight)
				1(low swell sea)
				Visibly:8
09,Jan,12	10:00-10:30	Scientists meeting		1/9 12:00 (LST)
				27-55.5N, 129-27.7
				rain
				NE-4(moderate breeze)
				3(sea slight)
				1(low swell sea)
				Visibly:6
10,Jan,12	6:30	Arrived at NANSEI SHOTO TRENCH Resarch Area		1/10 12:00 (LST)
	9:38	Sent out release command to mooring system		24-24.2N, 126-15.8
	10:10	Mooring system floated		rain
	11:25	Recovered mooring system		NNE-6(strong breeze)
	11:30	Proceeding to OFF MIYAKO island (Due to avoid rough sea)		4(sea moderate)
	15:45	Started drifting		3(moderate short)
				Visibly:4
11,Jan,12	4:15	Arrived at OFF ISHIGAKI island and started drifting		1/11 12:00 (LST)
	08:20-08:50	Used working boat and 1 scientist got off the ship		24-28.6N, 124-43.9
	9:00	Proceeding to OFF MIYAKO island		overcast
	15:00	Arrived at OFF MIYAKO island		North-7(near gale)
	16:15	Started drifting		5(sea rough)
				3(moderate short)
				Visibly:5
12,Jan,12	8:00	Arrived at resarch area B		1/12 12:00 (LST)
	08:24-08:50	Carried out MBES site survey		24-45.1N, 125-45.0
	8:49	Released XBT at 24-43.9921N, 125-44.8035E		overcast
	11:18	Deployed WHALE BONE at 24-45.1N, 125-45.1E		NE-4(moderate breeze)
	11:52	Hoisted up "KAIKO7000Ⅱ"		3(sea slight)
	11:57	Launched "KAIKO7000Ⅱ",it dove and started her operation(#528)		3(moderate short)
	12:47	"KAIKO7000Ⅱ" landed on the sea bottom (D=496m)		Visibly:5
	15:49	"KAIKO7000Ⅱ" left the sea botoom (D=501m)		
	16:33	Hoisted up "KAIKO7000Ⅱ"		
	16:43	Recovered "KAIKO7000Ⅱ" and finished her operation and finished her operation		
	19:45	Arrived at OFF MIYAKO island and started drifting		
13,Jan,12	0:00	Finished drifting and Proceeding to resarch area E		1/12 12:00 (LST)
	6:15	Arrived at resarch area E		23-50.1N, 126-08.2E
	6:25	Released XBT at 23-50.4986N, 126-07.8066E		cloudy
	6:40-06:55	Carried out MBES site survey		East-4(moderate breeze)
	8:25	Hoisted up "KAIKO7000Ⅱ"		3(sea slight)
	8:30	Launched "KAIKO7000Ⅱ",it dove and started her operation(#529)		3(moderate short)
	10:33	"KAIKO7000Ⅱ" landed on the sea bottom (D=2978m)		Visibly:8
	13:42	"KAIKO7000Ⅱ" left the sea botoom (D=2977m)		
	15:31	Hoisted up "KAIKO7000Ⅱ"		
	15:39	Recovered "KAIKO7000Ⅱ" and finished her operation and finished her operation,		
		Proceeding toresarch area F		
	17:35-17:51	Carried out MBES site survey		

Date	Time	Description	Remark	Position/Weather/Wind/Sea condition (Noon)
14,Jan,12	5:00	Started drifting		1/14 12:00 (LST)
	6:00	Finished drifting		23-54.5N, 126-21.8E
	7:55	Hoisted up "KAIKO7000Ⅱ"		overcast
	8:00	Launched "KAIKO7000Ⅱ", it dove and started her operation(#530)		SE-5(fresh breeze)
	10:36	"KAIKO7000Ⅱ" landed on the sea bottom (D=5011m)		4(sea moderate)
	13:38	"KAIKO7000Ⅱ" left the sea botoom (D=4963m)		3(moderate short)
	15:51	Hoisted up "KAIKO7000Ⅱ"		Visibly:7
	16:00	Recovered "KAIKO7000Ⅱ" and finished her operation		
	17:00	Proceeding to resarch area D		
	19:15	Arrived at resarch area D		
	19:18	Released XBT at 24-28.0934N, 126-11.1634E		
	19:37-19:53	Carried out MBES site survey		
	20:00	Started drifting at 24-32.5N, 126-08.9E		
15,Jan,12	3:00	Finished drifting		1/15 12:00 (LST)
	8:25	Hoisted up "KAIKO7000Ⅱ"		24-31.2N, 126-09.9E
	8:30	Lanuched "KAIKO7000Ⅱ", it dove and started her operation(#531)		fine but cloudy
	10:08	"KAIKO7000Ⅱ" landed on the sea bottom (D=1981m)		SSW-6(strong breeze)
	14:36	"KAIKO7000Ⅱ" left the sea botoom (D=1977m)		4(sea moderate)
	16:05	Hoisted up "KAIKO7000Ⅱ"		3(moderate short)
	16:13	Recovered "KAIKO7000Ⅱ" and finished her operation		Visibly:6
	16:45	Proceeding to resarch area C		
	18:25	Arrived at resarch area C		
	18:28-18:57	Carried out MBES site survey		
	19:00	Proceeding to OFF MIYAKO island		
16,Jan,12	4:00	Finished drifting		1/16 12:00 (LST)
	5:00	Proceeding to resarch area B		24-38.6N, 125-35.4E
	6:30	Arrived at resarch area B		rain
	8:00	Hoisted up "KAIKO7000Ⅱ"		North-8(gale)
	8:05	Lanuched "KAIKO7000Ⅱ", it dove and started her operation(#532)		5(sea rough)
	8:50	"KAIKO7000Ⅱ" landed on the sea bottom (D=498m)		3(moderate short)
	9:26	KAIKO7000Ⅱ left the sea botoom (D=496m)		Visibly:4
	10:07	Hoisted up "KAIKO7000Ⅱ"		
	10:19	Recovered "KAIKO7000Ⅱ" and finished her operation		
	11:15	Proceeding to OFF MIYAKO island (Due to rough sea)		
	13:00	Arrived OFF MIYAKO island and started drifting		
17,Jan,12	4:45	Finished drifting and Proceeding to resarch area C		1/17 12:00 (LST)
	6:50	Arrived at resarch area C		24-35.1N, 125-45.5E
	8:27	Hoisted up "KAIKO7000Ⅱ"		fine but cloudy
	8:33	Lanuched "KAIKO7000Ⅱ", it dove and started her operation(#533)		NNE-5(fresh breeze)
	9:40	KAIKO7000Ⅱ landed on the sea bottom (D=1002m)		5(sea rough)
	15:00	KAIKO7000Ⅱ left the sea botoom (D=994m)		4(moderate average)
	15:57	Hoisted up "KAIKO7000Ⅱ"		Visibly:8
	16:04	Recovered "KAIKO7000Ⅱ" and finished her operation		
	16:45	Proceeding to OFF MIYAKO island		
	17:00-17:30	Scientists meeting		
	19:30	Arrived at OFF MIYAKO island and started drifting		
18,Jan,12	0:00	Finished drifting and proceeding to resarch area F		1/18 12:00 (LST)
	6:30	Arrived at resarch area F		23-54.5N, 126-21.7E
	7:58	Hoisted up "KAIKO7000Ⅱ"		fine but cloudy
	8:03	Lanuched "KAIKO7000Ⅱ", it dove and started her operation(#534)		East-5(fresh breeze)
	10:28	KAIKO7000Ⅱ landed on the sea bottom (D=4916mm)		3(sea slight)
	13:45	KAIKO7000Ⅱ left the sea botoom (D=4927m)		3(moderate short)
	15:56	Hoisted up "KAIKO7000Ⅱ"		Visibly:8
	16:04	Recovered "KAIKO7000Ⅱ" and finished her operation		
	16:45	Proceeding to resarch area C		
19,Jan,12	2:45	Arrived at resarch area C and drifting		1/19 12:00 (LST)
	6:00	Finished drifting		24-34.9N, 125-45.5E
	8:27	Hoisted up "KAIKO7000Ⅱ"		cloudy
	8:32	Lanuched "KAIKO7000Ⅱ", it dove and started her operation(#535)		SSE_4(moderate breeze)

Date	Time	Description	Remark	Position/Weather/Wind/Sea condition (Noon)
	9:39	KAIKO7000Ⅱ landed on the sea bottom (D=1003m)		3(sea slight)
	15:08	KAIKO7000Ⅱ left the sea botoom (D=1001m)		3(moderate short)
	16:08	Hoisted up "KAIKO7000Ⅱ"		Visibly:8
	16:16	Recovered "KAIKO7000Ⅱ" and finished her operation		
	16:45	Proceeding to OFF MIYAKO island		
	19:45	Arrived at OFF MIYAKO island and started drifting		
20,Jan,12				1/19 12:00 (LST)
				24-34.9N, 125-45.5E
				cloudy
				SSE_4(moderate breeze)
				3(sea slight)
				3(moderate short)
				Visibly:8

KR12-01 ShipTrack



GMT 2012 Feb 17 07:12:21

VI. Deployment and retrieval list

潜航調査	2008年 NT08-12		2009年 YK09-04		2009年 NT09-10		2010年 NT10-07		2012年 KR12-01		2012年投置状況
サイト	設置	回収または亡失*1	設置	回収	設置	回収または亡失	設置	回収または亡失	設置	回収または亡失	設置済み
250m	・鯨骨【B03, B12, B15】 ・鯨骨【B07, B18】再設置 ・丸太【L01, L05, L13】 ・TP【TP01, TP02, TP03】	・鯨骨【B03, B12, B15】亡失			・牛／豚骨【FL-01】 ・KC【KC-01, KC-02】	・鯨骨【B07, B18】亡失 ・丸太【L13】 ・TP【TP03】	・牛／豚骨【FL-06】 ・KC【KC-10, KC-11】	・牛／豚骨【FL-01】 ・丸太【L01】 ・TP【TP02】 ・KC【KC-01】			・牛／豚骨【FL-06】 ・丸太【L05】 ・TP【TP01】 ・KC【KC-02, KC-10, KC-11】
500m-1	・鯨骨【B01, B04, B16】 ・丸太【L03, L14, L15】 ・TP【TP04, TP05, TP06】 ・Chemecol【C10, C11, C12】	・鯨骨【B01, B04, B16】亡失						・丸太【L03】 ・TP【TP04】 ・Chemecol【C10, C11, C12】		・TP【TP06】	・丸太【L14, L15】 ・TP【TP05】
500m-2					・鯨骨【ラベル無3個】 ・牛／豚骨【FL-02, FL-03】 ・KC【KC-03, KC-04, KC-05】 フリーフォール		・牛／豚骨【FL-04】 ・KC【KC-06, KC-07】	・鯨骨【ラベル無3個】亡失 ・牛／豚骨【FL-02, FL-03】 ・KC【KC-03】		・牛／豚骨【FL-04】 ・KC【KC-04, KC07】	・KC【KC-05, KC-06】
500m-3									ツチクジラ脊椎骨 ＋1トンシンカー フリーフォール		ツチクジラ脊椎骨 ＋1トンシンカー フリーフォール
2000m	・鯨骨【B08, B11, B13】 ・丸太【L04, L06, L11】 ・TP【TP07, TP08, TP09】						・牛／豚骨【FL-05】 ・KC【KC-08, KC-09】	・鯨骨【B13】温度計付 ・丸太【L04】 ・TP【TP08】		・牛／豚骨【FL-05】 ・TP【TP07】 ・KC【KC-09】	・鯨骨【B08, B11】 ・丸太【L06, L11】 ・TP【TP09】 ・KC【KC-08】
4000m	・鯨骨【B06, B10, B14】 ・丸太【L02, L07, L12】 ・TP【TP10, TP11, TP12】 ・Chemecol【C13, C14, C15】								・KC【KC-12, KC-14, KC-16】	・鯨骨【B14】 ・Chemicol【C13, C14, C15】	・鯨骨【B06, B10】 ・丸太【L02, L07, L12】 ・TP【TP10, TP11, TP12】 ・KC【KC-12, KC-14, KC-16】
5000m	・鯨骨【B09, B17, B19】 ・丸太【L16, L17, L18】 ・TP【TP13, TP14, TP15】								・KC【KC-13, KC-15, KC-17】	・鯨骨【B09】回収 ・鯨骨【B17, B19】亡失 ・TP【TP13】	・丸太【L16, L17, L18】 ・TP【TP14, TP15】 ・KC【KC-13, KC-15, KC-17】
5000m	・鯨骨【B02, B05, B20】 ・丸太【L08, L09, L10】 ・TP【TP16, TP17, TP18】 フリーフォール		・KC【73, 74】	・鯨骨【B20】 ・丸太【L10】 ・TP【TP18】						・鯨骨【B05】 ・KC【73】	・鯨骨【B02】 ・丸太【L08, L09】 ・TP【TP16, TP17】 ・KC【74】

＊1亡失：設置後、大型動物に持ち去られた

VII. Group portrait

VIII. Notice on Using

Notice on using: Insert the following notice to users regarding the data and samples obtained.

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

Users of data or results on this cruise report are requested to submit their results to the Data Management Group of JAMSTEC.