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Cruise Report

KS-17-J04

ROV *Hyper-Dolphin*/RV *Shinseimaru*

Researches on marine ecosystem dynamics off Sanriku

Off Sanriku

Febrary 11-27th, 2017

Japan Agency for Marine-Earth Science and Technology

Contents

1. Participants

SCIENTIFIC PARTY

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Marine Technician

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HYPER DOLPHIN operation team

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2nd Submersible Tec. Officer	Katsushi Chiba
2nd Submersible Tec. Officer	Shigeru Kikuya
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Captain	Yoshiyuki Nakamura
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Oiler	Toshinori Matsui
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Steward	Yukihide Chikuba
Steward	Hiroyuki Ohbai

2. Cruise Summary

Cruise Information

● Cruise ID　KS-17-J04

● Name of vessel Shinsei-maru

● Title of the cruise Researches on marine ecosystem dynamics off Sanriku

● Chief scientist Shinji Tsuchida [JAMSTEC]

● Representative of the Science Party Katsunori Fujikura [JAMSTEC]

○ Title of proposal Researches on marine ecosystem dynamics off Sanriku

● Cruise period Febrary 11th –27th 2017

●Ports of departure / call / arrival JAMSTEC/JAMSTEC

● Research area off Sanriku

○ Research map

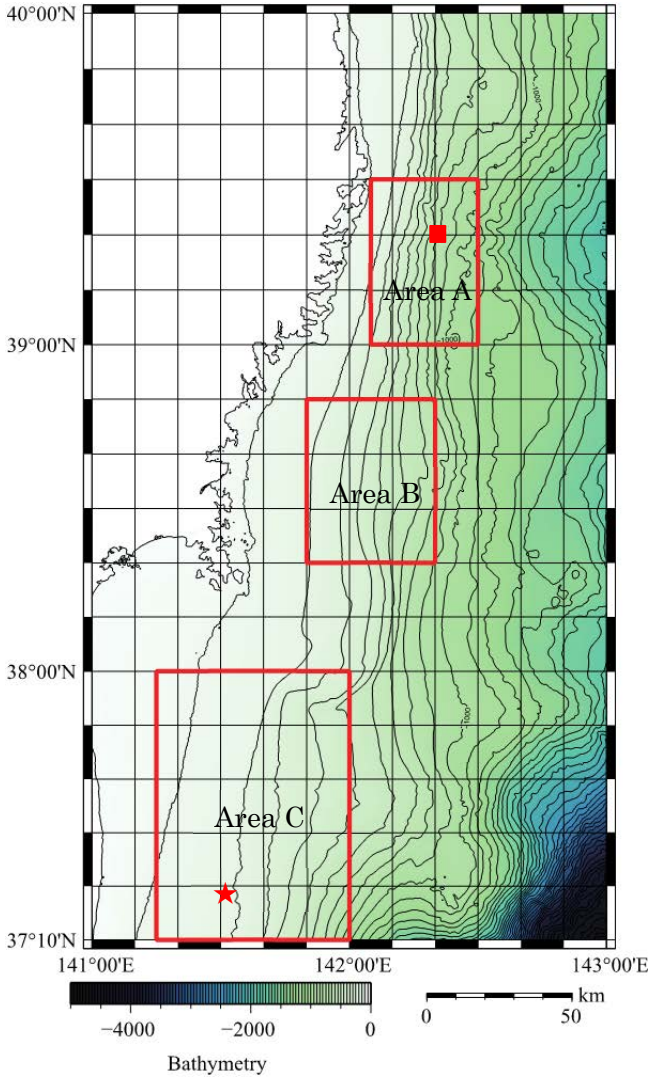


Figure Bathymetric map of the survey area. ■: Deployed point of bio-tracking system in KY15-08 Cruise. ★: Survey site of fissures found by the KS-16-19 Cruise.

Overview of the Observation

●Topographic survey

During the cruise, bathymetry and SBP data off Fukushima were obtained by SEABAT and TOPAS PS 18 System.

●Quantitative observation of benthic animals and debris using by the bottom observation camera system

The quantitative biomass of benthic animals and mass of marine debris were observed by the main HDTV and the bottom observation camera systems loaded on the rear of the Hyper-Dolphin for establishing the habitat models.

●Bioass estimation of scavengers and predators

Three types of baited cameras were deployed off Sanriku for estimating biomass of scavengers and predators attracted to the bait, contributing to establishing the ecosystem models.

○ Title of project

Project Team for Analyses of Changes in East Japan Marine Ecosystems
(Tohoku Ecosystem-Associated Marine Sciences)

3. Shipboard Log

日付 Date	時間 Local Time	内容 Note	特記事項 Description	本船位置／気象／海象 Position/Weather/Wind/Sea condition
11-Feb-17		**Scientists onboard & Anchoring at YOKOSUKA sec.4.**		
	12:30	scientists onboard.		
	13:30	Let go all shore lines & left YOKOSUKA for YOKOSUKA sec.4.		
	14:10	Let go port anchor in 28 in of water at YOKOSUKA sec.4 due to avoidance rough weather.		
	14:30-15:00	Carried out onboard education & Training for scientists.		
	18:00	Scientists meeting.		
12-Feb-17		**Up & Down port anchor. Proceeding to Research Area.**		2/12 12:00(UTC+9h)
	06:40	Up & Down port anchor.		35-01.8N, 140-17.4E
	16:40	konpira		off BOSO
	18:00	Scientists meeting.		Fine but cloudy
				NNW-4(Moderate breeze)
				2(Sea calm)
				1(Low swell short)
				Visibly: 8'
13-Feb-17		**"HPD4500" dive #1999.**		2/13 12:00(UTC+9h)
	03:00	Arrived at Research Area. Com'ced MBES mapping survey.		37-18.0N,141-23.5E
	06:23	Released XBT at <'37-18.2531N, 141-23.5164E>.		off FUKUSHIMA
	08:08	Finished MBES mapping survey, then proceeded to HPD dive point.		Fine but cloudy

	08:35	Arrived at HPD dive point.		WNW-2(Light breeze)
	09:41	Hoisted up "HPD4500".		2(Calm)
	09:46	Launched "HPD4500".		2(Low swell long)
	09:57	"HPD4500" dove & started her operation #1999.	@off SANRIKU	Visibly: 8'
	10:07	"HPD4500" landed on the sea bottom <37-18.0050N 141-23.3570E>.	D=140m	
	16:20	"HPD4500"left the sea bottom <37-18.0721N 141-24.4177E>.	D=146m	
	16:29	Refloated "HPD4500".		
	16:37	Hoisted up "HPD4500".		
	18:19	Scientists meeting.		
	16:43	Recovered "HPD4500" & finished above operation.		
	18:42	Com'ced MBES mapping survey.		
	21:17	Finished MBES mapping survey.		
	21:26	Com'ced SBP mapping survey.		
14-Feb-17		**"HPD4500" dive #2000.**		2/14 12:00(UTC+9h)
	05:03	Finished SBP mapping survey, then proceed to HPD dive point.		37-12.6N,141-20.0E
	06:00	Arrived at HPD dive point.		off Fukushima
	08:38	Hoisted up "HPD4500".		Fine but cloudy
	08:43	Launched "HPD4500".		NNW-3(Gentle breeze)
	08:54	"HPD4500" dove & started her operation #2000.	@off SANRIKU	2(Sea smooth)
	09:03	"HPD4500" landed on the sea bottom <37-11.9892N, 141-19.9998E>.	D=138m	2(Low swell long)
	16:16	"HPD4500" left the sea bottom <37-13.0534N, 141-20.3318E>.	D=139m	Visibly: 8'

	16:27	Refloated "HPD4500".		
	16:34	Hoisted up "HPD4500".		
	16:41	Recovered "HPD4500" & finished above operation.		
	18:20	Scientists meeting.		
	18:45-18:52	Com'ced out SBP mapping survey.		
	19:00	Com'ced proceeded to area B (off MIYAGI).		
15-Feb-17		**Com'ced BAITED CAMERA & "HPD4500" dive #2001.**		2/15 12:00(UTC+9h)
	06:00	Arrived at research area B (off MIYAGI).		38-20.6N,141-58.0E
	06:01	Released XBT at <38-28.2865N, 142-10.6339E>.		off MIYAGI
	06:42	Com'ced setting operation BAITED CAMERA (AT1-9), then hoisted up it.		Fine but cloudy
	06:50	Released above CAMERA & finished setting operation.		SW-3(Gentle breeze)
	7:19-7:33	Carried out 3 point calibration of above CAMERA setting point .	38-28.8833 N, 142-06.0196 E	2(Sea smooth)
	08:01	Com'ced setting operation of BAITED CAMERA (BC2-28), then hoisted up it.		1(No swell)
	08:18	Released top buoy & finished setting operation.		Visibly:8'
	08:36	Com'ced setting operation of BAITED CAMERA (BC2-29), then hoisted up it.		
	08:53	Released top buoy & finished setting operation.		
	08:55	proceeded to HPD dive point.		
	9:35	Arrived at HPD dive point.		
	10:04	Hoisted up "HPD4500".		
	10:08	Launched "HPD4500".		

	10:18	"HPD4500" dove & started her operation #2001.		
	10:38	"HPD4500" landed on the sea bottom <38-30.5815N, 141-58.5063E>.	D=314m	
	12:40	"HPD4500" left the sea bottom <38-30.5890N, 141-57.7179E>.	D=300m	
	12:55	Refloated "HPD4500".		
	13:01	Hoisted up "HPD4500".		
	13:07	Recovered "HPD4500" & finished above operation.		
	14:11	Sent out release command to BAITED CAMERA (AT1-9)		
	14:25	Refloated BAITED CAMERA (AT1-9).		
	14:36	Recovered BAITED CAMERA (AT1-9).		
	15:18-15:53	Recovered BAITED CAMERA (BC2-28)		
	16:26-16:53	Recovered BAITED CAMERA (BC2-29)		
	18:07	Scientists meeting.		
	22:00-23:00	Shifted to setting point of BEITED CAMERA.		
16-Feb-17		**Com'ced BAITED CAMERA & "HPD" dive #2003.**		2/16 12:00(UTC+9h)
	06:34	Com'ced setting operation of BEITED CAMERA (AT1-10), then hoisted up it.		38-30.0N,142-10.9E
	06:36	Released above CAMERA & finished setting operation & Carried out 3 point calibration of above CAMERA setting point.	38-23.0013 N, 142-10.5002 E	off MIYAGI
	07:53	Com'ced setting operation of BEITED CAMERA (AT2-8), then hoisted up it.		Fine but cloudy
	07:55	Released above CAMERA & finished setting operation.		SW-5(Fresh breeze)
	08:29-08:46	Carried out 3 point calibration of CAMERA setting point.	38-23.7964 N,	3(Sea slight)

			142-09.8584 E	
	09:12	Com'ced setting operation of BEITED CAMERA (BC1-30), then hoisted up it.		2(Low swell long)
	09:37	Released top buoy & finished setting operation.		Visibly:8'
	09:40	Proceed to HPD dive point.		
	10:20	Arrived at HPD dive point.		
	10:43	Hoisted up "HPD".		
	10:48	Launched "HPD".		
	11:00	"HPD" dove & started her operation #2002.		
	11:27	"HPD" landed on the bottom <38-29.9564N, 142-11.2005E>.	D=615m	
	12:45	"HPD" left the sea bottom<38-29.9973N, 142-10.7367E>,	D=607m	
	13:05	Refloated "HPD".		
	13:11	Hoisted up "HPD".		
	13:17	Recovered "HPD" & finished above operation.		
	14:04	Sent out release command to BAITED CAMERA (AT1-10).		
	14:22	Refloated BAITED CAMERA (AT1-10).		
	14:34	Recovered BAITED CAMERA (AT1-10).		
	14:52	Sent out release command to BAITED CAMERA (AT2-8).		
	15:08	Refloated BAITED CAMERA (AT2-8).		
	15:18	Recovered BAITED CAMERA (AT2-8).		
	15:52-16:24	Recovered BAITED CAMERA (BC1-30).		
	16:30	Com'ced proceeding to ISHINOMAKI.		
	18:35	Scientists meeting.		
	20:55	Arrived at off ISHINOMAKI.		

17-Feb-17		**Arrived at ISHINOMAKI. Finished leg.1 Cruise.**		2/17 12:00(UTC+9h)
	09:00	Arrived at ISHINOMAKI.		38-25.2N,141-16.1E
	11:00	Scientists left ship.		off MIYAGI
				Overcast
				SSW-3(Gentle breeze)
				1(Calm)
				0(No swell)
				Visibly:8'
18-Feb-17		**Carried out operation test of BAITED CAMERA (MT1).**		2/18 12:00(UTC+9h)
	08:00	Scientists onboard.		37-51.0N,141-22.0E
	09:00	Let go all shore lines & left ISHINOMAKI for research area C.		East of off SOMA BAY
	09:40-10:00	Carried out onboard education & training for scientists.		Fine but cloudy
	14:31-15:07	Carried out operation test of BAITED CAMERA (MT1).		NW-5(Fresh breeze)
	15:35	Com'ced proceeding to off Sanriku.		3(Sea Slight)
	17:57	Scientists meeting.		1(Low swell short)
				Visibly:8'
19-Feb-17		**Com'ced BAITED CAMERA.**		2/19 12:00(UTC+9h)
	01:00	Arrived at off SANRIKU.		38-51.9N,142-07.1E
	07:16	Com'ced setting operation of BAITED CAMERA (AT1-11), then hoisted up it.		East of off OFUNATO
	07:17	Released above CAMERA & finished setting operation.		Fine but cloudy

	08:02	Com'ced setting operation of BAITED CAMERA (AT2-9), then hoisted up it.		West-7(Near gale)
	08:03	Released above CAMERA & finished setting operation.		5(Sea rough)
	08:48	Com'ced setting operation of BAITED CAMERA (MT1-1), then hoisted up it.		3(Moderate short)
	08:52	Released above CAMERA & finished setting operation.		Visibly:8'
	09:19	Com'ced setting operation of BAITED CAMERA (BC1-31), then hoisted up it.		
	09:32	Released above CAMERA & finished setting operation.		
	09:45-10:02	Carried out 3 point calibration of BAITED CAMERA (MT1-1) setting point.		
	10:13-10:32	Carried out 3 point calibration of BAITED CAMERA (AT2-9) setting point.		
	10:42-11:01	Carried out 3 point calibration of BAITED CAMERA (AT1-11) setting point.		
	13:04	Released BAITED CAMERA (AT1-11).		
	13:14	Surfaced BAITED CAMERA (AT1-11).		
	13:27	Recovered BAITED CAMERA (AT1-11).		
	13:55	Released BAITED CAMERA (AT2-9).		
	14:04	Surfaced BAITED CAMERA (AT2-9).		
	14:16	Recovered BAITED CAMERA (AT2-9).		
	15:02	Released BAITED CAMERA (MT1-1).		
	15:13	Surfaced BAITED CAMERA (MT1-1).		
	15:30	Recovered BAITED CAMERA (MT1-1).		
	16:04-16:27	Recovered BAITED CAMERA (BC1-31).		
	18:00	Scientists meeting.		
20-Feb-17		**"HPD" dive #2003 & proceeding to avoidance area.**		2/20 12:00(UTC+9h)
	06:24	Released XBT at <38-54.0680N, 141-55.3839E>.		38-53.0N,141-54.0E
	08:15	Hoisted up "HPD".		off OFUNATO

	08:19	Launched "HPD".		Overcast
	08:32	"HPD" dove & started her operation #2003.		SSW-5(Fresh breeze)
	08:46	"HPD" landed on the sea bottom <38-54.3791N, 141-54.3840E>.	D=159m	3(Sea slight)
	11:11	"HPD" left the sea bottom <38-54.4149N, 141-54.3028E>.	D=158m	1(Low swell short)
	11:19	Refloated "HPD".		Visibly-8'
	11:27	Hoisted up "HPD".		
	11:31	Recovered "HPD" & finished above operation.		
	11:45	Com'ced proceeding to avoidance area (ISHINOMAKI WAN) due to rough sea.		
	16:13	Scientists meeting.		
21-Feb-17		**Anchoring at off ISHIMAKI.**		2/21 12:00(UTC+9h)
		Avoided to rough sea at off ISHIMAKI.		38-21.0N,141-17.6E
				off ISHINOMAKI
				Fine but cloudy
				WNW-8(Gale)
				4(Sea moderate)
				3(Moderate short)
				Visibly-8'
22-Feb-17		**Com'ced BAITED CAMERA.**		2/22 12:00(UTC+9h)
	03:00	Finished avoiding rough sea & com'ced proceeding to research area B.		38-22.8N,142-16.6E
	08:40	Arrived at research area B (off MIYAGI).		off MIYAGI
	09:12	Com'ced setting operation of BAITED CAMERA (AT2-10), then hoisted up it.		Fine but cloudy

	09:15	Released above CAMERA & finished setting operation.		West-4(Moderate breeze)
	09:44	Com'ced setting operation of BAITED CAMERA (AT1-12), then hoisted up it.		2(Sea smooth)
	09:46	Released above CAMERA & finished setting operation.		3(Moderate short)
	10:17	Com'ced setting operation of BEITED CAMERA (MT1-2), then hoisted up it.		Visibly-8'
	10:20	Released top buoy & finished setting operation.		
	10:50-11:16	Carried out 3 point calibration of BAITED CAMERA (MT1-2) setting point.		
	11:19-11:39	Carried out 3 point calibration of BAITED CAMERA (AT1-12) setting point.		
	11:41-12:04	Carried out 3 point calibration of BAITED CAMERA (AT2-10) setting point.		
	14:30	Released BAITED CAMERA (AT2-10).		
	14:51	Surfaced BAITED CAMERA (AT2-10).		
	15:01	Recovered above BAITED CAMERA (AT2-10).		
	15:20	Released BAITED CAMERA (AT1-12).		
	15:39	Surfaced BAITED CAMERA (AT1-12).		
	15:48	Recovered above BAITED CAMERA (AT1-12).		
	16:07	Released BAITED CAMERA (MT1-2).		
	16:31	Surfaced BAITED CAMERA (MT1-2).		
	16:43	Recovered above BAITED CAMERA (MT1-2).		
	16:50	Com'ced proceeding to research area A (off IWATE).		
23-Feb-17		**"HPD" dive #2004.**		2/23 12:00(UTC+9h)
	05:10	Finished research for BIO TRACKING SYSTEM STATION running, then proceeded to "HPD" dive point.		39-14.7N,142-18.8E
				off IWATE
	06:09	Released XBT <39-14.6200N,142-21.7371E>.		Overcast
	06:40	Arrived at "HPD" dive point.		WSW-1(Light air)

	07:54	Hoisted up "HPD".		2(Sea smooth)
	07:58	Launched "HPD".		2(Low swell long)
	08:10	"HPD" dove & started her operation #2004.	D=787m	Visibly-8'
	08:40	"HPD" launched on the sea bottom <39-14.7138N, 142-18.4711E>.	D=757m	
	13:09	"HPD" left the sea bottom <39-14.4396N, 142-18.5590E>.		
	13:31	Refloated "HPD".		
	13:39	Hoisted up "HPD".		
	13:44	Recovered "HPD" & finished above operation.		
	14:20	Com'ced proceeding to <off KAMAISHI> due to rough sea.		
	16:00	Arrived at avoidance area (off KAMAISHI), then com'ced avoidance rough sea.		
24-Feb-17		**Anchoring at off ISHINOMAKI.**		2/14 12:00(UTC+9h)
	17:50-18:30	Scientists meeting.		39-15.8N,141-56.7E
	23:04	Started searching of BIO TRACKING SYSTEM STAION.		off IWATE
				Cloudy
				West-4(Moderate breeze)
				2(Sea smooth)
				2(Low swell long)
				Visibly-7'
25-Feb-17		**"HPD" dive #2005.**		2/25 12:00(UTC+9h)
	04:45	Finished research for BIO TRACKING SYSTEM STATION running, then proceeded to setting point of BEITED CAMERA.		39-15.8'N, 141-56.7'E
				off IWATE
	05:40	Arrived at setting point.		Cloudy

	06:44	Com'ced setting operation of BAOTED CAMERA (MT1-3), then launched top buoy.		WSW-4(Moderate breeze)
	06:50	Released top buoy & finished setting operation.		3(Sea slight)
	06:55-07:10	Shifted to "HPD" dive point.		2(Low swell long)
	07:46	Hoisted up "HPD".		Visibly-8'
	07:50	Launched "HPD".		
	08:01	"HPD" dove & started her operation #2004.		
	08:26	"HPD" launched on the sea bottom <39-14.7138N, 142-18.4711E>.		
	10:31	"HPD" left the sea bottom <39-14.4396N, 142-18.5590E>.		
	11:21	Refloated "HPD".		
	11:37	Recovered "HPD" & finished above operation.		
	11:45	Proceeded to setting point of BAITED CAMERA (MT1-3).		
	12:00-12:19	Carried out 3 point calibration of BAITED CAMERA (MT1-3) setting point.		
	13:14	Surfaced BAITED CAMERA (MT1-3).		
	13:25-13:29	Recovered above BAITED CAMERA (MT1-3).		
	14:00	Left research area for YOKOSUKA.		
	18:05	Scientists meeting.		
26-Feb-17		**Proceeding to YOKOSUKA.**		2/26 12:00(UTC+10h)
	18:12	Scientists meeting.		35-17.0N,140-39.0E
				off BOUSOU
				Fine but cloudy
				NNW-3(Gentle breeze)
				2(Sea smooth)

				2(Low swell long)
				Visibly-8'
27-Feb-17		**The Shinseimaru arrived at YOKOSUKA. End of cruise.**		
	9:00	The Shinseimaru arrived at YOKOSUKA. End of cruise.		
		KS-17-J04 scientists disembarked.		

4. Preliminary results

4-1. Dive reports

Dive Report HD#1999

Date: Feb 13, 2017
Site: Off Fukushima **Depth:** 140-144m
Landing (Lat., Long., Time, Depth): 37°18.005'N, 141°23.357'E, 10:07, 140m
Leaving (Lat., Long., Time, Depth): 37°18.072'N, 141°24.417'E, 16:20, 146m
Pilot: Teppei Kido **Co-Pilot**: Jun Takenouchi
Observer: Takafumi Kasaya

Theme: Researches on marine ecosystem dynamics off Sanriku

Purpose:

1. Visual observation around a small cliff.
2. Sampling mud and benthic animals.

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Sampling box
5. MBARI core x3
6. Kumade scoop sampler

Sampling Points and Markers:

Time	Position	Depth (m)	Events
14:38	39°18.658' N, 142°18.296'E	704	Carrying No. 3 bio-tracking base station to
11:19			Coring (#3)
11:52	37°18.0058' N, 141°23.4783'E	142	Sampling some shells (#2 bottle)
16:14	37°18.0721' N, 141°23.4177'E	146	Sampling starfishes (#3 bottle)

Dive Summary

The purpose of *HPD dive #1999* was to observe around the low cliffs detected by the MBES surveys just after the Off Fukushima earthquake occurred at last November and investigate

the seafloor condition after the earthquake. We could not find any low cliff or fissure and seafloor was covered soft mud sediment. To find a cliff and fissure, we continue to observe toward North-West direction. At the end of dive, we could find small fissure, continued to observed lager fissure about 2 m wide. On the bottom of the fissure, A swarm of amphipods (family Lysianassidae) was found.

Dive Log

Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
09:41:48			-				-					吊り上げ
09:46:03			-				-					着水
09:58:48			-				-					潜航開始
10:02:31	94.3	37	-	18.0038	N	141	-	23.3698	E			
10:07:13	139.9	37	-	18.0049	N	141	-	23.3559	E			海底視認
10:07:37	139	37	-	18.0046	N	141	-	23.3564	E			着底
10:07:50	142.7	37	-	18.0043	N	141	-	23.3561	E			魚 ヒトデ
10:08:20	143	37	-	18.0035	N	141	-	23.3574	E			底質泥
10:08:33	142.5	37	-	18.0031	N	141	-	23.3576	E			アオメエソ
10:09:29	141.8	37	-	18.0034	N	141	-	23.3602	E			海底に穴
10:10:01	141.1	37	-	18.0033	N	141	-	23.3636	E			ヒトデ
10:11:19	140.7	37	-	18.0034	N	141	-	23.3706	E			カレイ
10:13:58	141.4	37	-	18.0033	N	141	-	23.3889	E			カレイ
10:14:16	141.9	37	-	18.0030	N	141	-	23.3912	E			ヒトデ
10:15:34	141.6	37	-	18.0048	N	141	-	23.4001	E			ヒトデ
10:16:00	142	37	-	18.0052	N	141	-	23.4020	E			ヒトデ
10:16:29	142.5	37	-	18.0049	N	141	-	23.4058	E			ホウボウの仲間
10:17:33	141.1	37	-	18.0063	N	141	-	23.4121	E			魚 ヒトデ
10:18:54	142.3	37	-	18.0066	N	141	-	23.4196	E			ヒトデ
10:19:09	142.4	37	-	18.0059	N	141	-	23.4206	E			カイメン
10:19:27	141.9	37	-	18.0063	N	141	-	23.4232	E			カレイ
10:23:38	141.9	37	-	18.0035	N	141	-	23.4472	E			ホウボウの仲間
10:23:58	142.5	37	-	18.0030	N	141	-	23.4483	E			カイメン
10:24:38	141.4	37	-	18.0034	N	141	-	23.4530	E			ホウボウの仲間
10:25:12	141.9	37	-	18.0037	N	141	-	23.4580	E			ヒトデ
10:25:40	141.3	37	-	18.0041	N	141	-	23.4608	E			ホウボウの仲間
10:26:21	141.7	37	-	18.0056	N	141	-	23.4673	E			ヒトデ
10:27:08	140.7	37	-	18.0062	N	141	-	23.4732	E			ヒトデ

10:27:35	141.7	37	-	18.0062	N	141	-	23.4768	E			段差視認
10:28:54	142.5	37	-	18.0049	N	141	-	23.4806	E			崖観察
10:29:31	143.9	37	-	18.0031	N	141	-	23.4818	E			ヒトデ
10:29:46	143.2	37	-	18.0033	N	141	-	23.4832	E			濁り強い
10:32:23	143.7	37	-	18.0033	N	141	-	23.4841	E			海底崩れている
10:32:45	151.5	37	-	18.0032	N	141	-	23.4830	E			二枚貝死にがら
10:33:19	145.7	37	-	18.0040	N	141	-	23.4832	E			海底断面？
10:33:53	144	37	-	18.0044	N	141	-	23.4831	E			死にがらはツキガイ科？？
10:36:12	144.7	37	-	18.0044	N	141	-	23.4832	E			ホウボウの仲間
10:37:39	144.9	37	-	18.0041	N	141	-	23.4831	E			海底観察カメラ OFF
10:41:58	146.5	37	-	18.0040	N	141	-	23.4829	E			海底白色域　ふよふよしている　バクテリアマット？
10:45:57	144.7	37	-	18.0041	N	141	-	23.4831	E			崖部分に死にがら埋まっている
10:47:04	146.2	37	-	18.0040	N	141	-	23.4830	E			割れ目に魚
10:49:17	146.3	37	-	18.0040	N	141	-	23.4830	E			スラープガンで貝殻サンプリング用意
10:53:23	147.9	37	-	18.0046	N	141	-	23.4827	E			スラープガンで貝殻サンプリング（ボトル1）
11:08:24	146.1	37	-	18.0043	N	141	-	23.4832	E			海底観察カメラ、砂中に何か出現
11:15:17	147.8	37	-	18.0043	N	141	-	23.4819	E			エムバリコア濃い緑、バクテリアマット採泥
11:18:29	144.4	37	-	18.0038	N	141	-	23.4822	E			筒折れた
11:35:04	144.5	37	-	17.9998	N	141	-	23.4823	E			白い貝殻？が複数あり。その前で着底中。
11:40:00	144.2	37	-	18.0002	N	141	-	23.4821	E			ハイパー動いた。底泥を撮影
11:41:55	142.4	37	-	18.0005	N	141	-	23.4801	E			20 秒前に岩と魚
11:45:29	146.3	37	-	17.9981	N	141	-	23.4793	E			進路変更、割れ目に向かって北東へ進行
11:50:00	142.1	37	-	18.0045	N	141	-	23.4829	E			崖部境界付近に魚
11:51:46	144.4	37	-	18.0084	N	141	-	23.4859	E			魚
11:52:11	142.7	37	-	18.0096	N	141	-	23.4873	E			崖周辺に貝殻たくさん、ヒトデ
11:53:22	144.8	37	-	18.0109	N	141	-	23.4889	E			着底、貝殻など撮影開

												始
11:59:18	144.6	37	-	18.0109	N	141	-	23.4888	E			スラープガンで貝殻サンプリング（ボトル2）
12:03:30	144.2	37	-	18.0106	N	141	-	23.4885	E			ボトル2のサンプリングにて巻貝採取
12:06:40	145.1	37	-	18.0101	N	141	-	23.4883	E			ホースにサンプルつまる
12:12:10	145.6	37	-	18.0103	N	141	-	23.4885	E			キタクシノハクモヒトデ
12:18:06	146.7	37	-	18.0102	N	141	-	23.4883	E			移動再開
12:18:29	145.8	37	-	18.0104	N	141	-	23.4884	E			ヒトデ
12:20:13	142.5	37	-	18.0124	N	141	-	23.4905	E			ヒトデ（？）
12:21:21	142.8	37	-	18.0147	N	141	-	23.4942	E			ヒトデ
12:23:13	142.7	37	-	18.0182	N	141	-	23.4986	E			ヒトデ
12:24:06	142.4	37	-	18.0210	N	141	-	23.5008	E			ヒトデ
12:25:15	141.9	37	-	18.0239	N	141	-	23.5040	E			ヒトデ
12:26:31	141.9	37	-	18.0269	N	141	-	23.5071	E			ヒトデ赤
12:27:01	142.4	37	-	18.0281	N	141	-	23.5081	E			ヒトデ白
12:27:34	143.4	37	-	18.0298	N	141	-	23.5092	E			まだら模様の鮫
12:28:07	142.2	37	-	18.0308	N	141	-	23.5101	E			ヒトデ赤
12:28:41	141.6	37	-	18.0331	N	141	-	23.5124	E			ヒトデ紅白
12:29:27	142.5	37	-	18.0349	N	141	-	23.5137	E			ヒトデ白
12:30:20	142.8	37	-	18.0365	N	141	-	23.5163	E			ハゼ科魚類
12:30:47	142.4	37	-	18.0379	N	141	-	23.5169	E			赤ヒトデ2
12:31:13	142.6	37	-	18.0392	N	141	-	23.5178	E			赤ヒトデ7個体が等間隔
12:31:52	144.1	37	-	18.0405	N	141	-	23.5193	E			白ヒトデ
12:32:29	141.2	37	-	18.0420	N	141	-	23.5205	E			赤ヒトデ 3
12:33:12	143.4	37	-	18.0443	N	141	-	23.5231	E			赤ヒトデ2、白ヒトデ1
12:33:39	142.5	37	-	18.0466	N	141	-	23.5253	E			赤ヒトデ2
12:33:57	141.9	37	-	18.0482	N	141	-	23.5266	E			白ヒトデ
12:34:07	142	37	-	18.0489	N	141	-	23.5275	E			赤ヒトデ
12:34:46	142.6	37	-	18.0517	N	141	-	23.5299	E			赤ヒトデ3、白ヒトデ 1
12:35:08	142.7	37	-	18.0530	N	141	-	23.5311	E			白ヒトデ
12:35:19	142.2	37	-	18.0535	N	141	-	23.5314	E			赤ヒトデ2
12:35:36	142.2	37	-	18.0543	N	141	-	23.5320	E			赤ヒトデ3
12:35:49	142.5	37	-	18.0547	N	141	-	23.5327	E			海底観察カメラ進行方向に堆積物流れた跡
12:36:28	142.3	37	-	18.0567	N	141	-	23.5338	E			赤ヒトデ4
12:36:38	141.9	37	-	18.0570	N	141	-	23.5342	E			ホウボウ、白ヒトデ

12:37:12	142.5	37	-	18.0594	N	141	-	23.5356	E			赤ヒトデ2、白ヒトデ1
12:37:37	143	37	-	18.0604	N	141	-	23.5368	E			イソギンチャク
12:37:49	142.2	37	-	18.0607	N	141	-	23.5373	E			赤ヒトデ2
12:38:34	141.6	37	-	18.0630	N	141	-	23.5393	E			赤ヒトデ2
12:39:01	142.2	37	-	18.0646	N	141	-	23.5402	E			ホウボウ
12:39:19	141.3	37	-	18.0653	N	141	-	23.5405	E			白ヒトデ
12:39:43	142.8	37	-	18.0668	N	141	-	23.5424	E			赤ヒトデ
12:40:05	143.1	37	-	18.0678	N	141	-	23.5435	E			赤ヒトデ1、白ヒトデ5
12:40:59	142.2	37	-	18.0703	N	141	-	23.5462	E			赤ヒトデ3
12:41:39	142.9	37	-	18.0718	N	141	-	23.5474	E			白ヒトデ
12:42:01	142.1	37	-	18.0737	N	141	-	23.5488	E			赤ヒトデ2
12:42:28	141.5	37	-	18.0746	N	141	-	23.5498	E			赤ヒトデ
12:42:55	141.7	37	-	18.0771	N	141	-	23.5515	E			魚
12:44:13	142.5	37	-	18.0805	N	141	-	23.5558	E			白ヒトデ3、赤ヒトデ
12:45:55	142.1	37	-	18.0854	N	141	-	23.5576	E			赤ヒトデ2、白ヒトデ
12:46:14	142.3	37	-	18.0869	N	141	-	23.5588	E			赤ヒトデ3、白ヒトデ2
12:47:01	142.5	37	-	18.0908	N	141	-	23.5634	E			赤ヒトデ1、白ヒトデ1
12:47:18	143	37	-	18.0915	N	141	-	23.5638	E			白ヒトデ1
12:47:47	142.3	37	-	18.0926	N	141	-	23.5651	E			赤ヒトデ
12:48:11	142	37	-	18.0940	N	141	-	23.5663	E			赤ヒトデ
12:48:22	142.4	37	-	18.0949	N	141	-	23.5665	E			白ヒトデ
12:48:31	142.5	37	-	18.0954	N	141	-	23.5672	E			白ヒトデ
12:48:35	142.5	37	-	18.0954	N	141	-	23.5672	E			クモヒトデ
12:48:45	141.8	37	-	18.0958	N	141	-	23.5678	E			イカっぽい魚
12:49:12	142.3	37	-	18.0974	N	141	-	23.5687	E			赤ヒトデ
12:49:35	143.3	37	-	18.0989	N	141	-	23.5698	E			赤ヒトデ1、白ヒトデ1
12:49:49	143	37	-	18.0996	N	141	-	23.5706	E			赤ヒトデ3
12:50:02	143.6	37	-	18.1006	N	141	-	23.5718	E			白ヒトデ1、赤ヒトデ4
12:51:44	142.9	37	-	18.1019	N	141	-	23.5753	E			着底
12:57:31	142.8	37	-	18.1019	N	141	-	23.5753	E			ハゼ科魚類
12:58:29	143.5	37	-	18.1019	N	141	-	23.5755	E			段差観察中
12:58:58	143.2	37	-	18.1020	N	141	-	23.5755	E			進行再開
13:00:51	142.5	37	-	18.1064	N	141	-	23.5773	E			白ヒトデ2
13:01:43	144.4	37	-	18.1078	N	141	-	23.5786	E			赤ヒトデ3＋3
13:02:32	141.8	37	-	18.1102	N	141	-	23.5803	E			白ヒトデ1＋まだら模様の魚＋赤ヒトデ1
13:03:04	142.1	37	-	18.1116	N	141	-	23.5815	E			赤ヒトデ4

13:03:45	142.4	37	-	18.1137	N	141	-	23.5838	E			なまこ？
13:04:36	141.8	37	-	18.1163	N	141	-	23.5871	E			赤ヒトデ2
13:05:06	142.5	37	-	18.1177	N	141	-	23.5895	E			赤ヒトデ1
13:06:01	142.5	37	-	18.1198	N	141	-	23.5905	E			ほうぼう？
13:07:07	141.9	37	-	18.1211	N	141	-	23.5942	E			赤ヒトデ1
13:07:42	141.6	37	-	18.1250	N	141	-	23.5989	E			濁りは高度がたかくなったせい？
13:08:44	143.4	37	-	18.1298	N	141	-	23.6033	E			ほうぼう？通過
13:09:44	143	37	-	18.1349	N	141	-	23.6085	E			筒状のごみ
13:10:00	141.9	37	-	18.1360	N	141	-	23.6091	E			白イソギンチャク
13:10:56	141.6	37	-	18.1384	N	141	-	23.6132	E			魚
13:11:55	141.9	37	-	18.1411	N	141	-	23.6189	E			貝殻
13:13:10	142.5	37	-	18.1430	N	141	-	23.6233	E			段差観察中
13:13:26	142.8	37	-	18.1430	N	141	-	23.6234	E			ビークル着底、濁り強
13:24:25	145	37	-	18.1431	N	141	-	23.6238	E			まだら模様の魚
13:26:20	144.5	37	-	18.1431	N	141	-	23.6237	E			ビークル航走再開
13:27:27	146.7	37	-	18.1433	N	141	-	23.6236	E			白ヒトデ1
13:29:32	142.5	37	-	18.1532	N	141	-	23.6359	E			魚
13:30:08	144.3	37	-	18.1544	N	141	-	23.6375	E			巻貝
13:30:19	142.6	37	-	18.1550	N	141	-	23.6379	E			赤ヒトデ1
13:30:38	143.1	37	-	18.1562	N	141	-	23.6390	E			白ヒトデ1、イソギンチャク1、ホウボウ1、クモヒトデ1
13:31:48	144.6	37	-	18.1594	N	141	-	23.6431	E			赤ヒトデ1
13:32:02	142	37	-	18.1606	N	141	-	23.6439	E			白イソギンチャク
13:32:24	143.7	37	-	18.1626	N	141	-	23.6450	E			ヒトデ1
13:32:45	142.4	37	-	18.1641	N	141	-	23.6462	E			赤ヒトデ1
13:33:02	143.4	37	-	18.1660	N	141	-	23.6478	E			クモヒトデ3
13:34:20	144.2	37	-	18.1712	N	141	-	23.6518	E			クモヒトデ2
13:34:46	142.3	37	-	18.1734	N	141	-	23.6530	E			ヒトデ spA1、ヒトデ spB1、ウミシダ1、ホウボウ1
13:35:35	143.2	37	-	18.1774	N	141	-	23.6566	E			白ヒトデ1
13:36:04	143.5	37	-	18.1796	N	141	-	23.6586	E			クモヒトデ、ウミシダ1
13:36:17	143.5	37	-	18.1805	N	141	-	23.6591	E			赤ヒトデ3
13:36:27	143.3	37	-	18.1813	N	141	-	23.6601	E			ビニール
13:36:40	143.9	37	-	18.1829	N	141	-	23.6617	E			白ヒトデ1
13:37:18	142.8	37	-	18.1853	N	141	-	23.6646	E			バクテリアマット？

13:37:35	142.9	37	-	18.1857	N	141	-	23.6656	E			クモヒトデ4
13:38:20	142.8	37	-	18.1869	N	141	-	23.6663	E			白ヒトデ1
13:38:48	142.6	37	-	18.1881	N	141	-	23.6671	E			クモヒトデ1
13:39:30	143.5	37	-	18.1914	N	141	-	23.6703	E			赤ヒトデ2
13:40:50	142.2	37	-	18.1929	N	141	-	23.6712	E			クモヒトデ2
13:41:12	143	37	-	18.1930	N	141	-	23.6712	E			赤ヒトデ1、白ヒトデ1
13:42:47	142.3	37	-	18.1969	N	141	-	23.6750	E			ヒトデ2、
13:43:28	142.9	37	-	18.1981	N	141	-	23.6776	E			まだら模様の魚
13:43:45	142.5	37	-	18.1972	N	141	-	23.6809	E			赤ヒトデ1
13:43:59	142.3	37	-	18.1993	N	141	-	23.6825	E			クモヒトデ1
13:44:56	142.7	37	-	18.2025	N	141	-	23.6854	E			赤ヒトデ2
13:45:14	143.5	37	-	18.2030	N	141	-	23.6878	E			赤ヒトデ2
13:45:28	143	37	-	18.2045	N	141	-	23.6888	E			白ヒトデ1
13:46:12	142.5	37	-	18.2095	N	141	-	23.6928	E			赤ヒトデ3
13:46:33	143.5	37	-	18.2109	N	141	-	23.6944	E			赤ヒトデ3
13:47:17	144.8	37	-	18.2141	N	141	-	23.6978	E			赤ヒトデ1、
13:49:38	144	37	-	18.2266	N	141	-	23.7080	E			白ヒトデ2
13:50:53	143.8	37	-	18.2335	N	141	-	23.7141	E			赤ヒトデ1
13:51:09	144.1	37	-	18.2345	N	141	-	23.7146	E			白ヒトデ2
13:51:31	142.9	37	-	18.2365	N	141	-	23.7161	E			魚
13:51:33	142.9	37	-	18.2365	N	141	-	23.7161	E			白ヒトデ1、赤ヒトデ2
13:51:51	143.9	37	-	18.2380	N	141	-	23.7167	E			クモヒトデ2
13:52:06	143.3	37	-	18.2392	N	141	-	23.7174	E			赤ヒトデ1
13:52:20	143.7	37	-	18.2401	N	141	-	23.7182	E			赤ヒトデ、ヒトデ小1
13:53:47	142.1	37	-	18.2409	N	141	-	23.7210	E			ビークル着底
14:01:03	141.8	37	-	18.2410	N	141	-	23.7226	E			ビークル航走再開
14:23:15	143.8	37	-	18.0059	N	141	-	23.7164	E			白ヒトデ1
14:23:53	146.1	37	-	18.0059	N	141	-	23.7125	E			赤ヒトデ1
14:24:02	144.7	37	-	18.0059	N	141	-	23.7128	E			白ヒトデ1
14:25:46	144.6	37	-	18.0072	N	141	-	23.7243	E			赤ヒトデ1
14:26:11	145.7	37	-	18.0084	N	141	-	23.7311	E			赤ヒトデ1
14:27:09	145.7	37	-	18.0091	N	141	-	23.7371	E			カレイ1
14:27:16	146.5	37	-	18.0092	N	141	-	23.7387	E			ホウボウ1
14:27:52	147.4	37	-	18.0098	N	141	-	23.7428	E			赤ヒトデ1
14:28:29	146	37	-	18.0107	N	141	-	23.7480	E			赤ヒトデ1、ウミサボテン1、白ヒトデ1
14:28:45	146.1	37	-	18.0115	N	141	-	23.7537	E			赤ヒトデ1

14:28:53	144.8	37	-	18.0119	N	141	-	23.7558	E			赤ヒトデ1
14:29:25	145.7	37	-	18.0122	N	141	-	23.7590	E			赤ヒトデ1
14:29:41	144.5	37	-	18.0129	N	141	-	23.7640	E			赤ヒトデ2
14:29:52	145	37	-	18.0131	N	141	-	23.7664	E			赤ヒトデ1
14:30:02	146.3	37	-	18.0133	N	141	-	23.7687	E			赤ヒトデ1、白ヒトデ1
14:30:18	145.2	37	-	18.0135	N	141	-	23.7710	E			赤ヒトデ1
14:30:29	145.3	37	-	18.0138	N	141	-	23.7734	E			赤ヒトデ1、カレイ1
14:31:05	146.6	37	-	18.0145	N	141	-	23.7817	E			赤ヒトデ1
14:32:03	145.6	37	-	18.0132	N	141	-	23.7916	E			赤ヒトデ2
14:32:11	145.7	37	-	18.0127	N	141	-	23.7937	E			白ヒトデ1
14:32:22	145.3	37	-	18.0125	N	141	-	23.7956	E			赤ヒトデ1
14:32:30	145.3	37	-	18.0125	N	141	-	23.7956	E			ホウボウ
14:32:53	146.3	37	-	18.0112	N	141	-	23.8013	E			白ヒトデ1、赤ヒトデ1
14:33:13	145.8	37	-	18.0103	N	141	-	23.8052	E			赤ヒトデ1
14:33:51	144.9	37	-	18.0090	N	141	-	23.8136	E			赤ヒトデ1
14:34:16	145.4	37	-	18.0083	N	141	-	23.8181	E			赤ヒトデ1
14:35:07	145.9	37	-	18.0063	N	141	-	23.8300	E			ウミサボテン
14:35:26	145.5	37	-	18.0055	N	141	-	23.8349	E			クモヒトデ1、赤ヒトデ1
14:36:01	146.8	37	-	18.0035	N	141	-	23.8438	E			魚
14:36:22	145.1	37	-	18.0032	N	141	-	23.8481	E			赤ヒトデ1
14:36:30	146	37	-	18.0028	N	141	-	23.8504	E			白ヒトデ1
14:36:37	146	37	-	18.0028	N	141	-	23.8504	E			赤ヒトデ1
14:36:43	145.3	37	-	18.0025	N	141	-	23.8523	E			ウミサボテン1
14:36:50	146.2	37	-	18.0020	N	141	-	23.8552	E			赤ヒトデ1
14:37:04	145.5	37	-	18.0018	N	141	-	23.8576	E			白ヒトデ1
14:37:20	145.6	37	-	18.0012	N	141	-	23.8623	E			赤ヒトデ1
14:37:27	145.6	37	-	18.0012	N	141	-	23.8623	E			赤ヒトデ1
14:37:37	145.8	37	-	18.0009	N	141	-	23.8652	E			白ヒトデ1、赤ヒトデ1、ホウボウ1、ウミサボテン
14:37:59	145.2	37	-	18.0005	N	141	-	23.8733	E			魚通過
14:38:18	144.5	37	-	18.0001	N	141	-	23.8772	E			ホウボウ1
14:38:38	145	37	-	17.9998	N	141	-	23.8793	E			ホウボウ2
14:39:37	145.7	37	-	17.9989	N	141	-	23.8886	E			さっきのホウボウかな1
14:39:53	147.3	37	-	17.9986	N	141	-	23.8910	E			赤ヒトデ1
14:40:10	146.9	37	-	17.9985	N	141	-	23.8939	E			赤ヒトデ1
14:40:30	145.3	37	-	17.9986	N	141	-	23.8953	E			赤ヒトデ2
14:40:43	146.6	37	-	17.9988	N	141	-	23.8983	E			赤ヒトデ2

14:40:58	147.3	37	-	17.9986	N	141	-	23.9005	E			赤ヒトデ1
14:41:15	147.8	37	-	17.9984	N	141	-	23.9044	E			魚猛スピードで通過
14:41:30	147.1	37	-	17.9986	N	141	-	23.9066	E			白ヒトデ1、赤ヒトデ1
14:41:51	147.2	37	-	17.9984	N	141	-	23.9127	E			白ヒトデ1
14:41:59	147.2	37	-	17.9984	N	141	-	23.9127	E			赤ヒトデ1、キタクシノハクモヒトデ1
14:43:11	146	37	-	17.9986	N	141	-	23.9294	E			赤ヒトデ1、何かが土に潜った
14:43:31	145.6	37	-	17.9987	N	141	-	23.9340	E			赤ヒトデ1
14:43:45	147.2	37	-	17.9985	N	141	-	23.9362	E			ホウボウ1、白ヒトデ1
14:44:01	145.1	37	-	17.9988	N	141	-	23.9404	E			白ヒトデ1
14:44:08	145.1	37	-	17.9988	N	141	-	23.9404	E			赤ヒトデ1
14:44:18	146.2	37	-	17.9987	N	141	-	23.9421	E			ホウボウ1、赤ヒトデ1、白ヒトデ1
14:44:39	146.8	37	-	17.9987	N	141	-	23.9467	E			赤ヒトデ1
14:44:58	147.7	37	-	17.9987	N	141	-	23.9514	E			ホウボウ1、白ヒトデ1
14:45:19	147.9	37	-	17.9988	N	141	-	23.9558	E			赤ヒトデ1
14:45:26	147.4	37	-	17.9990	N	141	-	23.9578	E			赤ヒトデ2
14:45:53	147.4	37	-	17.9989	N	141	-	23.9637	E			ホウボウ
14:46:04	148.4	37	-	17.9988	N	141	-	23.9659	E			白ヒトデ
14:46:21	148.1	37	-	17.9987	N	141	-	23.9713	E			タコ
14:46:28	148.1	37	-	17.9987	N	141	-	23.9713	E			赤ヒトデ
14:46:56	148.5	37	-	17.9984	N	141	-	23.9779	E			ウミサボテン2
14:47:07	147	37	-	17.9984	N	141	-	23.9793	E			魚
14:47:16	147.7	37	-	17.9982	N	141	-	23.9806	E			赤ヒトデ
14:47:43	150	37	-	17.9977	N	141	-	23.9828	E			赤ヒトデ2
14:48:03	148.3	37	-	17.9977	N	141	-	23.9862	E			赤ヒトデ2
14:48:26	147.5	37	-	17.9976	N	141	-	23.9910	E			ウミサボテン
14:48:48	147.2	37	-	17.9974	N	141	-	23.9960	E			赤ヒトデ
14:48:57	147.7	37	-	17.9975	N	141	-	23.9981	E			赤ヒトデ
14:49:00	148.4	37	-	17.9972	N	141	-	24.0008	E			赤ヒトデ1、白ヒトデ1
14:49:22	149.2	37	-	17.9970	N	141	-	24.0055	E			赤ヒトデ2、白ヒトデ2
14:50:01	147.3	37	-	17.9969	N	141	-	24.0142	E			赤ヒトデ
14:50:16	147.5	37	-	17.9968	N	141	-	24.0162	E			白ヒトデ
14:51:03	147.6	37	-	17.9965	N	141	-	24.0256	E			クモヒトデ1、赤ヒトデ1
14:51:18	148.5	37	-	17.9963	N	141	-	24.0276	E			白ヒトデ
14:51:45	148.5	37	-	17.9962	N	141	-	24.0330	E			赤ヒトデ

14:52:02	149.6	37	-	17.9961	N	141	-	24.0372	E			魚
14:52:14	147.8	37	-	17.9962	N	141	-	24.0387	E			魚
14:52:26	148.2	37	-	17.9962	N	141	-	24.0409	E			赤ヒトデ
14:52:54	147.7	37	-	17.9963	N	141	-	24.0469	E			白ヒトデ1、赤ヒトデ1
14:53:21	148.2	37	-	17.9963	N	141	-	24.0523	E			白ヒトデ
14:53:32	148	37	-	17.9961	N	141	-	24.0530	E			白ヒトデ1、赤ヒトデ2
14:53:44	148.1	37	-	17.9957	N	141	-	24.0545	E			赤ヒトデ2
14:54:10	148.2	37	-	17.9947	N	141	-	24.0592	E			赤ヒトデ
14:54:31	147.4	37	-	17.9936	N	141	-	24.0673	E			赤ヒトデ
14:54:57	147.2	37	-	17.9926	N	141	-	24.0720	E			白ヒトデ
14:55:06	146.3	37	-	17.9923	N	141	-	24.0742	E			白ヒトデ
14:55:15	147.8	37	-	17.9920	N	141	-	24.0766	E			赤ヒトデ
14:55:29	148.5	37	-	17.9916	N	141	-	24.0787	E			赤ヒトデ1、白ヒトデ1
14:56:02	147.4	37	-	17.9897	N	141	-	24.0884	E			赤ヒトデ
14:56:29	147.4	37	-	17.9893	N	141	-	24.0930	E			白ヒトデ
14:56:45	147.7	37	-	17.9885	N	141	-	24.0963	E			白ヒトデ
14:56:52	147.2	37	-	17.9882	N	141	-	24.0982	E			白ヒトデ
14:57:35	149.3	37	-	17.9865	N	141	-	24.1052	E			白ヒトデ
14:57:43	148.8	37	-	17.9864	N	141	-	24.1069	E			赤ヒトデ1
14:57:57	148.9	37	-	17.9862	N	141	-	24.1087	E			白ヒトデ
14:58:05	148.2	37	-	17.9860	N	141	-	24.1105	E			ウミサボテン1、赤ヒトデ1
14:58:18	148.7	37	-	17.9857	N	141	-	24.1127	E			赤ヒトデ
14:58:25	148.3	37	-	17.9853	N	141	-	24.1147	E			赤ヒトデ1、白ヒトデ1
14:58:32	148.4	37	-	17.9851	N	141	-	24.1172	E			ウミサボテン1、赤ヒトデ1、白ヒトデ1
14:59:54	148.6	37	-	17.9805	N	141	-	24.1347	E			赤ヒトデ
15:00:17	149.4	37	-	17.9799	N	141	-	24.1358	E			白ヒトデ1、赤ヒトデ2
15:00:58	148.9	37	-	17.9787	N	141	-	24.1394	E			赤ヒトデ1、白ヒトデ3
15:01:17	148.4	37	-	17.9779	N	141	-	24.1416	E			白ヒトデ2
15:01:29	148.8	37	-	17.9776	N	141	-	24.1435	E			赤ヒトデ
15:01:38	149.1	37	-	17.9769	N	141	-	24.1453	E			赤ヒトデ
15:01:46	149.9	37	-	17.9765	N	141	-	24.1471	E			赤ヒトデ
15:01:51	149	37	-	17.9761	N	141	-	24.1494	E			赤ヒトデ
15:01:57	149	37	-	17.9761	N	141	-	24.1494	E			魚
15:02:03	148.9	37	-	17.9756	N	141	-	24.1517	E			白ヒトデ
15:02:20	148.2	37	-	17.9745	N	141	-	24.1563	E			白ヒトデ
15:02:31	148.6	37	-	17.9742	N	141	-	24.1583	E			赤ヒトデ1、白ヒトデ1、魚

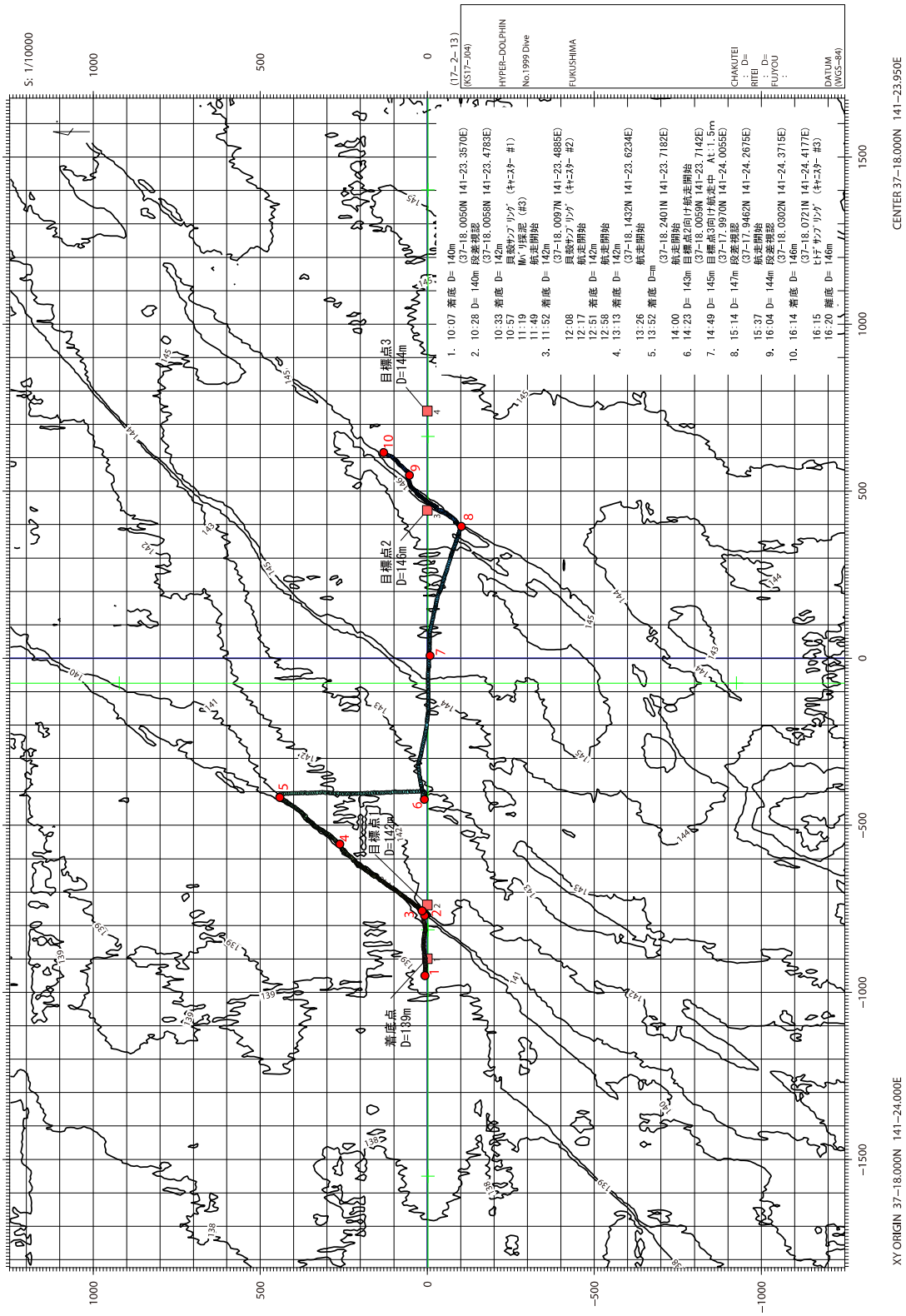
												4
15:03:03	147.7	37	-	17.9724	N	141	-	24.1648	E			白ヒトデ
15:03:07	147.7	37	-	17.9724	N	141	-	24.1648	E			赤ヒトデ
15:03:13	148.9	37	-	17.9717	N	141	-	24.1671	E			白ヒトデ
15:03:25	149.5	37	-	17.9712	N	141	-	24.1693	E			赤ヒトデ
15:03:38	149.6	37	-	17.9704	N	141	-	24.1716	E			赤ヒトデ1、白ヒトデ1
15:04:10	147.7	37	-	17.9690	N	141	-	24.1777	E			赤ヒトデ
15:04:17	150.2	37	-	17.9679	N	141	-	24.1800	E			赤ヒトデ1、白ヒトデ1
15:04:40	147.4	37	-	17.9672	N	141	-	24.1847	E			赤ヒトデ2
15:04:51	149.1	37	-	17.9654	N	141	-	24.1907	E			赤ヒトデ
15:05:01	147.7	37	-	17.9650	N	141	-	24.1937	E			赤ヒトデ
15:05:07	147.7	37	-	17.9650	N	141	-	24.1937	E			白ヒトデ2
15:05:19	148.3	37	-	17.9642	N	141	-	24.1971	E			白ヒトデ
15:05:32	147.3	37	-	17.9629	N	141	-	24.2026	E			赤ヒトデ
15:05:43	148.4	37	-	17.9623	N	141	-	24.2049	E			白ヒトデ2
15:06:11	148.5	37	-	17.9610	N	141	-	24.2094	E			クモヒトデ1、白ヒトデ1
15:06:35	148.5	37	-	17.9605	N	141	-	24.2114	E			赤ヒトデ2
15:06:48	149	37	-	17.9601	N	141	-	24.2125	E			ウミサボテン1、白ヒトデ 1
15:07:14	147.9	37	-	17.9591	N	141	-	24.2169	E			赤ヒトデ
15:07:56	150.1	37	-	17.9577	N	141	-	24.2210	E			赤ヒトデ
15:08:25	148.4	37	-	17.9577	N	141	-	24.2216	E			魚1、白ヒトデ1
15:08:36	149.9	37	-	17.9574	N	141	-	24.2220	E			赤ヒトデ
15:08:50	148.2	37	-	17.9573	N	141	-	24.2237	E			赤ヒトデ1、白ヒトデ1、ウミサボテン1
15:09:06	148.8	37	-	17.9557	N	141	-	24.2274	E			白ヒトデ
15:09:15	148.5	37	-	17.9554	N	141	-	24.2300	E			クモヒトデ
15:09:27	149.6	37	-	17.9547	N	141	-	24.2315	E			ホウボウ
15:09:37	148	37	-	17.9545	N	141	-	24.2334	E			白ヒトデ3赤ヒトデ6
15:09:59	147.5	37	-	17.9536	N	141	-	24.2371	E			白ヒトデ1、赤ヒトデ
15:10:06	147.7	37	-	17.9529	N	141	-	24.2382	E			赤ヒトデ
15:10:10	147.7	37	-	17.9529	N	141	-	24.2382	E			魚
15:10:21	148.4	37	-	17.9520	N	141	-	24.2412	E			白ヒトデ1、ホウボウ1
15:10:38	147.7	37	-	17.9515	N	141	-	24.2434	E			赤ヒトデ1、ウミサボテン2、白ヒトデ1
15:10:47	149.9	37	-	17.9506	N	141	-	24.2443	E			白ヒトデ
15:11:08	148.3	37	-	17.9503	N	141	-	24.2478	E			赤ヒトデ1、白ヒトデ1
15:11:21	150	37	-	17.9498	N	141	-	24.2506	E			イカっぽい魚

15:11:36	150.6	37	-	17.9492	N	141	-	24.2508	E			赤ヒトデ2
15:11:51	150.8	37	-	17.9490	N	141	-	24.2520	E			着底
15:12:55	149.3	37	-	17.9479	N	141	-	24.2584	E			白ヒトデ1、ウミサボテン1、航走再開
15:13:10	150	37	-	17.9468	N	141	-	24.2619	E			赤ヒトデ1、白ヒトデ1
15:13:16	150	37	-	17.9468	N	141	-	24.2619	E			ホウボウ 1、白ヒトデ1
15:13:52	149.2	37	-	17.9462	N	141	-	24.2666	E			大きな魚
15:14:02	147.5	37	-	17.9460	N	141	-	24.2667	E			段差視認、赤ヒトデ2
15:14:09	147.5	37	-	17.9460	N	141	-	24.2667	E			停止
15:14:34	151.5	37	-	17.9456	N	141	-	24.2675	E			大きな魚
15:17:16	148.2	37	-	17.9539	N	141	-	24.2746	E			赤ヒトデ3
15:18:14	149.4	37	-	17.9545	N	141	-	24.2775	E			航走、高度3m
15:42:34	147.7	37	-	17.9749	N	141	-	24.2955	E			白ヒトデ
15:43:04	148.6	37	-	17.9756	N	141	-	24.2983	E			白ヒトデ
15:43:22	146.9	37	-	17.9784	N	141	-	24.2993	E			白ヒトデ
15:43:34	147.1	37	-	17.9804	N	141	-	24.3000	E			赤ヒトデ4
15:43:44	151	37	-	17.9822	N	141	-	24.3009	E			ウミサボテン
15:44:02	148.2	37	-	17.9856	N	141	-	24.3020	E			白ヒトデ2
15:44:12	147.8	37	-	17.9857	N	141	-	24.3034	E			赤ヒトデ6
15:44:45	147	37	-	17.9850	N	141	-	24.3059	E			白ヒトデ
15:44:54	149.2	37	-	17.9857	N	141	-	24.3052	E			赤ヒトデ20、白ヒトデ3
15:45:17	147.8	37	-	17.9873	N	141	-	24.3070	E			赤ヒトデ2、ウミサボテン1
15:45:35	146.9	37	-	17.9871	N	141	-	24.3075	E			白ヒトデ1、ホウボウ1
15:45:58	148.4	37	-	17.9874	N	141	-	24.3079	E			赤ヒトデ10以上
15:46:18	146.2	37	-	17.9888	N	141	-	24.3087	E			白ヒトデ
15:46:53	147.7	37	-	17.9907	N	141	-	24.3099	E			白ヒトデ2
15:47:13	147.2	37	-	17.9922	N	141	-	24.3107	E			白ヒトデ
15:47:48	146	37	-	17.9932	N	141	-	24.3125	E			白ヒトデ3、赤ヒトデ2
15:48:10	147.2	37	-	17.9952	N	141	-	24.3135	E			赤ヒトデ5、白ヒトデ2
15:49:07	147.3	37	-	17.9977	N	141	-	24.3149	E			赤ヒトデ
15:49:15	146.8	37	-	17.9980	N	141	-	24.3151	E			白ヒトデ2
15:49:41	148.8	37	-	18.0000	N	141	-	24.3166	E			白ヒトデ2、赤ヒトデ1
15:50:00	148.8	37	-	18.0008	N	141	-	24.3173	E			赤ヒトデ5
15:50:40	149	37	-	18.0033	N	141	-	24.3194	E			赤ヒトデ2
15:51:19	148.7	37	-	18.0049	N	141	-	24.3217	E			赤ヒトデ2
15:51:42	147.8	37	-	18.0067	N	141	-	24.3231	E			白ヒトデ
15:52:30	148	37	-	18.0082	N	141	-	24.3251	E			割れ目続く

15:52:32	149.3	37	-	18.0087	N	141	-	24.3259	E			赤ヒトデ2
15:53:04	148	37	-	18.0103	N	141	-	24.3275	E			白ヒトデ
15:53:11	149.5	37	-	18.0107	N	141	-	24.3275	E			スケトウダラ1、カレイ1、赤ヒトデ1、白ヒトデ1
15:53:52	149.8	37	-	18.0126	N	141	-	24.3292	E			赤ヒトデ3
15:54:18	147.9	37	-	18.0137	N	141	-	24.3306	E			ホウボウ1、白ヒトデ1
15:55:45	147.6	37	-	18.0176	N	141	-	24.3353	E			溝？割れ目？
15:56:24	148.5	37	-	18.0177	N	141	-	24.3384	E			赤ヒトデ2
15:57:57	148.1	37	-	18.0230	N	141	-	24.3424	E			白ヒトデ2、赤ヒトデ1
15:58:26	149.1	37	-	18.0236	N	141	-	24.3443	E			赤ヒトデ2
15:58:48	147.5	37	-	18.0248	N	141	-	24.3450	E			白ビニール袋
15:59:12	147.7	37	-	18.0263	N	141	-	24.3468	E			白ヒトデ1、赤ヒトデ2
15:59:58	148.3	37	-	18.0276	N	141	-	24.3504	E			赤ヒトデ1
16:00:23	147.4	37	-	18.0281	N	141	-	24.3523	E			真ん中が赤いヒトデ1、白ヒトデ1
16:01:04	148.4	37	-	18.0287	N	141	-	24.3548	E			赤ヒトデ1
16:01:33	149.2	37	-	18.0288	N	141	-	24.3568	E			白ヒトデ1
16:02:25	147.5	37	-	18.0307	N	141	-	24.3618	E			海サボテン
16:02:51	147.8	37	-	18.0309	N	141	-	24.3641	E			白ヒトデ1
16:04:02	146.7	37	-	18.0302	N	141	-	24.3715	E			溝？割れ目？
16:04:14	146.8	37	-	18.0302	N	141	-	24.3740	E			白ヒトデ1
16:04:31	146	37	-	18.0301	N	141	-	24.3756	E			赤ヒトデ28
16:05:22	148	37	-	18.0341	N	141	-	24.3793	E			白ヒトデ1、赤ヒトデ9
16:05:51	147.9	37	-	18.0370	N	141	-	24.3832	E			白ヒトデ2、赤ヒトデ7
16:06:14	148.3	37	-	18.0391	N	141	-	24.3861	E			赤ヒトデ1
16:06:26	147.5	37	-	18.0404	N	141	-	24.3876	E			赤ヒトデ12、ナマコ1
16:06:42	149.3	37	-	18.0428	N	141	-	24.3900	E			赤ヒトデ8、白ヒトデ1
16:06:58	148.8	37	-	18.0439	N	141	-	24.3907	E			白ヒトデ1、赤ヒトデ1
16:07:13	149.8	37	-	18.0456	N	141	-	24.3926	E			赤ヒトデ3
16:07:27	148.2	37	-	18.0462	N	141	-	24.3930	E			赤ヒトデ3、白いにょろにょろ
16:07:42	148.4	37	-	18.0468	N	141	-	24.3949	E			枕
16:07:48	148.4	37	-	18.0468	N	141	-	24.3949	E			白ヒトデ1、赤ヒトデ3
16:08:10	149.3	37	-	18.0477	N	141	-	24.3967	E			白ヒトデ3
16:08:33	149	37	-	18.0491	N	141	-	24.3994	E			赤ヒトデ5
16:08:52	147.4	37	-	18.0512	N	141	-	24.4007	E			白ヒトデ1
16:09:10	148.6	37	-	18.0522	N	141	-	24.4026	E			白ヒトデ2、赤ヒトデ3

16:09:40	147.9	37	-	18.0540	N	141	-	24.4041	E			赤ヒトデ2、白ヒトデ2
16:10:13	148	37	-	18.0562	N	141	-	24.4062	E			溝が浅くなったのは前からかも
16:10:22	148.3	37	-	18.0563	N	141	-	24.4071	E			赤ヒトデ1、白ヒトデ2
16:10:35	148.4	37	-	18.0572	N	141	-	24.4078	E			赤ヒトデ1
16:11:02	148	37	-	18.0617	N	141	-	24.4102	E			赤ヒトデ2、白ヒトデ1、ホウボウ
16:11:27	147.8	37	-	18.0648	N	141	-	24.4117	E			赤ヒトデ1
16:11:40	147.8	37	-	18.0684	N	141	-	24.4132	E			赤ヒトデ2
16:11:48	147.8	37	-	18.0684	N	141	-	24.4132	E			赤ヒトデ1
16:12:02	148.6	37	-	18.0700	N	141	-	24.4142	E			魚1
16:12:17	148.4	37	-	18.0693	N	141	-	24.4150	E			魚1、泳いでいる魚
16:12:42	147.8	37	-	18.0706	N	141	-	24.4161	E			赤ヒトデ1
16:12:59	146.9	37	-	18.0711	N	141	-	24.4171	E			ウミサボテン
16:14:09	146.6	37	-	18.0713	N	141	-	24.4169	E			赤ヒトデをスラープガンで採取挑戦
16:15:19	147.9	37	-	18.0719	N	141	-	24.4198	E			赤ヒトデ1を採取
16:20:26	148.6	37	-	18.0718	N	141	-	24.4199	E			ビークル離底、深度146m
16:25:28	84.2	37	-	18.0239	N	141	-	24.4383	E			ビークル浮上してた

Dive track HD#1999



Dive Report HD#2000

Date: Feb 14, 2017
Site: Off Fukushima **Depth:** 136-143m
Landing (Lat., Long., Time, Depth): 37°11.9892'N, 141°19.9998'E, 09:03, 138m
Leaving (Lat., Long., Time, Depth): 37°13.0534'N, 141°120.3318'E, 17:02, 139m
Pilot: Shigeru Kikuya **Co-Pilot**: Yudai Tayama
Observer: Takafumi Kasaya

Theme: Researches on marine ecosystem dynamics off Sanriku

Purpose:

1. Visual observation around a small cliff.
2. Sampling mud and benthic animals.

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Sampling box
5. MBARI core x3
6. Kumade scoop sampler

Sampling Points and Markers:

Time	Position	Depth (m)	Events
10:24	37°12.1921' N, 141°19.7439'E	137	Sampling a starfish (Sample Box)
10:36	37°12.2244' N, 141°19.7628'E	137	Sampling a brittle star (Sample Box)
10:43			Sampling a brittle star (#1 bottle)
10:54	37°12.2308' N, 141°19.7668'E	137	Sampling 3 brittle stars (#2 bottle)
11:03	37°12.2463' N, 141°19.7790'E	137	Sampling some brittle starts (#3 bottle)
12:36	37°12.6507' N, 141°20.0192'E	137	Sampling mud (Sample Box)
13:15	37°12.6739' N, 141°20.0508'E	138	Sampling a brittle start (Sample Box)
15:02	37°13.0510' N, 141°20.3316'E	138	Sampling some benthic animals (#4 bottle)
15:10		139	Sampling some benthic animals (#5 bottle)

Dive Summary

The purpose of *HPD dive #2000* was to observe around the low cliffs with a height of 2 m detected by the MBES surveys just after the Off Fukushima earthquake occurred at last November and investigate the seafloor condition after the earthquake. We can soon detect a low cliff with some fissures, and soft sediments were covered a lower mud sediment layer. Some white colored mats (bacterium mats?) were found around and/or in the fissures, and got a core sample of a white-colored mat. Some shells in the soft sediment layer were collected using a slurp gun. After that, we continued the visual observation along strike of the series ese of low cliffs and fissures.

Dive Log

Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
8:39:48			-				-					吊り上げ
8:43:23			-				-					着水
08:55:39	34.5	37	-	11.9808	N	141	-	19.9944	E			潜航開始
09:02:41	135.9	37	-	11.9900	N	141	-	19.9991	E			海底視認
09:03:31	136.9	37	-	11.9892	N	141	-	19.9998	E			着底
09:03:40	136.9	37	-	11.9892	N	141	-	19.9998	E			ヒトデ
09:03:53	139	37	-	11.9875	N	141	-	20.0002	E			ホウボウ
09:04:17	139.3	37	-	11.9857	N	141	-	19.9997	E			ヒトデ
09:11:23	139.9	37	-	11.9940	N	141	-	19.9842	E			ヒトデ
09:11:56	140.5	37	-	11.9939	N	141	-	19.9803	E			ヒトデ
												魚
												ホウボウ 0913
09:14:57	139.5	37	-	11.9965	N	141	-	19.9410	E			クモヒトデ
09:15:26	139.5	37	-	12.0002	N	141	-	19.9347	E			白ヒトデ
09:16:38	141.6	37	-	12.0021	N	141	-	19.9244	E			ヒトデ
09:17:28	139.6	37	-	12.0023	N	141	-	19.9204	E			ヒトデ
09:18:11	138.5	37	-	12.0013	N	141	-	19.9043	E			ヒトデ
09:18:55	141.4	37	-	12.0009	N	141	-	19.8946	E			ヒトデ
09:19:22	141.6	37	-	12.0000	N	141	-	19.8893	E			ヒトデ
09:20:03	139.9	37	-	11.9995	N	141	-	19.8848	E			ヒトデ
09:20:26	139.7	37	-	11.9990	N	141	-	19.8839	E			ホウボウ
09:21:19	140.3	37	-	11.9989	N	141	-	19.8771	E			ヒトデ
09:21:40	139.4	37	-	11.9986	N	141	-	19.8727	E			ホウボウ ヒトデ
09:22:07	140.1	37	-	11.9982	N	141	-	19.8693	E			ウミサボテン

09:22:46	139.5	37	-	11.9981	N	141	-	19.8602	E			ヒトデ
09:22:53	139.6	37	-	11.9979	N	141	-	19.8591	E			クモヒトデ
09:24:25	138.5	37	-	11.9977	N	141	-	19.8422	E			ヒトデ
09:24:50	141.3	37	-	11.9992	N	141	-	19.8363	E			ヒトデ
09:26:06	138.6	37	-	11.9986	N	141	-	19.8252	E			ヒトデ
09:26:13	139.4	37	-	11.9983	N	141	-	19.8234	E			ホウボウ
09:27:03	139	37	-	11.9988	N	141	-	19.8164	E			ヒトデ
09:27:26	139.7	37	-	11.9986	N	141	-	19.8131	E			ヒトデ
09:29:15	139.5	37	-	11.9978	N	141	-	19.7944	E			ほうぼう
09:29:41	139.6	37	-	11.9978	N	141	-	19.7879	E			クモヒトデ
09:30:14	139.8	37	-	11.9983	N	141	-	19.7825	E			ヒトデ
09:30:52	141.6	37	-	12.0006	N	141	-	19.7738	E			クモヒトデ　ウミサボテン
09:32:21	139	37	-	12.0024	N	141	-	19.7584	E			ヒトデ
09:33:01	138.6	37	-	12.0026	N	141	-	19.7504	E			ヒトデ
09:33:24	140	37	-	12.0021	N	141	-	19.7457	E			カレイ　ヒトデ　サメ
09:34:28	140.3	37	-	12.0010	N	141	-	19.7354	E			ヒトデ
09:36:31	140	37	-	12.0004	N	141	-	19.7091	E			ヒトデ
09:37:03	139.3	37	-	12.0007	N	141	-	19.7026	E			サメ
09:37:45	139	37	-	12.0002	N	141	-	19.6966	E			ヒトデ
09:38:21	140.8	37	-	11.9996	N	141	-	19.6904	E			ウミサボテン
09:39:02	141.5	37	-	11.9993	N	141	-	19.6855	E			ヒトデ
09:39:48	140.8	37	-	11.9991	N	141	-	19.6788	E			ホウボウ　ヒトデ
09:40:14	140.7	37	-	11.9993	N	141	-	19.6736	E			ヒトデ
09:40:30	138.8	37	-	11.9989	N	141	-	19.6717	E			ホウボウ
09:41:27	140.1	37	-	11.9989	N	141	-	19.6631	E			ホウボウ
09:42:30	138.8	37	-	12.0003	N	141	-	19.6510	E			ホウボウ
09:43:21	138.7	37	-	11.9999	N	141	-	19.6447	E			ヒトデ
09:43:57	138.9	37	-	11.9997	N	141	-	19.6417	E			ヒトデ
09:44:41	137.6	37	-	11.9991	N	141	-	19.6344	E			ヒトデ
09:45:11	137.8	37	-	11.9982	N	141	-	19.6309	E			ヒトデ
09:48:39	137.6	37	-	12.0018	N	141	-	19.6272	E			ヒトデ
09:48:58	137.4	37	-	12.0039	N	141	-	19.6290	E			ホウボウ　カレイ
09:50:32	138.9	37	-	12.0129	N	141	-	19.6371	E			ヒトデ
09:53:21	138.7	37	-	12.0333	N	141	-	19.6504	E			ホウボウ
09:54:45	139.3	37	-	12.0433	N	141	-	19.6548	E			ホウボウ
09:55:43	139.4	37	-	12.0504	N	141	-	19.6568	E			ホウボウ
09:59:03	137.7	37	-	12.0743	N	141	-	19.6748	E			ヒトデ

10:00:01	139.1	37	-	12.0825	N	141	-	19.6809	E			クモヒトデ
10:03:31	138.6	37	-	12.1088	N	141	-	19.6940	E			ヒトデ
10:08:27	140.1	37	-	12.1352	N	141	-	19.7121	E			ヒトデ
10:08:42	139.5	37	-	12.1377	N	141	-	19.7118	E			ホウボウ
10:16:34	137.8	37	-	12.1718	N	141	-	19.7303	E			ヒトデ
10:16:48	138.9	37	-	12.1730	N	141	-	19.7301	E			ホウボウ
10:17:33	138.3	37	-	12.1792	N	141	-	19.7335	E			ホウボウ
10:17:50	138.3	37	-	12.1810	N	141	-	19.7353	E			ヒトデ
10:17:55	138.3	37	-	12.1810	N	141	-	19.7353	E			ヒトデ2
10:18:49	138.1	37	-	12.1865	N	141	-	19.7397	E			ホウボウ
10:19:11	138	37	-	12.1894	N	141	-	19.7422	E			ウミサボテン2
10:19:26	142.5	37	-	12.1901	N	141	-	19.7429	E			ヒトデ
10:20:45	142	37	-	12.1916	N	141	-	19.7439	E			ヒトデ採取　スラープガン
10:21:48	139.6	37	-	12.1924	N	141	-	19.7441	E			口でとまる
10:22:35	139.7	37	-	12.1925	N	141	-	19.7442	E			サンプル BOX へヒトデ
10:30:01	138.3	37	-	12.2130	N	141	-	19.7583	E			ホウボウ
10:30:49	139.1	37	-	12.2199	N	141	-	19.7613	E			ヒトデ
10:31:06	138.5	37	-	12.2233	N	141	-	19.7623	E			クモヒトデ
10:36:50	141.1	37	-	12.2239	N	141	-	19.7625	E			サンプル BOX へクモヒトデ採集
10:39:05	140.9	37	-	12.2277	N	141	-	19.7657	E			クモヒトデ
10:42:26	141.9	37	-	12.2278	N	141	-	19.7653	E			クモヒトデ採集　スラープガン　キャニスター1
10:44:27	138.9	37	-	12.2282	N	141	-	19.7653	E			航走再開
10:45:00	138.8	37	-	12.2305	N	141	-	19.7665	E			クモヒトデ
10:46:39	139.7	37	-	12.2307	N	141	-	19.7672	E			着底
10:47:17	139.6	37	-	12.2304	N	141	-	19.7667	E			クモヒトデ観察中
10:50:42	139.5	37	-	12.2307	N	141	-	19.7668	E			クモヒトデ採集　スラープガン　キャニスター2
10:56:49	139.6	37	-	12.2308	N	141	-	19.7675	E			走行再開
10:57:52	138.9	37	-	12.2361	N	141	-	19.7717	E			白ヒトデ
11:00:24	139.2	37	-	12.2466	N	141	-	19.7791	E			クモヒトデ採集　スラープガン　キャニスター3
11:07:08	140.3	37	-	12.2475	N	141	-	19.7797	E			カナガシラ
11:09:10	139.2	37	-	12.2607	N	141	-	19.7881	E			カナガシラ
11:10:00	138.7	37	-	12.2679	N	141	-	19.7926	E			白ヒトデ
11:10:24	138.1	37	-	12.2707	N	141	-	19.7942	E			白ヒトデ

11:10:54	137.8	37	-	12.2747	N	141	-	19.7969	E			カナガシラ
11:11:10	138.6	37	-	12.2769	N	141	-	19.7982	E			白ヒトデ
11:12:14	139.2	37	-	12.2900	N	141	-	19.8040	E			白ヒトデ
11:12:45	139.5	37	-	12.2954	N	141	-	19.8048	E			ウミサボテン
11:13:32	137.9	37	-	12.3023	N	141	-	19.8077	E			白ヒトデ
11:13:52	139.7	37	-	12.3043	N	141	-	19.8117	E			白ヒトデ
11:14:02	138.8	37	-	12.3057	N	141	-	19.8135	E			カナガシラ
11:14:16	139	37	-	12.3070	N	141	-	19.8147	E			白ヒトデ
11:14:29	139.4	37	-	12.3082	N	141	-	19.8163	E			トラザメ
11:14:49	140.2	37	-	12.3096	N	141	-	19.8178	E			白ヒトデ
11:15:08	139.7	37	-	12.3115	N	141	-	19.8188	E			白ヒトデ
11:15:23	138.8	37	-	12.3142	N	141	-	19.8203	E			カナガシラ
11:15:40	139.2	37	-	12.3152	N	141	-	19.8210	E			赤ヒトデ
11:16:43	139.9	37	-	12.3220	N	141	-	19.8249	E			カレイ
11:17:31	137.8	37	-	12.3292	N	141	-	19.8273	E			白ヒトデ
11:17:41	138	37	-	12.3317	N	141	-	19.8284	E			カナガシラ
11:18:03	138.2	37	-	12.3346	N	141	-	19.8301	E			白ヒトデ
11:19:05	139.5	37	-	12.3373	N	141	-	19.8348	E			白ヒトデ
11:19:36	137.5	37	-	12.3404	N	141	-	19.8383	E			ウミサボテン
11:19:49	140.3	37	-	12.3406	N	141	-	19.8390	E			白ヒトデ
11:20:05	138.8	37	-	12.3430	N	141	-	19.8401	E			白ヒトデ
11:20:46	138.9	37	-	12.3478	N	141	-	19.8423	E			カレイ
11:21:28	139.6	37	-	12.3528	N	141	-	19.8432	E			白ヒトデ3
11:21:46	138.7	37	-	12.3568	N	141	-	19.8448	E			白ヒトデ
11:22:14	138.6	37	-	12.3606	N	141	-	19.8468	E			赤ヒトデ
11:22:36	139.4	37	-	12.3632	N	141	-	19.8493	E			赤ヒトデ
11:22:42	138.9	37	-	12.3640	N	141	-	19.8500	E			白ヒトデ
11:23:39	139.5	37	-	12.3693	N	141	-	19.8504	E			カナガシラ
11:24:30	140	37	-	12.3742	N	141	-	19.8521	E			白ヒトデ
11:26:13	138.5	37	-	12.3776	N	141	-	19.8629	E			赤ヒトデ
11:26:39	137.4	37	-	12.3790	N	141	-	19.8641	E			赤ヒトデ
11:26:45	139.2	37	-	12.3806	N	141	-	19.8649	E			カナガシラ
11:27:15	137.8	37	-	12.3830	N	141	-	19.8661	E			カナガシラ2
11:27:24	139.5	37	-	12.3826	N	141	-	19.8669	E			白ヒトデ
11:28:17	138.8	37	-	12.3874	N	141	-	19.8679	E			白ヒトデ
11:29:18	138.7	37	-	12.3907	N	141	-	19.8720	E			カナガシラ2
11:29:43	138	37	-	12.3963	N	141	-	19.8746	E			赤ヒトデ

11:30:13	140.6	37	-	12.4000	N	141	-	19.8788	E			赤ヒトデ
11:30:23	139.2	37	-	12.4016	N	141	-	19.8788	E			白ヒトデ
11:30:52	140.2	37	-	12.4051	N	141	-	19.8801	E			白ヒトデ
11:31:17	141.7	37	-	12.4074	N	141	-	19.8820	E			白ヒトデ
11:34:28	140.3	37	-	12.4264	N	141	-	19.8983	E			白ヒトデ
11:35:02	141.1	37	-	12.4324	N	141	-	19.9011	E			ウミサボテン
11:35:38	139.5	37	-	12.4341	N	141	-	19.8996	E			魚
11:35:55	140.1	37	-	12.4375	N	141	-	19.9007	E			魚群れ
11:36:17	141.3	37	-	12.4399	N	141	-	19.9011	E			ウミサボテン
11:37:09	137	37	-	12.4448	N	141	-	19.9076	E			赤ヒトデ
11:37:31	141	37	-	12.4480	N	141	-	19.9118	E			カナガシラ2
11:38:10	139.8	37	-	12.4511	N	141	-	19.9142	E			白ヒトデ
11:38:22	140	37	-	12.4539	N	141	-	19.9155	E			赤ヒトデ
11:38:29	140	37	-	12.4539	N	141	-	19.9155	E			カナガシラ
11:38:39	138.3	37	-	12.4545	N	141	-	19.9169	E			赤ヒトデ
11:38:52	137.8	37	-	12.4563	N	141	-	19.9183	E			赤ヒトデ
11:39:41	140.1	37	-	12.4607	N	141	-	19.9189	E			赤ヒトデ
11:41:04	139.8	37	-	12.4666	N	141	-	19.9221	E			白ヒトデ
11:41:14	139.3	37	-	12.4669	N	141	-	19.9217	E			白ヒトデ
11:42:55	138.8	37	-	12.4747	N	141	-	19.9248	E			赤ヒトデ
11:43:53	139.5	37	-	12.4855	N	141	-	19.9301	E			白ヒトデ
11:45:23	139.3	37	-	12.4949	N	141	-	19.9368	E			白ヒトデ
11:49:03	139.3	37	-	12.5060	N	141	-	19.9448	E			白ヒトデ
11:50:08	139.3	37	-	12.5123	N	141	-	19.9508	E			カナガシラ2
11:50:20	139	37	-	12.5136	N	141	-	19.9514	E			白ヒトデ
11:50:40	140.7	37	-	12.5149	N	141	-	19.9524	E			赤ヒトデ
11:50:57	139.2	37	-	12.5168	N	141	-	19.9537	E			イカ
11:51:22	142.6	37	-	12.5204	N	141	-	19.9558	E			カナガシラ
11:54:00	140	37	-	12.5213	N	141	-	19.9583	E			アイナメ？
11:54:20	137.9	37	-	12.5227	N	141	-	19.9589	E			白ヒトデ2
11:54:40	140	37	-	12.5259	N	141	-	19.9594	E			カナガシラ
11:54:55	140.9	37	-	12.5270	N	141	-	19.9588	E			赤ヒトデ
11:55:44	140.2	37	-	12.5308	N	141	-	19.9567	E			赤ヒトデ
11:56:39	140.2	37	-	12.5358	N	141	-	19.9553	E			白ヒトデ、海サボテン
11:57:29	139.2	37	-	12.5390	N	141	-	19.9547	E			ホウボウ1
11:58:57	138.5	37	-	12.5462	N	141	-	19.9536	E			ウミシダ？
11:59:07	138.9	37	-	12.5471	N	141	-	19.9537	E			カイメン4？

11:59:55	139.2	37	-	12.5506	N	141	-	19.9530	E			クモヒトデ、カイメン
12:00:13	138.4	37	-	12.5519	N	141	-	19.9534	E			イカ
12:00:23	139.7	37	-	12.5528	N	141	-	19.9536	E			ホウボウ
12:02:14	139.8	37	-	12.5597	N	141	-	19.9533	E			白ヒトデ
12:02:59	138.8	37	-	12.5639	N	141	-	19.9535	E			木？
12:07:41	140	37	-	12.5790	N	141	-	19.9637	E			白ヒトデ
12:08:20	138.2	37	-	12.5815	N	141	-	19.9659	E			赤ヒトデ
12:08:58	140.4	37	-	12.5848	N	141	-	19.9687	E			白ヒトデ
12:10:19	138	37	-	12.5924	N	141	-	19.9750	E			クモヒトデ
12:11:23	139.9	37	-	12.5994	N	141	-	19.9808	E			白ヒトデ
12:12:03	138.7	37	-	12.6028	N	141	-	19.9833	E			ホウボウ
12:12:38	138.6	37	-	12.6043	N	141	-	19.9842	E			ホウボウ
12:12:55	138.2	37	-	12.6052	N	141	-	19.9851	E			赤い魚
12:13:23	140.2	37	-	12.6087	N	141	-	19.9881	E			白ヒトデ、ホウボウ
12:13:37	138.6	37	-	12.6101	N	141	-	19.9895	E			カレイ
12:15:53	139.8	37	-	12.6168	N	141	-	19.9968	E			赤ヒトデ
12:16:13	140.3	37	-	12.6183	N	141	-	19.9982	E			クモヒトデ
12:18:36	141.3	37	-	12.6281	N	141	-	20.0033	E			白ヒトデ
12:19:22	137.8	37	-	12.6328	N	141	-	20.0064	E			白ヒトデ
12:19:47	138.7	37	-	12.6349	N	141	-	20.0081	E			カレイ
12:20:48	138.6	37	-	12.6389	N	141	-	20.0118	E			カレイ
12:21:25	138.1	37	-	12.6434	N	141	-	20.0138	E			白ヒトデ1、赤ヒトデ1
12:22:00	138.7	37	-	12.6469	N	141	-	20.0165	E			ホウボウ
12:22:25	139.6	37	-	12.6490	N	141	-	20.0186	E			構造物、まわりにエゾイソアイナメ5とタコ、クモヒトデ
12:24:23	141	37	-	12.6515	N	141	-	20.0194	E			木の枝
12:28:30	139.6	37	-	12.6512	N	141	-	20.0197	E			砂採取（熊手5杯）サンプルボックス
12:35:20	139.9	37	-	12.6515	N	141	-	20.0199	E			採取終了
12:37:32	139.2	37	-	12.6516	N	141	-	20.0194	E			板状のもの持ち上げる
12:39:19	139.1	37	-	12.6512	N	141	-	20.0196	E			タコ、アイナメ逃げる
12:41:53	138.9	37	-	12.6532	N	141	-	20.0215	E			ヒトデ
12:43:10	139.2	37	-	12.6576	N	141	-	20.0260	E			ヒトデ
12:46:07	139.5	37	-	12.6639	N	141	-	20.0335	E			岩　クモヒトデ　イソギンチャク　カイメン
12:50:28	140.9	37	-	12.6639	N	141	-	20.0332	E			テヅルモヅル

12:52:54	141.5	37	-	12.6641	N	141	-	20.0332	E			岩撮影終了
12:55:36	138.7	37	-	12.6650	N	141	-	20.0335	E			ヒトデ
12:56:45	139.2	37	-	12.6679	N	141	-	20.0339	E			ホウボウ
12:57:41	138.6	37	-	12.6706	N	141	-	20.0338	E			ヒトデ
12:58:38	138.1	37	-	12.6716	N	141	-	20.0377	E			ヒトデ　ホウボウ
12:59:01	138.6	37	-	12.6734	N	141	-	20.0427	E			ホウボウ
12:59:04	138.6	37	-	12.6734	N	141	-	20.0427	E			ホウボウ
12:59:31	139.4	37	-	12.6726	N	141	-	20.0451	E			ヤギ
13:00:36	139.6	37	-	12.6719	N	141	-	20.0493	E			転石　カイメン　クモヒトデ
13:01:19	137.9	37	-	12.6729	N	141	-	20.0507	E			アイナメ　たくさん
13:01:51	139.1	37	-	12.6744	N	141	-	20.0514	E			イソギンチャク
13:02:21	142.6	37	-	12.6747	N	141	-	20.0515	E			ヒトデ
13:03:00	142	37	-	12.6743	N	141	-	20.0510	E			ヤドカリ
13:04:38	140.4	37	-	12.6752	N	141	-	20.0519	E			アイナメ　エゾイソアイナメ
13:14:09	141.3	37	-	12.6760	N	141	-	20.0515	E			ヒトデ採集　スラープガンでサンプルボックスへ
13:17:57	139.4	37	-	12.6760	N	141	-	20.0536	E			転石
13:18:37	138.7	37	-	12.6789	N	141	-	20.0530	E			ヒトデ
13:19:41	141	37	-	12.6821	N	141	-	20.0556	E			ヒトデ
13:19:44	141	37	-	12.6821	N	141	-	20.0556	E			転石
13:20:45	139.4	37	-	12.6838	N	141	-	20.0590	E			クモヒトデ　イソギンチャク
13:21:33	138.3	37	-	12.6865	N	141	-	20.0611	E			クモヒトデ
13:22:06	138.3	37	-	12.6885	N	141	-	20.0626	E			クモヒトデ
13:22:33	138.4	37	-	12.6904	N	141	-	20.0638	E			転石
13:22:45	138.8	37	-	12.6913	N	141	-	20.0639	E			カナガシラ　エゾイソアイナメ　クモヒトデ
13:23:36	138.7	37	-	12.6940	N	141	-	20.0655	E			転石
13:24:46	137.3	37	-	12.6978	N	141	-	20.0687	E			ヒトデ
13:25:09	139.1	37	-	12.6996	N	141	-	20.0705	E			石
13:27:43	138.9	37	-	12.7120	N	141	-	20.0821	E			ヒトデ
13:28:03	138.8	37	-	12.7135	N	141	-	20.0838	E			ヒトデ
13:28:32	139	37	-	12.7152	N	141	-	20.0861	E			魚
13:29:28	139.9	37	-	12.7173	N	141	-	20.0909	E			転石
13:29:54	138.9	37	-	12.7175	N	141	-	20.0932	E			クモヒトデ　群れ

13:30:00	138.4	37	-	12.7177	N	141	-	20.0935	E			アイナメ 転石
13:30:42	139.5	37	-	12.7201	N	141	-	20.0959	E			アイナメ
13:30:56	139.7	37	-	12.7198	N	141	-	20.0969	E			転石
13:31:04	138.7	37	-	12.7194	N	141	-	20.0983	E			テヅルモヅル
13:31:26	139.8	37	-	12.7198	N	141	-	20.1005	E			転石
13:31:45	139.8	37	-	12.7211	N	141	-	20.1007	E			アイナメ イソギンチャク
13:32:19	139	37	-	12.7237	N	141	-	20.0996	E			ウミサボテン
13:33:02	138.5	37	-	12.7272	N	141	-	20.1017	E			ホウボウ
13:33:12	139.2	37	-	12.7278	N	141	-	20.1025	E			ヒトデ
13:34:32	139.2	37	-	12.7328	N	141	-	20.1070	E			白ヒトデ1
13:34:35	139.2	37	-	12.7328	N	141	-	20.1070	E			白ヒトデ2
13:35:00	139.2	37	-	12.7340	N	141	-	20.1084	E			カレイ
13:35:07	140	37	-	12.7358	N	141	-	20.1098	E			白ヒトデ
13:35:15	140.3	37	-	12.7370	N	141	-	20.1107	E			魚
13:36:01	138.6	37	-	12.7416	N	141	-	20.1146	E			ヒトデ
13:36:49	140.1	37	-	12.7446	N	141	-	20.1170	E			ヒトデ ウミサボテン
13:37:14	138.8	37	-	12.7477	N	141	-	20.1194	E			ヒトデ ウミサボテン
13:40:40	139.7	37	-	12.7672	N	141	-	20.1350	E			下向きカメラ復旧
13:41:34	139.9	37	-	12.7721	N	141	-	20.1390	E			ヒトデ ウミサボテン
13:42:38	139.8	37	-	12.7777	N	141	-	20.1436	E			ヒトデ
13:43:13	142.5	37	-	12.7824	N	141	-	20.1469	E			トラザメ ホウボウ
13:44:07	139.7	37	-	12.7874	N	141	-	20.1507	E			ヒトデ
13:44:32	139.8	37	-	12.7898	N	141	-	20.1528	E			ホウボウ
13:45:21	140.4	37	-	12.7945	N	141	-	20.1565	E			ヒトデ
13:45:48	144.7	37	-	12.7955	N	141	-	20.1578	E			ウミサボテン クモヒトデ
13:46:22	139.6	37	-	12.8009	N	141	-	20.1615	E			ヒトデ
13:46:42	139.4	37	-	12.8032	N	141	-	20.1632	E			魚
13:46:46	139.4	37	-	12.8032	N	141	-	20.1632	E			ヒトデ
13:48:38	139.8	37	-	12.8147	N	141	-	20.1706	E			魚
13:49:33	140.1	37	-	12.8207	N	141	-	20.1765	E			ヒトデ
13:51:54	140.1	37	-	12.8364	N	141	-	20.1883	E			ヒトデ
13:52:28	139.9	37	-	12.8386	N	141	-	20.1901	E			ホウボウ
13:53:07	139.6	37	-	12.8433	N	141	-	20.1939	E			ヒトデ
13:53:56	139.8	37	-	12.8498	N	141	-	20.1990	E			赤い魚 ヒトデ
13:54:55	140.7	37	-	12.8558	N	141	-	20.2042	E			ホウボウ
13:55:19	139.9	37	-	12.8578	N	141	-	20.2057	E			カレイ
13:55:29	139.5	37	-	12.8586	N	141	-	20.2064	E			ヒトデ

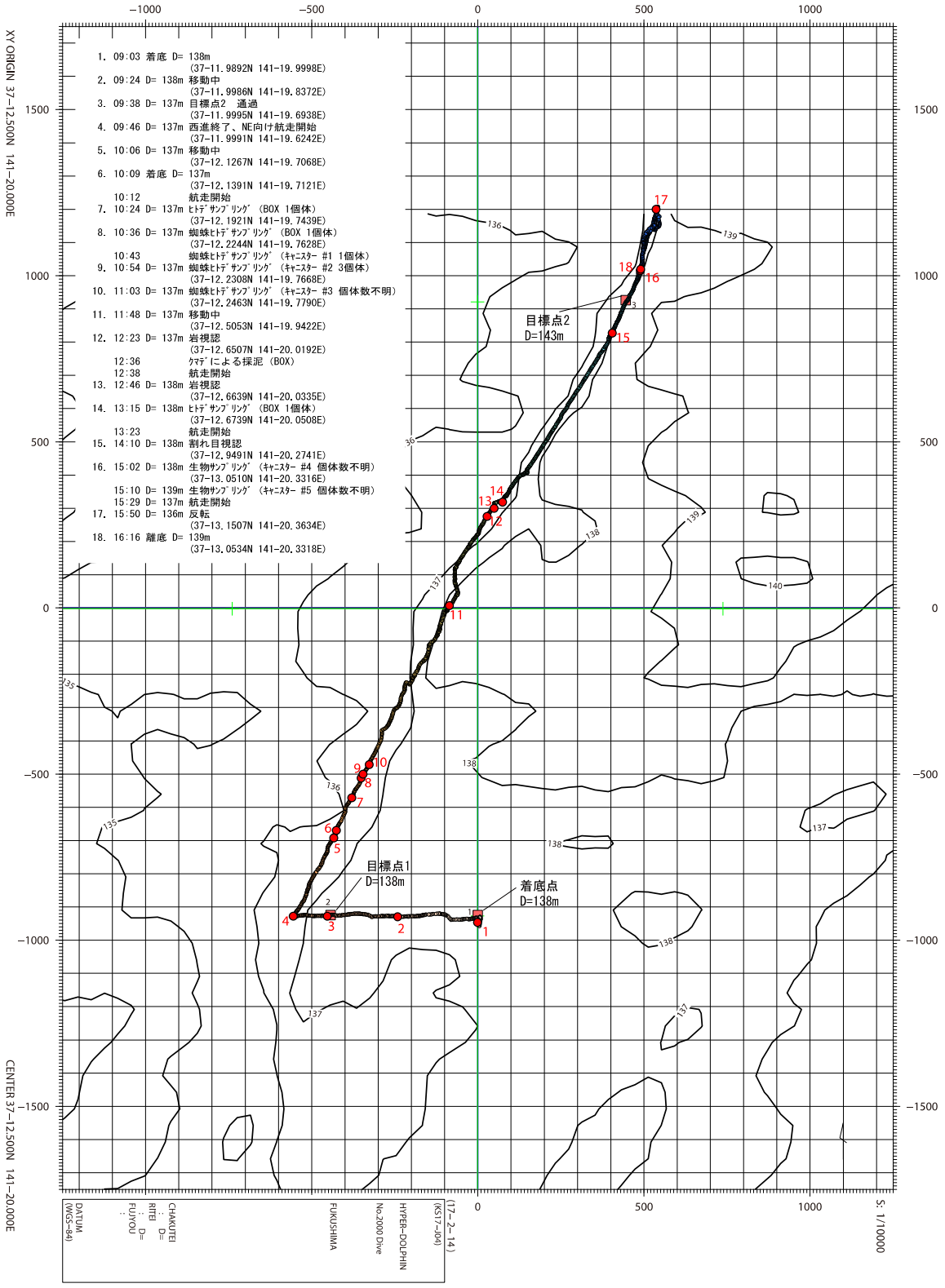
13:55:52	140.6	37	-	12.8627	N	141	-	20.2099	E			ヒトデ
13:56:11	140.1	37	-	12.8656	N	141	-	20.2121	E			枝
13:57:22	139.2	37	-	12.8735	N	141	-	20.2181	E			クモヒトデ
13:57:41	140.9	37	-	12.8756	N	141	-	20.2200	E			ヒトデ
13:57:50	140.9	37	-	12.8756	N	141	-	20.2200	E			カレイ
13:58:30	139.4	37	-	12.8808	N	141	-	20.2237	E			ヒトデ
13:58:50	138.1	37	-	12.8836	N	141	-	20.2260	E			ヒトデ
14:01:51	139.5	37	-	12.9065	N	141	-	20.2440	E			ヒトデ
14:03:08	139.3	37	-	12.9141	N	141	-	20.2490	E			魚
14:03:53	141.4	37	-	12.9185	N	141	-	20.2539	E			ホウボウ
14:04:07	139.5	37	-	12.9197	N	141	-	20.2547	E			白ヒトデ2
14:04:18	139.4	37	-	12.9205	N	141	-	20.2553	E			ホウボウ
14:04:33	148.3	37	-	12.9214	N	141	-	20.2562	E			白ヒトデ
14:05:09	139.5	37	-	12.9255	N	141	-	20.2593	E			白ヒトデ
14:05:46	139.7	37	-	12.9309	N	141	-	20.2635	E			白ヒトデ
14:06:33	139.8	37	-	12.9361	N	141	-	20.2678	E			カレイ
14:06:43	140.3	37	-	12.9373	N	141	-	20.2673	E			くぼみあり
14:07:13	140.8	37	-	12.9387	N	141	-	20.2656	E			白ヒトデ
14:07:31	140.5	37	-	12.9401	N	141	-	20.2668	E			白ヒトデ2
14:07:46	139.7	37	-	12.9409	N	141	-	20.2671	E			白ヒトデ3
14:08:09	141.4	37	-	12.9419	N	141	-	20.2678	E			くぼみに貝殻がたくさん
14:08:28	140.7	37	-	12.9431	N	141	-	20.2689	E			ブイが落ちている
14:08:41	141	37	-	12.9439	N	141	-	20.2698	E			白ヒトデ
14:08:51	140.6	37	-	12.9442	N	141	-	20.2702	E			白ヒトデ3
14:09:19	139.5	37	-	12.9452	N	141	-	20.2712	E			溝がつづく
14:09:30	140.1	37	-	12.9456	N	141	-	20.2717	E			魚
14:09:49	141.2	37	-	12.9472	N	141	-	20.2725	E			白ヒトデ2
14:10:02	139.5	37	-	12.9488	N	141	-	20.2737	E			赤ヒトデ
14:10:16	140.2	37	-	12.9491	N	141	-	20.2741	E			魚
14:10:44	140.3	37	-	12.9514	N	141	-	20.2755	E			白ヒトデ2
14:11:37	140.2	37	-	12.9555	N	141	-	20.2774	E			白ヒトデ2
14:11:52	142.9	37	-	12.9564	N	141	-	20.2784	E			木片のようなものが溝に落ちている
14:12:07	140.7	37	-	12.9571	N	141	-	20.2788	E			魚
14:12:17	140.6	37	-	12.9582	N	141	-	20.2792	E			白ヒトデ2
14:12:31	141.2	37	-	12.9596	N	141	-	20.2797	E			赤ヒトデ
14:12:34	141.2	37	-	12.9596	N	141	-	20.2797	E			赤ヒトデ

14:13:01	142.1	37	-	12.9612	N	141	-	20.2809	E			白ヒトデ2
14:13:28	141.8	37	-	12.9629	N	141	-	20.2821	E			ミズダコ
14:13:46	140.2	37	-	12.9649	N	141	-	20.2828	E			白ヒトデ2
14:14:09	140.8	37	-	12.9656	N	141	-	20.2834	E			白ヒトデ
14:14:15	140.8	37	-	12.9657	N	141	-	20.2834	E			赤ヒトデ
14:14:26	139.5	37	-	12.9668	N	141	-	20.2842	E			ウミサボテン
14:14:34	141	37	-	12.9672	N	141	-	20.2847	E			赤ヒトデ2
14:14:41	141.1	37	-	12.9678	N	141	-	20.2852	E			白ヒトデ
14:15:24	140.6	37	-	12.9712	N	141	-	20.2871	E			白ヒトデ
14:15:30	140.4	37	-	12.9718	N	141	-	20.2875	E			赤ヒトデ2
14:15:50	141.1	37	-	12.9732	N	141	-	20.2881	E			白ヒトデ
14:16:14	140.9	37	-	12.9745	N	141	-	20.2886	E			カレイ(斑点あり)
14:16:33	140.8	37	-	12.9762	N	141	-	20.2893	E			白ヒトデ
14:18:10	139.4	37	-	12.9827	N	141	-	20.2929	E			白ヒトデ
14:18:16	140.2	37	-	12.9837	N	141	-	20.2936	E			カレイ
14:18:36	140.3	37	-	12.9856	N	141	-	20.2940	E			ウミサボテン
14:18:44	140.3	37	-	12.9859	N	141	-	20.2945	E			白ヒトデ3
14:19:39	140.2	37	-	12.9900	N	141	-	20.2966	E			赤ヒトデ
14:20:14	143.6	37	-	12.9931	N	141	-	20.2981	E			布
14:20:28	140.2	37	-	12.9942	N	141	-	20.2984	E			トラザメ
14:20:32	139.8	37	-	12.9949	N	141	-	20.2991	E			カレイ
14:20:38	139.8	37	-	12.9949	N	141	-	20.2991	E			赤ヒトデ2
14:20:58	139.9	37	-	12.9970	N	141	-	20.3008	E			白ヒトデ
14:21:12	143.2	37	-	12.9987	N	141	-	20.3022	E			赤ヒトデ
14:21:48	139.7	37	-	13.0005	N	141	-	20.3046	E			赤ヒトデ
14:22:54	140.7	37	-	13.0063	N	141	-	20.3087	E			漁具
14:23:04	140.2	37	-	13.0073	N	141	-	20.3081	E			赤ヒトデ
14:23:36	142.2	37	-	13.0091	N	141	-	20.3094	E			溝に貝殻がたくさん
14:24:49	140.5	37	-	13.0156	N	141	-	20.3142	E			クモヒトデたくさん
14:24:59	142.7	37	-	13.0160	N	141	-	20.3150	E			魚
14:25:07	140.2	37	-	13.0171	N	141	-	20.3155	E			溝
14:25:26	139.9	37	-	13.0185	N	141	-	20.3164	E			クモヒトデ続く
14:26:36	139.3	37	-	13.0241	N	141	-	20.3187	E			ホウボウ
14:27:26	140	37	-	13.0279	N	141	-	20.3208	E			クモヒトデ
14:28:36	139.6	37	-	13.0330	N	141	-	20.3240	E			何かが地表から頭をだした
14:29:13	140.3	37	-	13.0360	N	141	-	20.3252	E			ヒトデ

14:29:24	140.6	37	-	13.0364	N	141	-	20.3250	E			えぐれている
14:30:17	139.6	37	-	13.0411	N	141	-	20.3265	E			ホウボウ
14:32:11	138.7	37	-	13.0474	N	141	-	20.3291	E			ウミシダ
14:32:45	141.2	37	-	13.0489	N	141	-	20.3293	E			穴が開いてる
14:32:56	139.9	37	-	13.0497	N	141	-	20.3299	E			ヨコエビが大量に群れる
14:34:41	141.6	37	-	13.0507	N	141	-	20.3305	E			着底
14:59:24	140.1	37	-	13.0520	N	141	-	20.3309	E			海底観察カメラで撮影開始
15:01:21	140.9	37	-	13.0524	N	141	-	20.3314	E			ヨコエビ採集　スラープガン　キャにスター4
15:02:53	141.1	37	-	13.0528	N	141	-	20.3315	E			採集終了
15:03:22	140.2	37	-	13.0528	N	141	-	20.3313	E			再開　キャニスター5
15:08:23	141	37	-	13.0524	N	141	-	20.3314	E			採集終了　キャニスター5
15:08:59	140.7	37	-	13.0526	N	141	-	20.3315	E			採集延長　キャニスター5
15:10:12	141.4	37	-	13.0523	N	141	-	20.3313	E			採集終了　キャニスター5
15:11:25	141.4	37	-	13.0526	N	141	-	20.3315	E			航走再開
15:12:07	141	37	-	13.0525	N	141	-	20.3310	E			アイナメ
15:12:41	139.7	37	-	13.0534	N	141	-	20.3313	E			アイナメ、一時停止
15:23:16	142	37	-	13.0534	N	141	-	20.3311	E			震災時に落ちた岩を観察するために濁りの晴れ待ち
15:27:27	141.4	37	-	13.0535	N	141	-	20.3312	E			魚
15:29:20	141.4	37	-	13.0535	N	141	-	20.3312	E			海底観察終了
15:29:24	140.3	37	-	13.0537	N	141	-	20.3313	E			航走再開
15:30:20	139.2	37	-	13.0551	N	141	-	20.3326	E			白ヒトデ
15:31:33	142.4	37	-	13.0603	N	141	-	20.3348	E			カレイ
15:33:11	140.5	37	-	13.0679	N	141	-	20.3332	E			溝観察
15:34:02	139	37	-	13.0710	N	141	-	20.3344	E			捨てロープ視認
15:38:14	139.1	37	-	13.0914	N	141	-	20.3408	E			ウミサボテン
15:38:30	139.6	37	-	13.0920	N	141	-	20.3409	E			段差観察
15:38:50	139.3	37	-	13.0942	N	141	-	20.3414	E			ナマコ
15:39:27	139.4	37	-	13.0970	N	141	-	20.3429	E			カレイ
15:39:52	141	37	-	13.0995	N	141	-	20.3434	E			白ヒトデ
15:40:45	140.2	37	-	13.1015	N	141	-	20.3435	E			ホウボウ
15:40:56	141.2	37	-	13.1018	N	141	-	20.3439	E			白ヒトデ

15:41:27	138.7	37	-	13.1046	N	141	-	20.3455	E			クモヒトデ
15:42:16	139.5	37	-	13.1089	N	141	-	20.3476	E			魚
15:42:31	138.1	37	-	13.1101	N	141	-	20.3488	E			海底にゴミ？
15:42:54	139.8	37	-	13.1113	N	141	-	20.3491	E			クモヒトデ2
15:43:06	139.5	37	-	13.1122	N	141	-	20.3496	E			クモヒトデ
15:43:17	139.2	37	-	13.1130	N	141	-	20.3498	E			ホウボウ
15:43:37	139.5	37	-	13.1147	N	141	-	20.3504	E			窪みの上を進む
15:43:49	139	37	-	13.1155	N	141	-	20.3506	E			白ヒトデ
15:44:33	139.3	37	-	13.1197	N	141	-	20.3530	E			魚
15:44:57	139.1	37	-	13.1201	N	141	-	20.3550	E			白ヒトデ
15:46:07	139.4	37	-	13.1270	N	141	-	20.3571	E			白ヒトデ
15:46:49	138.6	37	-	13.1321	N	141	-	20.3590	E			鉄のごみにクモヒトデ5
15:47:18	141.1	37	-	13.1338	N	141	-	20.3589	E			クモヒトデ2、白ヒトデ1
15:47:58	139.4	37	-	13.1364	N	141	-	20.3605	E			クモヒトデ1、白ヒトデ1、ウミサボテン2
15:48:18	139.7	37	-	13.1389	N	141	-	20.3614	E			赤ヒトデ
15:48:31	140.4	37	-	13.1417	N	141	-	20.3627	E			ホウボウ
15:48:58	139.6	37	-	13.1443	N	141	-	20.3639	E			白ヒトデ
15:49:47	139.2	37	-	13.1488	N	141	-	20.3659	E			白ヒトデ
15:50:07	139.5	37	-	13.1497	N	141	-	20.3645	E			ウミサボテン
15:50:28	138.9	37	-	13.1503	N	141	-	20.3644	E			進行方向反転
15:50:42	138.9	37	-	13.1518	N	141	-	20.3632	E			小さな魚
15:58:19	140.8	37	-	13.1125	N	141	-	20.3491	E			魚
16:03:07	139.3	37	-	13.0927	N	141	-	20.3368	E			赤ヒトデ
16:06:01	141.3	37	-	13.0657	N	141	-	20.3343	E			海底に白い何か
16:06:24	140.3	37	-	13.0624	N	141	-	20.3339	E			段差観察
16:08:54	141	37	-	13.0535	N	141	-	20.3323	E			揚収作業開始
16:10:55	141.6	37	-	13.0534	N	141	-	20.3321	E			溝の底、ヨコエビの群れ観察
16:14:32	140.9	37	-	13.0537	N	141	-	20.3320	E			観察終了
16:17:39	140.7	37	-	13.0532	N	141	-	20.3315	E			浮上開始

Dive track HD#2000



Dive Report HD#2001

Date: Feb 15, 2017
Site: Off Minami-Sanriku **Depth:** 300-314m
Landing (Lat., Long., Time, Depth): 38°30.582'N, 141°58.506'E, 10:38, 314m
Leaving (Lat., Long., Time, Depth): 38°30.589'N, 141°57.718'E, 12:40, 300m
Pilot: Atsushi Takenouchi **Co-Pilot**: Yudai Tayama
Observer: Shisako Matsuba

Theme: Researches on marine ecosystem dynamics off Minami-Sanriku

Purpose:

1. Mapping animals and sediment
2. Sampling benthic animals and sediment

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Sampling box
5. MBARI core x3
6. Kumade scoop sampler

Sampling Points and Markers:

Time	Position	Depth(m)	Events
12:21	38°30.596' N, 141°57.759'E	300	Sampling of ophiuroids with slurp gun
16:24	38°30.596' N, 141°57.759'E	300	Sampling of ophiuroids with slurp gun
16:31	38°30.596' N, 141°57.759'E	300	Sampling of sediment with Kumade scoop sampler

Dive Summary

At the landing point, 314m depth, lots of squids spread in front of Hyper-Dolphin. We found several individuals of *Liponematidae* sp. and their feces, while few ophiuroids were around there. *Liponematidae* sp. and their feces were constantly present through this dive. We moved to the west, some sunken wooden debris and artificial one were observed. Around 700m in west from the lading point, the number of ophiuroids gradually increased. Moving to

west about 100m, we could observe a school of ophiuroids covering over the seabed, which were present until our leaving point. At about 100m west from there we captured some ophiuroids by a slurp gun and sediment samples by a rake, then we finished this dive and left there.

Dive Log

Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
10:05:00												吊り上げ
10:08:46			-				-					着水
10:20:07	36.6	38	-	30.6103	N	141	-	58.5191	E			潜航開始
10:30:38	206.8	38	-	30.5925	N	141	-	58.4766	E			
10:32:37	246.3	38	-	30.5844	N	141	-	58.4756	E			イカ
10:33:46	268	38	-	30.5868	N	141	-	58.4923	E			イカ
10:34:10	277.4	38	-	30.5827	N	141	-	58.4870	E			イカ大群
10:36:32	306.7	38	-	30.5860	N	141	-	58.5041	E			魚
10:36:52	311.8	38	-	30.5839	N	141	-	58.5014	E			海底視認
10:37:16	312.9	38	-	30.5818	N	141	-	58.4951	E			イカ群
10:37:55	313.4	38	-	30.5839	N	141	-	58.5058	E			サメ
10:38:18	314.9	38	-	30.5840	N	141	-	58.5068	E			ダーリア
10:38:57	315.2	38	-	30.5841	N	141	-	58.5069	E			巻貝とイソギンチャク
10:39:17	315.8	38	-	30.5812	N	141	-	58.5017	E			航走開始
10:41:24	317.6	38	-	30.5797	N	141	-	58.4898	E			ヤドカリ
10:42:03	314	38	-	30.5909	N	141	-	58.5111	E			魚
10:42:36	316.1	38	-	30.5930	N	141	-	58.5010	E			カイメン
10:43:48	315.9	38	-	30.5956	N	141	-	58.4986	E			ダーリア
10:44:35	314.9	38	-	30.5949	N	141	-	58.5002	E			底質砂泥
10:44:52	314.9	38	-	30.5949	N	141	-	58.5002	E			ダーリア
10:46:21	316.4	38	-	30.6012	N	141	-	58.4822	E			沈木
10:47:13	317	38	-	30.6028	N	141	-	58.4767	E			沈木　巻貝
10:47:39	317.6	38	-	30.6029	N	141	-	58.4747	E			ダーリア
10:48:29	316.8	38	-	30.6028	N	141	-	58.4702	E			ダーリア
10:48:50	316.5	38	-	30.6021	N	141	-	58.4675	E			ダーリア
10:49:22	317	38	-	30.6026	N	141	-	58.4618	E			イソギンチャク
10:50:00	316.3	38	-	30.6031	N	141	-	58.4589	E			ダーリア
10:50:29	316.8	38	-	30.6034	N	141	-	58.4554	E			イソギンチャク
10:51:03	316.2	38	-	30.6041	N	141	-	58.4497	E			ダーリア

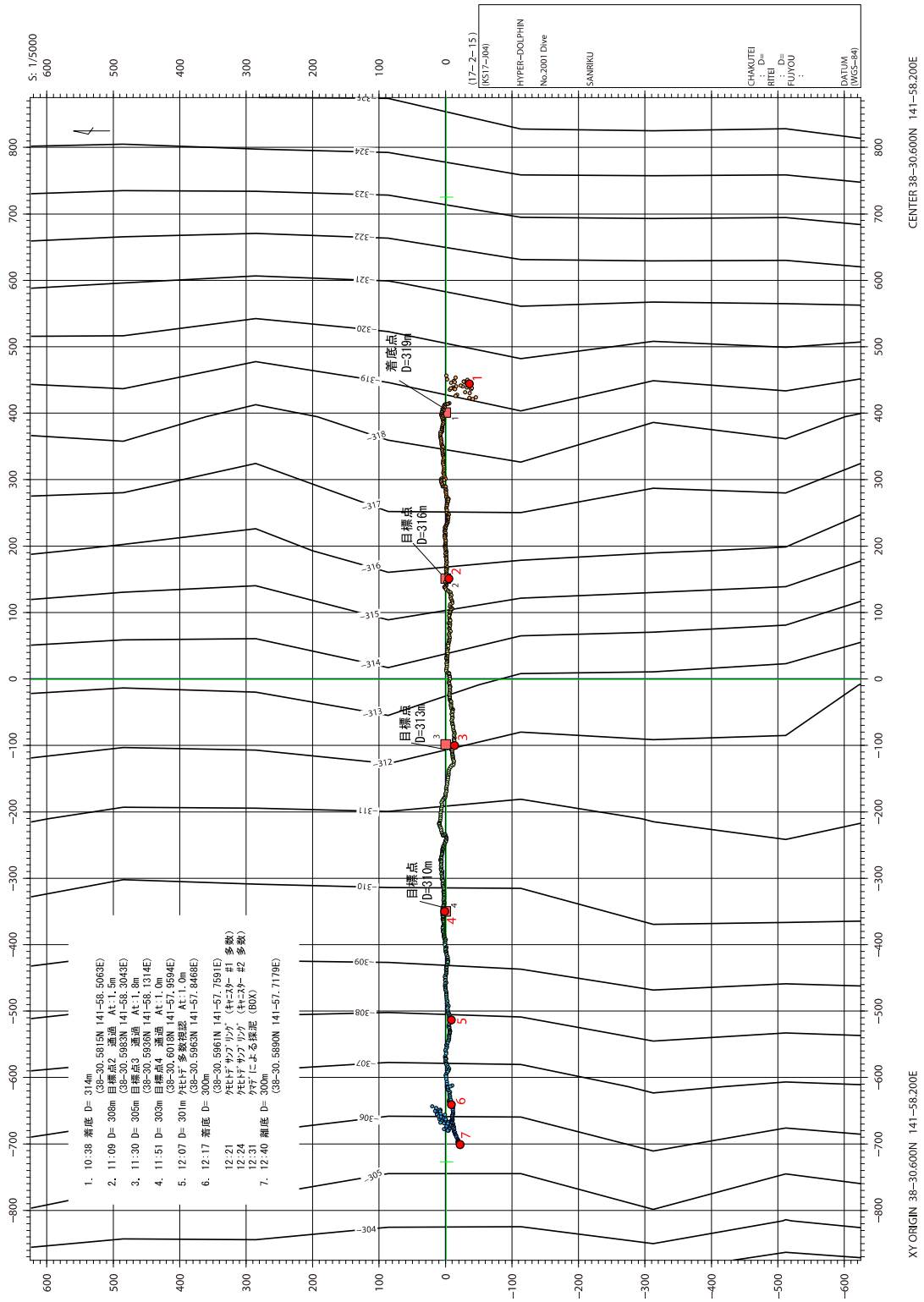
10:51:12	316	38	-	30.6039	N	141	-	58.4487	E			カイメン
10:51:31	316.5	38	-	30.6035	N	141	-	58.4450	E			ダーリア
10:52:03	316.3	38	-	30.6029	N	141	-	58.4406	E			魚
10:52:35	316.1	38	-	30.6027	N	141	-	58.4361	E			魚
10:53:02	316.5	38	-	30.6020	N	141	-	58.4315	E			ダーリア　3
10:53:44	315.6	38	-	30.6020	N	141	-	58.4263	E			ダーリア
10:54:17	315.5	38	-	30.6017	N	141	-	58.4212	E			ダーリア
10:54:35	316.1	38	-	30.6013	N	141	-	58.4169	E			カレイ
10:55:01	315.7	38	-	30.6012	N	141	-	58.4123	E			ダーリア
10:55:19	315.2	38	-	30.6013	N	141	-	58.4105	E			魚
10:55:50	315.8	38	-	30.6033	N	141	-	58.4073	E			沈木
10:56:08	316.1	38	-	30.6039	N	141	-	58.4061	E			ダーリア
10:57:01	315.2	38	-	30.6015	N	141	-	58.3996	E			イソギンチャク
10:57:25	315.1	38	-	30.5999	N	141	-	58.3987	E			カイメン
10:57:51	315	38	-	30.5998	N	141	-	58.3937	E			ダーリア
10:58:44	315.6	38	-	30.5983	N	141	-	58.3874	E			ダーリア
10:59:51	314.7	38	-	30.5993	N	141	-	58.3772	E			ダーリア
11:00:23	315.2	38	-	30.5989	N	141	-	58.3718	E			巻貝
11:00:45	314.9	38	-	30.5974	N	141	-	58.3700	E			カレイ
11:02:51	314.2	38	-	30.6002	N	141	-	58.3554	E			ダーリア糞かい
11:03:09	314.8	38	-	30.6005	N	141	-	58.3541	E			魚
11:03:20	314.7	38	-	30.6005	N	141	-	58.3532	E			ダーリア　イソギンチャク
11:04:41	313.8	38	-	30.5999	N	141	-	58.3428	E			魚　ヒトデ
11:05:42	313.8	38	-	30.6003	N	141	-	58.3356	E			魚
11:06:04	314.5	38	-	30.6000	N	141	-	58.3328	E			クモヒトデ
11:07:08	313.6	38	-	30.5996	N	141	-	58.3255	E			魚
11:07:45	314.1	38	-	30.5995	N	141	-	58.3190	E			魚
11:08:19	313.1	38	-	30.5994	N	141	-	58.3142	E			ダーリア
11:08:38	313.3	38	-	30.5997	N	141	-	58.3128	E			だーりあ
11:10:07	312.9	38	-	30.5988	N	141	-	58.3014	E			沈木
11:10:35	313.3	38	-	30.5993	N	141	-	58.2974	E			毛ガニ
11:11:43	312.9	38	-	30.5981	N	141	-	58.2914	E			ダーリア
11:12:14	312.3	38	-	30.5961	N	141	-	58.2874	E			ダーリア
11:12:46	313.2	38	-	30.5955	N	141	-	58.2827	E			ダーリア
11:13:12	312.6	38	-	30.5946	N	141	-	58.2783	E			タコ
11:13:42	313	38	-	30.5955	N	141	-	58.2737	E			ダーリア
11:14:59	312.6	38	-	30.5970	N	141	-	58.2660	E			魚、ダーリア

11:15:12	313.6	38	-	30.5970	N	141	-	58.2627	E			ダーリア
11:15:40	311.8	38	-	30.5962	N	141	-	58.2602	E			マダラ
11:16:40	311.6	38	-	30.5967	N	141	-	58.2504	E			魚
11:16:52	312	38	-	30.5961	N	141	-	58.2493	E			巻貝
11:17:00	312.5	38	-	30.5969	N	141	-	58.2472	E			ダーリア
11:17:06	312.5	38	-	30.5969	N	141	-	58.2472	E			魚
11:17:36	312.6	38	-	30.5967	N	141	-	58.2426	E			カレイ
11:17:59	312.4	38	-	30.5970	N	141	-	58.2398	E			木片
11:18:13	311.7	38	-	30.5977	N	141	-	58.2368	E			ゴミ
11:18:35	312.2	38	-	30.5982	N	141	-	58.2358	E			ゴミ
11:18:47	312	38	-	30.5979	N	141	-	58.2341	E			魚
11:20:00	311.2	38	-	30.5995	N	141	-	58.2208	E			ゲンゲ、ソコダラ
11:21:00	310.9	38	-	30.5991	N	141	-	58.2123	E			ゲンゲ
11:21:07	310.9	38	-	30.5991	N	141	-	58.2123	E			魚
11:21:17	311.4	38	-	30.5995	N	141	-	58.2103	E			イソギンチャク
11:21:55	311.3	38	-	30.5974	N	141	-	58.2056	E			細長い人工物
11:22:46	311.2	38	-	30.5965	N	141	-	58.1998	E			魚
11:23:03	311.4	38	-	30.5974	N	141	-	58.1960	E			魚
11:23:10	311.4	38	-	30.5974	N	141	-	58.1960	E			ダーリア
11:23:48	311.2	38	-	30.5968	N	141	-	58.1909	E			魚
11:23:55	311.5	38	-	30.5966	N	141	-	58.1887	E			巻貝
11:24:11	311.4	38	-	30.5970	N	141	-	58.1853	E			ダーリア
11:25:02	311.9	38	-	30.5963	N	141	-	58.1774	E			イソギンチャク
11:26:01	311.8	38	-	30.5953	N	141	-	58.1693	E			マダラ
11:26:20	310.1	38	-	30.5941	N	141	-	58.1685	E			ダーリア
11:26:41	310.7	38	-	30.5943	N	141	-	58.1657	E			ダーリア
11:26:54	310.8	38	-	30.5950	N	141	-	58.1636	E			イソギンチャク2
11:27:46	310.6	38	-	30.5948	N	141	-	58.1550	E			ダーリア
11:28:16	310.4	38	-	30.5941	N	141	-	58.1513	E			魚
11:28:36	310.6	38	-	30.5936	N	141	-	58.1473	E			魚
11:28:42	310.8	38	-	30.5932	N	141	-	58.1460	E			ダーリア
11:29:57	310.4	38	-	30.5931	N	141	-	58.1357	E			ダーリア
11:30:10	309.5	38	-	30.5936	N	141	-	58.1314	E			魚
11:31:01	309.8	38	-	30.5952	N	141	-	58.1264	E			ズワイガニ
11:31:37	308.9	38	-	30.5947	N	141	-	58.1224	E			ダーリア
11:31:56	309.7	38	-	30.5942	N	141	-	58.1199	E			ダーリア
11:33:58	308.7	38	-	30.5976	N	141	-	58.1004	E			ダーリア

11:34:38	309.3	38	-	30.5987	N	141	-	58.0927	E			魚
11:34:48	309	38	-	30.5988	N	141	-	58.0907	E			ダーリア
11:34:56	309.7	38	-	30.5991	N	141	-	58.0886	E			ダーリア
11:36:23	309.1	38	-	30.6020	N	141	-	58.0750	E			ダーリア
11:37:05	309.1	38	-	30.6032	N	141	-	58.0676	E			ゲンゲ
11:38:05	309	38	-	30.6042	N	141	-	58.0552	E			カレイ
11:39:03	308.6	38	-	30.6048	N	141	-	58.0478	E			魚
11:39:47	309.9	38	-	30.6030	N	141	-	58.0407	E			ソコダラ
11:42:14	308.7	38	-	30.6012	N	141	-	58.0275	E			赤ヒトデ
11:43:14	308.5	38	-	30.6026	N	141	-	58.0211	E			イソギンチャク2
11:43:46	308.7	38	-	30.6028	N	141	-	58.0190	E			魚？
11:45:22	308.6	38	-	30.6037	N	141	-	58.0069	E			ダーリア
11:45:39	308.9	38	-	30.6034	N	141	-	58.0049	E			ダーリア
11:46:22	307.9	38	-	30.6030	N	141	-	57.9988	E			イソギンチャク
11:47:18	308.3	38	-	30.6024	N	141	-	57.9916	E			ダーリア
11:48:28	308	38	-	30.6018	N	141	-	57.9804	E			魚
11:49:06	307.9	38	-	30.6013	N	141	-	57.9759	E			クモヒトデ　ぱらぱら
11:49:54	307.9	38	-	30.6013	N	141	-	57.9689	E			ダーリア
11:50:24	308.2	38	-	30.6017	N	141	-	57.9655	E			魚
11:51:21	307.7	38	-	30.6018	N	141	-	57.9594	E			イソギンチャク
11:51:34	307.9	38	-	30.6023	N	141	-	57.9582	E			マダラ
11:51:54	307.8	38	-	30.6023	N	141	-	57.9559	E			ダーリア
11:52:38	307.8	38	-	30.6022	N	141	-	57.9509	E			イソギンチャク
11:53:38	306.9	38	-	30.6014	N	141	-	57.9449	E			ダーリア
11:53:56	306.8	38	-	30.6022	N	141	-	57.9435	E			イソギンチャク
11:54:18	307.7	38	-	30.6023	N	141	-	57.9418	E			クモヒトデ　増えてきた
11:54:40	307.7	38	-	30.6020	N	141	-	57.9379	E			ダーリア
11:55:09	307.3	38	-	30.6012	N	141	-	57.9352	E			イソギンチャク
11:56:24	306.5	38	-	30.6006	N	141	-	57.9272	E			タコ
11:56:55	307	38	-	30.5995	N	141	-	57.9223	E			クモヒトデ
11:57:28	307.7	38	-	30.6001	N	141	-	57.9195	E			ゲンゲ
11:57:59	307.1	38	-	30.5997	N	141	-	57.9166	E			ゲンゲ
11:59:29	307.7	38	-	30.5983	N	141	-	57.9063	E			イソギンチャク
12:00:04	306.8	38	-	30.5993	N	141	-	57.9017	E			ひとで　イソギンチャク
12:00:49	306.6	38	-	30.5992	N	141	-	57.8978	E			ダーリア
12:01:34	307.4	38	-	30.6006	N	141	-	57.8916	E			ダーリア
12:01:50	307.3	38	-	30.6001	N	141	-	57.8901	E			クモヒトデ　群れ

12:02:19	307	38	-	30.5998	N	141	-	57.8855	E			ヒトデ
12:04:34	306.3	38	-	30.5990	N	141	-	57.8674	E			枝
12:12:08	305.4	38	-	30.6003	N	141	-	57.8078	E			ダーリア
12:13:31	304.7	38	-	30.5981	N	141	-	57.7980	E			魚
12:14:24	305.3	38	-	30.5994	N	141	-	57.7910	E			ヒトデ
12:17:35	303.6	38	-	30.5967	N	141	-	57.7610	E			タコ
12:17:55	304.6	38	-	30.5961	N	141	-	57.7591	E			着底
12:18:59	304.9	38	-	30.5956	N	141	-	57.7593	E			スラープガンでクモヒトデ採取開始、キャニスター1
12:21:12	305.2	38	-	30.5962	N	141	-	57.7593	E			キャニスター2でもクモヒトデ採取
12:24:13	305.2	38	-	30.5958	N	141	-	57.7589	E			サンプリング終了
12:25:06	305.1	38	-	30.5965	N	141	-	57.7587	E			泥採集開始
12:30:05	306.4	38	-	30.5987	N	141	-	57.7364	E			泥採取終了、計3杯
12:33:40	305.1	38	-	30.5957	N	141	-	57.7590	E			航走再開
12:35:08	304.8	38	-	30.5945	N	141	-	57.7486	E			クモヒトデ大群引き続き
12:35:36	304.2	38	-	30.5945	N	141	-	57.7442	E			揚収スタンバイ
12:37:05	303.5	38	-	30.5933	N	141	-	57.7362	E			ダーリア
12:40:04	303.4	38	-	30.5890	N	141	-	57.7179	E			ダーリア2
12:40:27	303.5	38	-	30.5877	N	141	-	57.7180	E			離底指示
12:41:44	302.2	38	-	30.5882	N	141	-	57.7156	E			離底
12:51:41	103.8	38	-	30.5747	N	141	-	57.7839	E			100m上昇
12:55:35	20.7	38	-	30.5522	N	141	-	57.7652	E			海面到達
13:01:28			-				-					吊り上げ開始

Dive track HD#2001



Dive Report HD#2002

Date: Feb 16, 2017
Site: Off Minami-Sanriku **Depth:** 607-615m
Landing (Lat., Long., Time, Depth): 38°29.956'N, 142°11.201'E, 11:27, 615m
Leaving (Lat., Long., Time, Depth): 38°29.997'N, 142°10.737'E, 12:45, 607m
Pilot: Yudai Tayama **Co-Pilot**: Teppei Kido
Observer: Shinji Tsuchida

Theme: Researches on marine ecosystem dynamics off Minami-Sanriku

Purpose:

1. Mapping animals and sediment
2. Sampling benthic animals and sediment

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Sampling box
5. MBARI core x3
6. Kumade scoop sampler

Sampling Points and Markers:

Time	Position	Depth(m)	Events
12:16	38°30.0026' N, 142°10.7858'E	608	Ophiuroids sampling, Canister#1
12:16	38°30.0026' N, 142°10.7858'E	608	Sampling animals in mud, Canister#2
12:32	38°30.0046' N, 142°10.7396'E	607	Sampling animals in mud, Canister#3
12:42	38°29.9973' N, 142°10.7367'E	607	Sampling animals, Canister#4
12:44	38°29.9973' N, 142°10.7367'E	607	Ophiuroids sampling, Canister#5

Dive Summary

We landed at the point of about 619m depth off Minami-Sanriku and moved to the westward. At the landing point, we found squids, eels, Darian anemone on the muddy bottom. About

500m distance from the landing point, ophiuroids and other animals in mud were sampled by the slurp gun in the canister#1 and #2. On the way to moving the westward at 608m depth, eel predating on the sargestid shrimp was observed. Then, we landed and sampled animals in mud by the slurp gun in canister#3. About 20m down to the south, we landed again and sampled ophiuroids and other animals in mud by the slurp gun in canister#4 and #5. This short dive was finished and ascended from the 607m depth point.

Dive Log

Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
10:43:25			-				-					吊り上げ
10:45:43			-				-					着水
11:01:31	27	38	-	30.0851	N	142	-	11.3086	E			潜航開始
11:21:24	484.8	38	-	29.9548	N	142	-	11.2124	E			サクラエビ、クラゲなど
11:25:15	608.8	38	-	29.9512	N	142	-	11.2041	E			サクラエビ
11:25:33	612	38	-	29.9544	N	142	-	11.2054	E			イカ
11:26:29	622.3	38	-	29.9554	N	142	-	11.2033	E			イカ
11:26:34	622.9	38	-	29.9560	N	142	-	11.2019	E			海底視認、イカ、アナゴ、ダーリアイソギンチャク、泥
11:27:09	626.4	38	-	29.9564	N	142	-	11.2005	E			ダーリアイソギンチャク1
11:29:15	625.9	38	-	29.9659	N	142	-	11.1846	E			浮いてるナマコ状の形のもの
11:30:37	625	38	-	29.9683	N	142	-	11.1730	E			巻き貝殻1、3.9℃、水深614m
11:32:06	624.9	38	-	29.9710	N	142	-	11.1622	E			アナゴ、ダーリアイソギンチャク
11:33:04	550.5	38	-	29.9761	N	142	-	11.1435	E			アナゴ
11:33:56	549.8	38	-	29.9799	N	142	-	11.1318	E			白ヒトデ1
11:34:45	565.8	38	-	29.9788	N	142	-	11.1284	E			ダーリアイソギンチャク
11:36:23	566.1	38	-	29.9803	N	142	-	11.1201	E			アナゴ2
11:37:05	625.3	38	-	29.9826	N	142	-	11.1113	E			白ヒトデ
11:37:36	625.4	38	-	29.9837	N	142	-	11.1078	E			ダーリアイソギンチャク、アナゴ
11:38:41	624.4	38	-	29.9870	N	142	-	11.0980	E			サクラエビ
11:38:59	625.5	38	-	29.9878	N	142	-	11.0949	E			貝殻まばらにある
11:39:37	623.8	38	-	29.9891	N	142	-	11.0883	E			魚
11:41:11	623.9	38	-	29.9949	N	142	-	11.0719	E			ダーリアイソギンチャク
11:42:29	624.2	38	-	29.9956	N	142	-	11.0578	E			ダーリアイソギンチャク

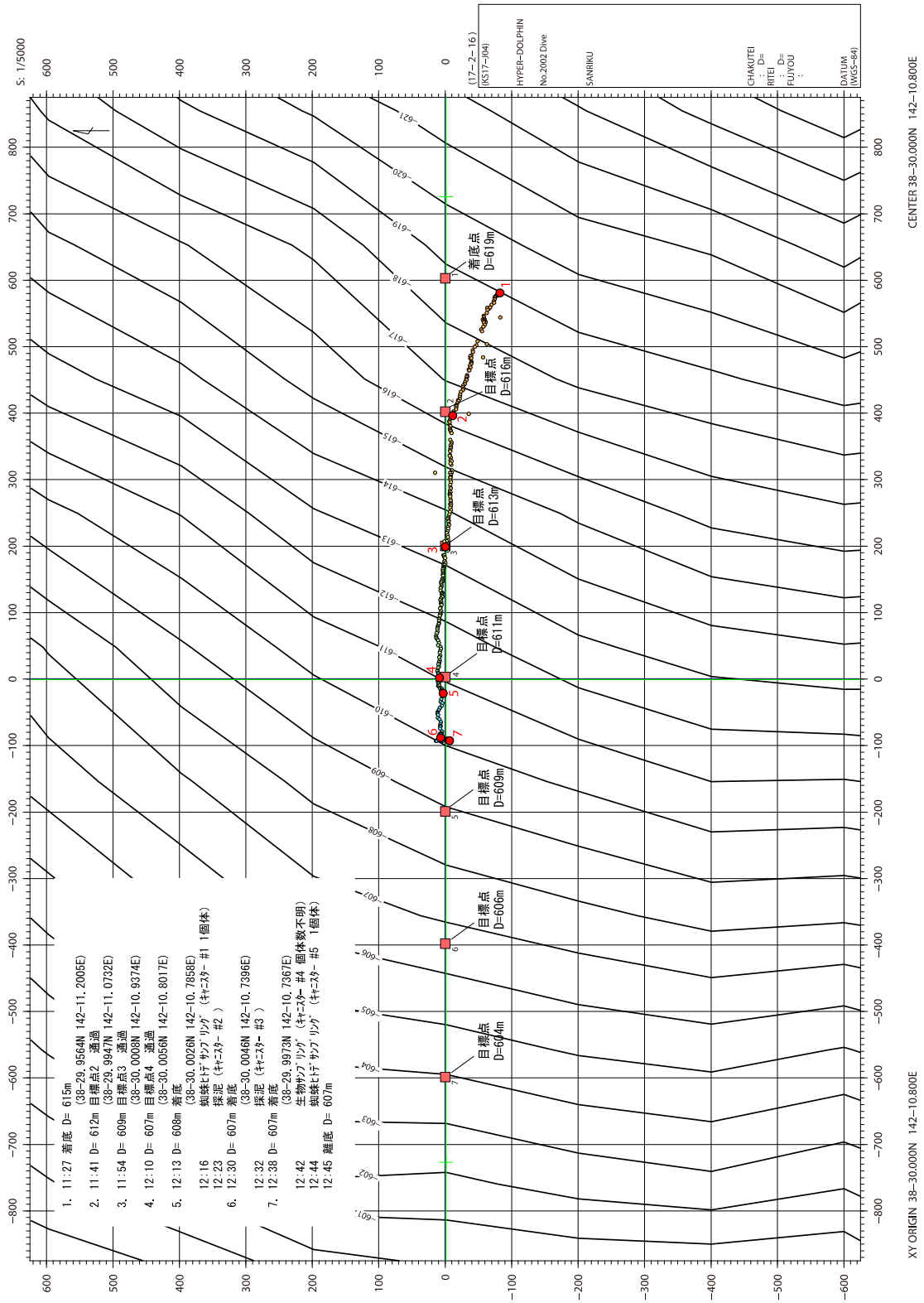
11:43:00	623.9	38	-	29.9948	N	142	-	11.0552	E			アナゴ、サクラエビ
11:44:11	608.9	38	-	29.9958	N	142	-	11.0419	E			ゲンゲ2
11:44:52	609.1	38	-	29.9959	N	142	-	11.0354	E			魚
11:45:17	607.8	38	-	29.9956	N	142	-	11.0293	E			アナゴ
11:45:51	608.1	38	-	29.9951	N	142	-	11.0217	E			ダーリア2
11:46:26	608.3	38	-	29.9945	N	142	-	11.0159	E			イソギンチャク
11:47:53	607.6	38	-	29.9959	N	142	-	11.0087	E			エビ
11:48:20	606.8	38	-	29.9953	N	142	-	11.0040	E			クモヒトデ、ソコダラ
11:48:34	607.9	38	-	29.9961	N	142	-	11.0010	E			ソコダラ
11:48:50	608.1	38	-	29.9956	N	142	-	10.9971	E			ゲンゲ
11:49:06	607.5	38	-	29.9963	N	142	-	10.9949	E			アナゴ
11:49:15	607.5	38	-	29.9957	N	142	-	10.9934	E			イソギンチャク
11:50:12	607.7	38	-	29.9957	N	142	-	10.9857	E			クモヒトデ、エビ
11:50:26	606.7	38	-	29.9956	N	142	-	10.9840	E			アナゴ
11:50:54	607	38	-	29.9953	N	142	-	10.9806	E			クモヒトデ
11:51:27	607.7	38	-	29.9954	N	142	-	10.9748	E			アナゴ
11:52:01	606.6	38	-	29.9973	N	142	-	10.9663	E			イソギンチャク
11:52:27	606.7	38	-	29.9972	N	142	-	10.9639	E			アナゴ
11:53:21	606.5	38	-	29.9981	N	142	-	10.9530	E			ゲンゲ
11:53:46	605.9	38	-	29.9981	N	142	-	10.9488	E			イソギンチャク
11:54:17	605.4	38	-	29.9987	N	142	-	10.9427	E			アナゴ
11:55:08	606.1	38	-	30.0013	N	142	-	10.9346	E			ヒトデ
11:55:57	605.3	38	-	30.0007	N	142	-	10.9262	E			アナゴ
11:56:13	605.6	38	-	30.0007	N	142	-	10.9222	E			イソギンチャク2
11:56:58	606.3	38	-	30.0008	N	142	-	10.9179	E			ソコダラ
11:57:20	606.4	38	-	30.0012	N	142	-	10.9152	E			イソギンチャク
11:57:46	607.2	38	-	30.0019	N	142	-	10.9136	E			アナゴ
11:57:57	605.4	38	-	30.0021	N	142	-	10.9118	E			イソギンチャク、オタマボヤ、魚
11:58:42	605.7	38	-	30.0015	N	142	-	10.9042	E			巻貝
11:59:02	605.5	38	-	30.0024	N	142	-	10.9026	E			ダーリア、アナゴ2
11:59:24	604.8	38	-	30.0034	N	142	-	10.9004	E			アナゴ
11:59:37	605.1	38	-	30.0031	N	142	-	10.9007	E			エビ、イソギンチャク
12:00:11	605	38	-	30.0037	N	142	-	10.8943	E			イソギンチャク、ソコダラ
12:00:24	605.2	38	-	30.0039	N	142	-	10.8941	E			エビ
12:00:34	606	38	-	30.0038	N	142	-	10.8914	E			巻貝
12:00:42	606.9	38	-	30.0025	N	142	-	10.8893	E			エビ

12:01:11	605.1	38	-	30.0027	N	142	-	10.8874	E			エビ2
12:01:19	605.1	38	-	30.0027	N	142	-	10.8874	E			巻貝
12:01:26	604.6	38	-	30.0026	N	142	-	10.8863	E			アナゴ
12:01:48	604.7	38	-	30.0035	N	142	-	10.8833	E			魚
12:01:58	604.8	38	-	30.0037	N	142	-	10.8832	E			ヒトデ
12:02:07	604.9	38	-	30.0036	N	142	-	10.8814	E			魚、イソギンチャク
12:02:22	605.6	38	-	30.0034	N	142	-	10.8801	E			イカ、エビ2
12:02:38	604.8	38	-	30.0037	N	142	-	10.8785	E			アナゴ
12:02:46	604.6	38	-	30.0031	N	142	-	10.8775	E			エビ、イソギンチャク
12:02:58	605.2	38	-	30.0031	N	142	-	10.8766	E			エビ、ソコダラ
12:03:12	605.1	38	-	30.0041	N	142	-	10.8730	E			エビ2、ソコダラ2
12:03:26	604.7	38	-	30.0034	N	142	-	10.8704	E			エビ2
12:03:35	604.5	38	-	30.0040	N	142	-	10.8688	E			アナゴ、イソギンチャク、エビ
12:03:59	604.1	38	-	30.0042	N	142	-	10.8666	E			エビ
12:04:05	604.5	38	-	30.0044	N	142	-	10.8653	E			エビ
12:04:15	604.2	38	-	30.0047	N	142	-	10.8627	E			エビ、細長い何か
12:04:28	604.5	38	-	30.0051	N	142	-	10.8618	E			ヒトデ
12:04:38	604.2	38	-	30.0052	N	142	-	10.8599	E			イソギンチャク
12:04:46	604	38	-	30.0051	N	142	-	10.8576	E			巻貝2、ソコダラ
12:05:00	604.7	38	-	30.0055	N	142	-	10.8567	E			イソギンチャク、
12:05:09	605.7	38	-	30.0061	N	142	-	10.8549	E			エビ3
12:05:15	604.6	38	-	30.0061	N	142	-	10.8539	E			エビ
12:05:32	605	38	-	30.0065	N	142	-	10.8513	E			エビ、イソギンチャク2
12:05:47	605.1	38	-	30.0064	N	142	-	10.8488	E			クモヒトデ、エビ2
12:06:10	604	38	-	30.0074	N	142	-	10.8449	E			エビ4
12:06:21	604.7	38	-	30.0071	N	142	-	10.8426	E			エビ3
12:06:37	606	38	-	30.0065	N	142	-	10.8411	E			エビ2
12:06:44	604.1	38	-	30.0059	N	142	-	10.8398	E			エビ3
12:06:54	604.9	38	-	30.0052	N	142	-	10.8372	E			アナゴ
12:07:09	603.9	38	-	30.0059	N	142	-	10.8349	E			イソギンチャク
12:07:33	603.6	38	-	30.0043	N	142	-	10.8289	E			エビ
12:07:43	604.7	38	-	30.0044	N	142	-	10.8270	E			エビ、ヒトデ
12:08:12	604.8	38	-	30.0050	N	142	-	10.8225	E			アナゴ
12:08:21	603.8	38	-	30.0045	N	142	-	10.8195	E			イソギンチャク
12:08:38	602.9	38	-	30.0048	N	142	-	10.8177	E			アナゴ
12:08:54	603.8	38	-	30.0053	N	142	-	10.8159	E			クシクラゲ

12:09:03	604.2	38	-	30.0056	N	142	-	10.8151	E			タコ
12:09:27	603.3	38	-	30.0058	N	142	-	10.8115	E			ソコダラ
12:09:43	604.2	38	-	30.0065	N	142	-	10.8080	E			ソコダラ2
12:09:55	603.7	38	-	30.0058	N	142	-	10.8064	E			アナゴ、イソギンチャク
12:10:12	602.7	38	-	30.0056	N	142	-	10.8034	E			ソコダラ
12:10:21	603.5	38	-	30.0059	N	142	-	10.8028	E			アナゴ、エビ、イソギンチャク
12:10:42	603.7	38	-	30.0053	N	142	-	10.8009	E			エビ4、アナゴ1、巻貝1
12:11:08	603.8	38	-	30.0060	N	142	-	10.7980	E			エビ
12:11:25	604.1	38	-	30.0051	N	142	-	10.7963	E			エビ、ソコダラ2
12:11:37	603.4	38	-	30.0058	N	142	-	10.7952	E			エビ3
12:11:44	603.9	38	-	30.0059	N	142	-	10.7930	E			ゴミ？
12:12:18	603.9	38	-	30.0046	N	142	-	10.7908	E			ヒトデ、魚
12:12:33	603.1	38	-	30.0030	N	142	-	10.7902	E			エビ、魚
12:12:44	604	38	-	30.0034	N	142	-	10.7886	E			エビ
12:13:01	603.7	38	-	30.0024	N	142	-	10.7862	E			クモヒトデ発見、着底
12:15:04	604.3	38	-	30.0017	N	142	-	10.7865	E			アナゴ
12:16:14	604.4	38	-	30.0013	N	142	-	10.7856	E			視認したクモヒトデスラープガンで採集、キャニスター1
12:17:43	604.6	38	-	30.0017	N	142	-	10.7867	E			周辺の泥スラープガンで採集、キャニスター2
12:19:54	605.2	38	-	30.0014	N	142	-	10.7864	E			引き続き周辺の泥サンプリング、キャニスター2継続
12:25:06	604.5	38	-	30.0022	N	142	-	10.7857	E			採集終了、航走再開
12:25:18	604	38	-	30.0026	N	142	-	10.7838	E			アナゴ
12:25:38	603	38	-	30.0033	N	142	-	10.7790	E			ソコダラ
12:25:54	603.4	38	-	30.0023	N	142	-	10.7749	E			ダーリア、ゲンゲ
12:26:13	603.2	38	-	30.0042	N	142	-	10.7702	E			魚
12:26:33	603.5	38	-	30.0053	N	142	-	10.7676	E			魚
12:26:49	604.4	38	-	30.0064	N	142	-	10.7657	E			アナゴ
12:27:04	601.8	38	-	30.0064	N	142	-	10.7643	E			アナゴ
12:27:14	602.1	38	-	30.0059	N	142	-	10.7627	E			魚、アナゴ
12:27:36	602.8	38	-	30.0048	N	142	-	10.7584	E			魚、ソコダラ、魚 B
12:28:15	603.2	38	-	30.0037	N	142	-	10.7514	E			ホラアナゴがサクラエビ捕食
12:29:07	603.1	38	-	30.0030	N	142	-	10.7434	E			アナゴ
12:29:32	603.9	38	-	30.0033	N	142	-	10.7429	E			イソギンチャク、エビ2

12:29:48	603.6	38	-	30.0033	N	142	-	10.7428	E			ゲンゲ
12:30:21	604.3	38	-	30.0049	N	142	-	10.7388	E			着底
12:30:38	603.7	38	-	30.0047	N	142	-	10.7419	E			魚
12:31:05	603.5	38	-	30.0051	N	142	-	10.7394	E			表層の泥スラープガンで採集、キャニスター3
12:31:39	604.9	38	-	30.0046	N	142	-	10.7395	E			ホラアナゴがサクラエビ捕食
12:32:54	603.8	38	-	30.0049	N	142	-	10.7393	E			キャニスター3採集終了
12:34:04	603.6	38	-	30.0049	N	142	-	10.7400	E			ゲンゲ、イソギンチャク
12:34:31	603.3	38	-	30.0046	N	142	-	10.7398	E			魚
12:35:47	603.6	38	-	30.0042	N	142	-	10.7389	E			航走再開
12:36:57	602.1	38	-	30.0042	N	142	-	10.7377	E			イソギンチャク
12:37:11	602.9	38	-	30.0022	N	142	-	10.7360	E			魚、ダーリア、アナゴ
12:38:02	603.1	38	-	29.9981	N	142	-	10.7372	E			着底
12:38:31	603.8	38	-	29.9972	N	142	-	10.7370	E			ヤドカリと巻貝
12:39:02	603.6	38	-	29.9976	N	142	-	10.7357	E			表層の泥スラープガンで採集、キャニスター4
12:40:54	603.7	38	-	29.9978	N	142	-	10.7367	E			魚スラープガンで採集、キャニスター4
12:42:54	603.7	38	-	29.9973	N	142	-	10.7365	E			クモヒトデ視認
12:44:38	603.2	38	-	29.9970	N	142	-	10.7378	E			クモヒトデスラープガンで採集、キャニスター5
12:46:57	603.5	38	-	29.9970	N	142	-	10.7367	E			採集終了
12:47:12	603.4	38	-	29.9974	N	142	-	10.7370	E			離底
12:48:00	592.7	38	-	30.0019	N	142	-	10.7309	E			1305浮上予定
13:02:50	38.6	38	-	29.9549	N	142	-	10.6955	E			トラポン視認

Dive track HD#2002



Dive Report HD#2003

Date: Feb 20, 2017
Site: Off Hirota Bay **Depth:** 159m
Landing (Lat., Long., Time, Depth): 38°54.3791'N, 141°54.3840'E, 8:46, 159m
Leaving (Lat., Long., Time, Depth): 38°54.4149'N, 141°54.3028'E, 11:11, 158m
Pilot: Shigeru Kikuya **Co-Pilot**: Yuta Sakakibara
Observer: Masaru Kawato

Theme: Researches on marine ecosystem dynamics off Minami-Sanriku

Purpose:
1. Mapping animals and sediment
2. Sampling benthic animals and sediment

Payload Equipment:
1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Sampling box
5. MBARI core x3
6. Kumade scoop sampler

Sampling Points and Markers:

Time	Position	Depth (m)	Events
10:01	38°54.4039' N, 141°54.2918'E	157	Discovery of the large rock

Dive Summary

The purpose of *HPD dive #2003* was to observe the sunken wood log that has been observed in 2013 and 2014. After landing, we tried to find the sunken wood by visual observation and acoustic sonar near the target point. But we couldn't find the wood log. Instead, we could find the large rock that has been observed previously. We observed the rock and fauna around the rock in detail, and took pictures using the mapping camera equipped. And then HyperDolphin left the bottom.

Dive Log

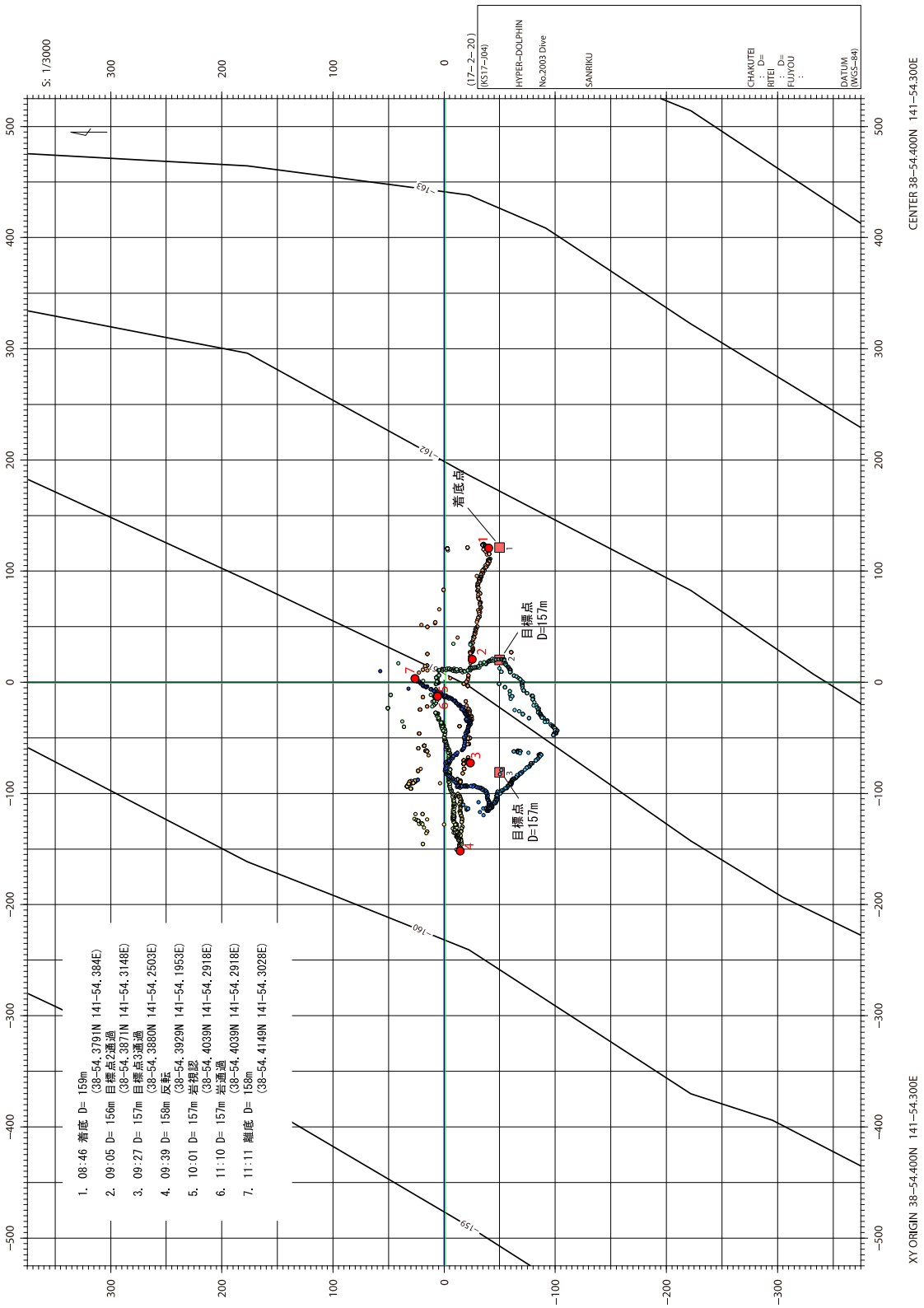
Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
08:15:25			-				-					吊り上げ
08:19:50			-				-					着水
08:32:50			-				-					潜航開始
08:44:49	85.7	38	-	54.3667	N	141	-	54.3876	E		358.9	海底視認、ヒトデ、生物孔、着底
08:52:41	90.7	38	-	54.3667	N	141	-	54.3867	E			ROV の位置が出ないので待ち。
08:55:05	90.7	38	-	54.3664	N	141	-	54.3877	E		282.0	2 番に向かって航走開始
08:56:08	90.7	38	-	54.3659	N	141	-	54.3847	E	0.9		サンショウウニ科？
08:57:14	89.8	38	-	54.3661	N	141	-	54.3800	E	1.8	285.0	サンショウウニ科？
08:59:05	91.9	38	-	54.3683	N	141	-	54.3646	E	0.8		ウミエラ
												海底に細い白い管のようなものが多い
09:00:19	92.2	38	-	54.3691	N	141	-	54.3551	E			カナガシラの仲間
09:01:24	91.3	38	-	54.3688	N	141	-	54.3455	E			イカ、バイ、サンショウウニ科？
09:02:24	91.3	38	-	54.3688	N	141	-	54.3361	E	1.0		ところどころにマウンドと窪みあり
09:03:00	252.2	38	-	54.3637	N	141	-	54.3196	E			ゲンゲ、ヒトデ、ウミシダ、サンショウウニ科？
09:05:54	91.8	38	-	54.3712	N	141	-	54.3112	E			カナガシラの仲間、ヒトデ、サンショウウニ科？
09:08:16	177	38	-	54.3920	N	141	-	54.3055	E	0.8	285.0	このまま 3 番へ向かう。
09:09:35	99.6	38	-	54.3741	N	141	-	54.2988	E		280.0	ヒトデ、ウミシダ、サンショウウニ科？底質に細い管多い。
09:11:25	192.6	38	-	54.3956	N	141	-	54.2840	E			カレイ
09:12:21	92.3	38	-	54.3718	N	141	-	54.2809	E			イカ
09:12:59	92.3	38	-	54.3710	N	141	-	54.2768	E		281.0	ナマコ
09:13:19	92.2	38	-	54.3714	N	141	-	54.2750	E	1.1		サンショウウニ科？多い
09:14:10	110	38	-	54.3764	N	141	-	54.2715	E			ウミシダ
09:15:00	92.8	38	-	54.3717	N	141	-	54.2646	E			ウミエラ、ヒトデ
09:16:17	91.8	38	-	54.3723	N	141	-	54.2595	E			ウミシダ、サンショウウニ科？
09:17:42	91.9	38	-	54.3720	N	141	-	54.2504	E			ゲンゲ、カレイ

09:18:26	92.5	38	-	54.3720	N	141	-	54.2474	E		277.8	着底する。カレイ観察。
09:24:59	93.4	38	-	54.3725	N	141	-	54.2447	E	1.4	281.0	18m 先にソナー反応あり。航走再開。カレイ、サンショウウニ科？
09:27:04	178	38	-	54.3956	N	141	-	54.2433	E			着底。ウミシダ、サンショウウニ科？
09:31:31	179.4	38	-	54.3968	N	141	-	54.2385	E		280.0	280° 50m 前進。航走再開、ナマコ。
09:33:29	91.5	38	-	54.3767	N	141	-	54.2289	E	1.1		ヒトデ、バイ
09:37:20	178.7	38	-	54.3952	N	141	-	54.2064	E			ヒトデ、イカ、サンショウウニ科？
09:38:57	180.9	38	-	54.3969	N	141	-	54.1985	E			着底した。ヒトデ見える
09:39:16	90	38	-	54.3790	N	141	-	54.1951	E		100.0	航走再開。180 度旋回。戻る。
09:41:20	91.8	38	-	54.3799	N	141	-	54.1975	E			カレイ、バイ、サンショウウニ科？後ろ向きに走る？
09:43:55	96.9	38	-	54.3816	N	141	-	54.2028	E		81.0	航走再開。高度がとれてないっぽい。
09:49:13	90.9	38	-	54.3828	N	141	-	54.2244	E		90.0	イカ、ウミエラ、サンショウウニ科？、ヒトデ
09:50:42	91.1	38	-	54.3841	N	141	-	54.2330	E			沈木が見つからないため、周辺を探索。
09:54:16	91.1	38	-	54.3847	N	141	-	54.2541	E	0.8		ゲンゲ、サンショウウニ科？、ヒトデ
09:59:06	160.8	38	-	54.4026	N	141	-	54.2774	E			ウミシダ、サンショウウニ科？、ヒトデ
10:00:34	160.1	38	-	54.4052	N	141	-	54.2856	E			岩視認、ウミシダ多、カイメン、チゴダラ多、ヒトデ
10:02:53	161	38	-	54.4030	N	141	-	54.2998	E			岩の上を通過。マダラ
10:04:10	159.9	38	-	54.4029	N	141	-	54.3074	E		180.0	2 番に向かう
10:08:14	160.2	38	-	54.3799	N	141	-	54.3118	E		172.0	サンショウウニ科？ウミシダ
10:11:16	160.4	38	-	54.3687	N	141	-	54.3093	E		232.0	旋回、流木を探す。
10:12:01	164.4	38	-	54.3679	N	141	-	54.3063	E			カナガシラの仲間
10:12:56	259.7	38	-	54.3723	N	141	-	54.3066	E			岩の位置は過去と整合取れる。その場所から沈木を捜索。
10:15:03	160.7	38	-	54.3571	N	141	-	54.2913	E			ゲンゲ、バイ、サンショウウ

												ニ科？
10:15:45	258.5	38	-	54.3677	N	141	-	54.2910	E			ウミエラ
10:17:59	161.3	38	-	54.3515	N	141	-	54.2777	E			ゲンゲ、ウミシダ、サンショウウニ科？
10:19:45	160.5	38	-	54.3463	N	141	-	54.2713	E		320.0	旋回
10:20:55	160.9	38	-	54.3470	N	141	-	54.2672	E	0.9	320.0	ゲンゲ、サンショウウニ科？
10:29:03			-				-					着底
10:30:18			-				-					浮上
10:31:17			-				-					浮上しながらポジションキープ
10:36:39			-				-					ヤドカリ観察
10:40:29	261.2	38	-	54.3631	N	141	-	54.2570	E	1.7	330.0	航走再開
10:42:22	159.8	38	-	54.3608	N	141	-	54.2455	E			ヒトデ、サンショウウニ科？ウミシダ。2m先にレーダ反応あり
10:43:52	160	38	-	54.3670	N	141	-	54.2386	E			止まって周辺観察。
10:45:54	160.5	38	-	54.3691	N	141	-	54.2355	E	1.4	330.0	20m先にレーダ反応あり。向かう。ゲンゲ
10:47:43	160.2	38	-	54.3744	N	141	-	54.2294	E			カレイ。20m先の反応消える。3 番に向かう。
10:49:49	160.9	38	-	54.3757	N	141	-	54.2247	E			ゲンゲ、ヒトデ、サンショウウニ科？
10:51:54	160.9	38	-	54.3783	N	141	-	54.2210	E	1.1	63.0	沈木が見つからないため、先ほどの岩に向かう。
10:54:13	161	38	-	54.3782	N	141	-	54.2251	E		19.0	ヒトデ、サンショウウニ科？ウミシダ
10:56:35	161	38	-	54.3857	N	141	-	54.2357	E		8.0	イカ、サンショウウニ科？、ヒトデ
10:57:32	163.5	38	-	54.3900	N	141	-	54.2350	E	1.1	340.0	ウミシダ
10:59:33	159.9	38	-	54.3981	N	141	-	54.2419	E		68.0	イカ、
11:00:26	159.8	38	-	54.3994	N	141	-	54.2461	E		70.0	ゲンゲ、バイ
11:03:03	161.2	38	-	54.3902	N	141	-	54.2653	E		74.0	魚類、ヒトデ、サンショウウニ科？
11:04:58	160.8	38	-	54.3892	N	141	-	54.2770	E		30.0	ゲンゲ、ヒトデ
11:05:57	161.2	38	-	54.3905	N	141	-	54.2820	E		40.0	カナガシラの仲間、バイ、ウミシダ、ヒトデ、サンショウウニ科？

11:07:51	161.5	38	-	54.3984	N	141	-	54.2909	E		350.0	ウミシダ。岩視認、ソイ
11:08:54	159.4	38	-	54.4031	N	141	-	54.2939	E			岩の上を通過中。
11:09:46	159.5	38	-	54.4065	N	141	-	54.2957	E		12.8	岩の上を通過中。
11:10:20	162.8	38	-	54.4102	N	141	-	54.2976	E			岩の上を通過。底質は砂質？、下向きカメラで撮影
11:10:49	160.8	38	-	54.4131	N	141	-	54.3007	E			作業終了、離底
11:19:45	47.9	38	-	54.4409	N	141	-	54.2935	E			水面浮上
11:27:14			-				-					ビークル吊り上げ

Dive track HD#2003



Dive Report HD#2004

Date: February 23, 2017
Site: Kamaishi Submarine Canyon, **Depth:** 757-811 m
Landing (Lat., Lon., Time, Depth): 39°14.7138'N, 142°18.4711'E, 08:40, 787m
Leaving (Lat., Lon., Time, Depth): 39°14.4396'N, 142°18.5590'E, 13:09, 757m
Pilot: Yuta Sakakibara **Co-Pilot**: Teppei Kido
Observer: Yoshihiro Fujiwara

Theme: Researches on marine ecosystem dynamics off Sanriku after Tohoku Tsunami

Purpose:

1. Understanding of "bacterial mat" dynamics in the Kamaishi Submarine Canyon
2. Sediment core sampling at the "bacterial mat" site

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Large sample box (3 separation type)
5. MBARI core x6
6. Ekman-Berge bottom sampler x2

Sampling Points and Markers:

Time	Position	Depth (m)	Events
09:09	39°14.7350'N, 142°18.3981'E	782	MBARI core (#1~3) sampling at "bacterial mat" site
09:56	39°14.8466'N, 142°18.6321'E	789	MBARI core (#4~6) sampling at a reference site
10:48	39°14.8359'N, 142°18.6600'E	793	Ekman-Berge sampling
11:39	39°14.8359'N, 142°18.6600'E	793	Suction sampling of ophiuroids

Dive Summary

Core sampling was conducted at "bacterial mat" site and at a reference site at a depth of 780 m in Kamaishi Submarine Canyon. Blackish sediments were collected from the bacterial mat site but not from the reference site. Ekman-Berge bottom sampling was conducted for biomass analyses of ophiuroids. More than 30 individuals of ophiuroids were

suctioned for rearing experiments. Density of debris was increased at the base of canyon wall.

Dive Log

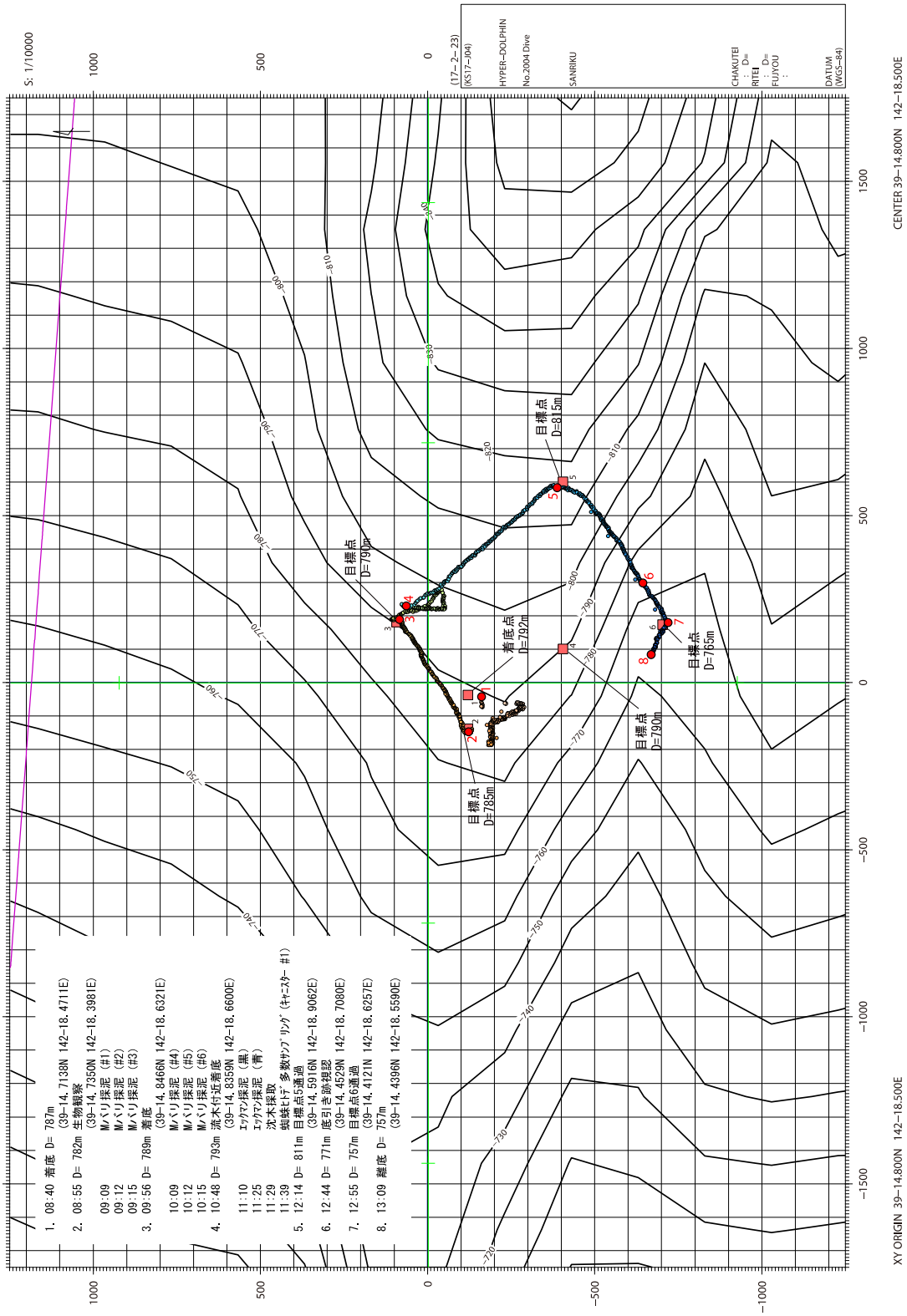
Time (Local)	Dep. (m)	Pos. Lat					Pos. Lon				Alt. (m)	Head (Deg)	Description
7:56:10			-				-						吊り上げ
7:59:00			-				-						着水
08:10:08			-				-						潜航開始
08:21:01	136.2	39	-	14.7634	N	142	-	18.4910	E				イカ
08:22:38	162.4	39	-	14.7556	N	142	-	18.4864	E				イカ
08:24:56	208.6	39	-	14.7489	N	142	-	18.4827	E				イカ
08:27:02	231.2	39	-	14.7438	N	142	-	18.4797	E				立ち泳ぎするさかな？？
08:27:48	231.2	39	-	14.7438	N	142	-	18.4797	E				イカ
08:28:18	231.2	39	-	14.7438	N	142	-	18.4797	E				ハダカイワシ
08:29:22	287.6	39	-	14.7400	N	142	-	18.4768	E				イカ
08:33:17			-				-						イカ
08:34:44	376.7	39	-	14.7327	N	142	-	18.4768	E				エビがくるくる回ってた
08:34:57	357.7	39	-	14.7332	N	142	-	18.4775	E				イカ
08:35:35	367.4	39	-	14.7331	N	142	-	18.4773	E				エビ
08:38:51	769.2	39	-	14.7108	N	142	-	18.4731	E				海底視認
08:39:48	773.3	39	-	14.7094	N	142	-	18.4722	E				ノルマンクモヒトデ、アナゴ、バイ、ゲンゲ
08:40:39	732.4	39	-	14.7141	N	142	-	18.4701	E				ゲンゲ、変色域があるところまで行きます。
08:41:45	774.5	39	-	14.7014	N	142	-	18.4674	E				キチジ
08:41:53	774	39	-	14.7014	N	142	-	18.4669	E		1.1		あなご、ノルマンクモヒトデ、ゲンゲ多い。
08:42:47	773.4	39	-	14.7030	N	142	-	18.4625	E				ソコダラ、ゲンゲ、アナゴ、バイ
08:43:44	774.4	39	-	14.7043	N	142	-	18.4564	E				カレイ、ソコダラ、ノルマンクモヒトデ、アナゴ、バイ
08:44:32	773.6	39	-	14.7057	N	142	-	18.4524	E				ゴミ、キチジ
08:45:10	771.8	39	-	14.7077	N	142	-	18.4472	E				ヒトデ
08:45:38	772.4	39	-	14.7095	N	142	-	18.4475	E				ベニズワイガニ、キチジ、ゲンゲ
08:45:43	775.3	39	-	14.7098	N	142	-	18.4454	E				ウミシダ
08:46:38	774.8	39	-	14.7146	N	142	-	18.4374	E				ゲンゲ、バイ

08:47:16	773.5	39	-	14.7168	N	142	-	18.4336	E			ソコダラ
08:47:34	773.9	39	-	14.7166	N	142	-	18.4317	E			ゲンゲ
08:48:28	773.4	39	-	14.7204	N	142	-	18.4267	E			
08:48:35	774.8	39	-	14.7210	N	142	-	18.4253	E			ゲンゲ、コンゴウアナゴ、ソコダラ、ノルマンクモヒトデ、バイ多い
08:50:06	771.8	39	-	14.7249	N	142	-	18.4212	E	1.5		ベニズワイガニ、キチジ、アナゴ、サクラエビ
08:52:46	771.1	39	-	14.7307	N	142	-	18.4050	E	1.7		キチジ
08:53:21	771	39	-	14.7304	N	142	-	18.4034	E			ゲンゲ、ソコダラ、ヤドカリ、
08:53:57	771.3	39	-	14.7321	N	142	-	18.3998	E			着底、ノルマン、ソコダラ、ヤドカリ、バイ、サクラエビ
08:55:16	770.2	39	-	14.7344	N	142	-	18.3972	E			ヤドカリ観察。
08:56:28	770.5	39	-	14.7352	N	142	-	18.3966	E			ノルマンクモヒトデアップ。マリンスノーすごい。
09:08:06	783.5	39	-	14.7363	N	142	-	18.3973	E			1 番コア採泥（緑）、ヒトデナシ、魚なしで
09:10:59	783.1	39	-	14.7365	N	142	-	18.3972	E			2 番コア採泥（赤）、ヒトデナシ、魚なしで
09:13:58	783	39	-	14.7374	N	142	-	18.3963	E			3 番コア採泥（青）、ヒトデナシ、魚なしで
09:17:13	783.3	39	-	14.7370	N	142	-	18.3967	E			3 番に向けて航走します。キチジ
09:17:44	781.7	39	-	14.7374	N	142	-	18.3966	E			キチジ
09:18:22	781.7	39	-	14.7423	N	142	-	18.4020	E			ゲンゲ、キチジ、バイ
09:18:56	781.6	39	-	14.7431	N	142	-	18.4070	E	2.1		ソコダラ、ゲンゲ
09:19:24	781.5	39	-	14.7447	N	142	-	18.4115	E			キチジ、ゲンゲ
09:20:15	782.9	39	-	14.7457	N	142	-	18.4191	E			ウミシダ,キチジ、ソコダラ
09:21:25	783	39	-	14.7482	N	142	-	18.4241	E			ヤドカリ、キチジ、黒いナマコ、ソコダラ
09:22:21	783.6	39	-	14.7500	N	142	-	18.4350	E	2.9		ヒトデ、ソコダラ、キチジ
09:23:25	783.7	39	-	14.7526	N	142	-	18.4408	E			ヒトデ、ベニズワイ、キチジ、バイ、アナゴ、ゲンゲ
09:25:24	784	39	-	14.7577	N	142	-	18.4517	E			ヤドカリ、ホラアナゴ、ソコダラ、バイ
09:26:35	784.3	39	-	14.7625	N	142	-	18.4601	E			キチジ、ゲンゲ

09:27:51	784.7	39	-	14.7662	N	142	-	18.4681	E	1.5		キチジ、ヒトデ、ゲンゲ
09:29:07	785.6	39	-	14.7689	N	142	-	18.4753	E		31.4	キチジ、
09:31:11	784.4	39	-	14.7751	N	142	-	18.4877	E			アナゴ、ウミシダ、ゲンゲ
09:32:17	785.1	39	-	14.7802	N	142	-	18.4963	E			相変わらずノルマンクモヒトデ多い。ソコダラ、ヒトデ、キチジ
09:33:18	785.2	39	-	14.7848	N	142	-	18.5037	E	1.6		ヒトデ、アナゴ、ゲンゲ、ヤドカリ
09:34:54	784.5	39	-	14.7925	N	142	-	18.5163	E			キチジ、ウミシダ、アナゴ、ゲンゲ
09:35:31	784.9	39	-	14.7933	N	142	-	18.5197	E			ウミシダ、ゲンゲ、バイ
09:36:10	784.4	39	-	14.7962	N	142	-	18.5238	E			ソコダラ、端まであと150m
09:36:39	784.2	39	-	14.7980	N	142	-	18.5291	E			ゲンゲ、ソコダラ、バイ、
09:38:07	786	39	-	14.8050	N	142	-	18.5393	E			キチジ、キチジ、ソコダラ、ヤドカリ
09:39:07	785	39	-	14.8070	N	142	-	18.5465	E	2.0		ソコダラ。
09:39:55	785.3	39	-	14.8085	N	142	-	18.5502	E	1.3	35.0	ヤドカリ、
09:40:53	784.9	39	-	14.8102	N	142	-	18.5564	E			バイ、ソコダラ、ヤドカリ
09:41:54	785.9	39	-	14.8105	N	142	-	18.5584	E			キチジ、アナゴ
09:42:39	786.4	39	-	14.8104	N	142	-	18.5632	E			ウミシダ
09:43:24	787.3	39	-	14.8129	N	142	-	18.5707	E			アナゴ、キチジ、ヒトデ
09:44:24	786.4	39	-	14.8148	N	142	-	18.5746	E			ヤドカリ、ゲンゲ
09:45:13	786	39	-	14.8166	N	142	-	18.5773	E			ソコダラ、ゲンゲ
09:45:59	787	39	-	14.8203	N	142	-	18.5817	E	1.5	31.0	ゲンゲ、ヤドカリ、アナゴ
09:47:09	786.3	39	-	14.8229	N	142	-	18.5869	E			ヤドカリ、ベニズワイガニ、ゲンゲ、バイ
09:48:02	786.8	39	-	14.8239	N	142	-	18.5888	E			ゲンゲ、バイ、コンゴウアナゴ
09:48:55	786.1	39	-	14.8259	N	142	-	18.5945	E			ヒトデ、ゲンゲ、ゲンゲ、ヤドカリ
09:49:40	786.6	39	-	14.8298	N	142	-	18.6011	E	1.0	35.0	ヒトデ、ゲンゲ、ヤドカリ
09:50:47	786.8	39	-	14.8346	N	142	-	18.6073	E			ソコダラ、ゲンゲ、ヤドカリ、アナゴ
09:51:41	786.9	39	-	14.8381	N	142	-	18.6138	E			イソギンチャク、キチジ
09:54:09	788.4	39	-	14.8411	N	142	-	18.6238	E			ゲンゲ、ソコダラ。キチジ、

09:54:51	754.4	39	-	14.8453	N	142	-	18.6293	E			ゲンゲ、ヤドカリ、ソコダラ、ベニズワイガニ
09:56:19	790.1	39	-	14.8479	N	142	-	18.6335	E			着底

Dive track HD#2004



Dive Report HD#2005

Date: February 25, 2017
Site: Kamaishi Submarine Canyon, **Depth:** 517-547 m
Landing (Lat., Lon., Time, Depth): 39°14.8332'N, 142°14.2583'E, 08:26, 532m
Leaving (Lat., Lon., Time, Depth): 39°14.7728'N, 142°14.0540'E, 10:31, 517m
Pilot: Shigeru Kikuya **Co-Pilot**: Yudai Tayama
Observer: Yumiko Yara

Theme: Researches on marine ecosystem dynamics off Sanriku after Tohoku Tsunami

Purpose:

1. Mapping around marine debris in the Kamaishi Submarine Canyon using a mapping camera system
2. Biological sampling using a suction sampler.

Payload Equipment:

1. Slurp gun
2. Seven bottles canister
3. Bottom observation camera
4. Large sample box (3 separation type)
5. MBARI core x3

Sampling Points and Markers:

Time	Position	Depth (m)	Events
08:30	39°14.8394'N, 142°14.2363'E	529	Small clif observed
08:42	39°14.8248'N, 142°14.1955'E	544	Car bumper debris observed
09:45	39°14.8072'N, 142°14.1915'E	547	Large skilfish observed
10:14	39°14.7811'N, 142°14.1375'E	526	Suction sampling of ophiuroids, Canister#1
10:39	39°14.7811'N, 142°14.1375'E	526	Suction sampling of ophiuroids, Canister#2

Dive Summary

According to the past survey (dive HD#1582 NT13-21, HD#1673 NT14-11 and HD#1819 KY15-08), we were observing the marine debris and organisms around a car bumper in the Kamaishi Submarine Canyon at a depth of 547 m. In this dive HD#2005

KS17-J04, two car bumpers were discovered at about the same location where a bumper was observed during the past survey. Several of skilfish were found at rock shadow at some distance from the bumper. More than 40 individuals of brittle stars were collected using a suction sampler.

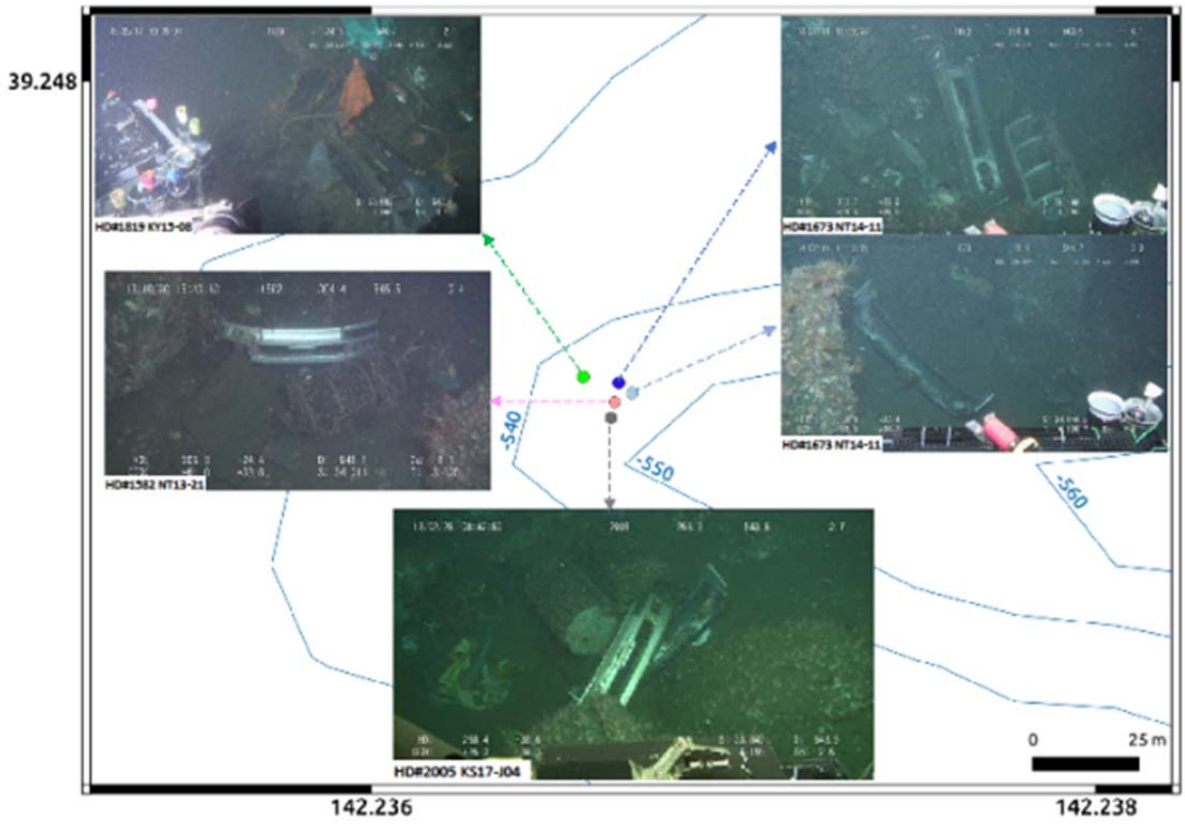


Fig. Change of a car bumper

Dive Log

Time (Local)	Dep. (m)	Pos. Lat				Pos. Lon				Alt. (m)	Head (Deg)	Description
7:46:25			-				-					吊り上げ
7:50:53			-				-					着水
08:05:15	85.5	39	-	14.8396	N	142	-	14.3584	E			潜航開始
08:24:44	528.9	39	-	14.8273	N	142	-	14.2536	E			クシクラゲ、ハダカイワシ
08:25:20	527.2	39	-	14.8344	N	142	-	14.2569	E			海底視認
08:25:53	531.7	39	-	14.8337	N	142	-	14.2586	E			アナゴ
08:26:11	531.7	39	-	14.8334	N	142	-	14.2578	E			着底　D＝532、クモヒトデ、イソギンチャク、イ

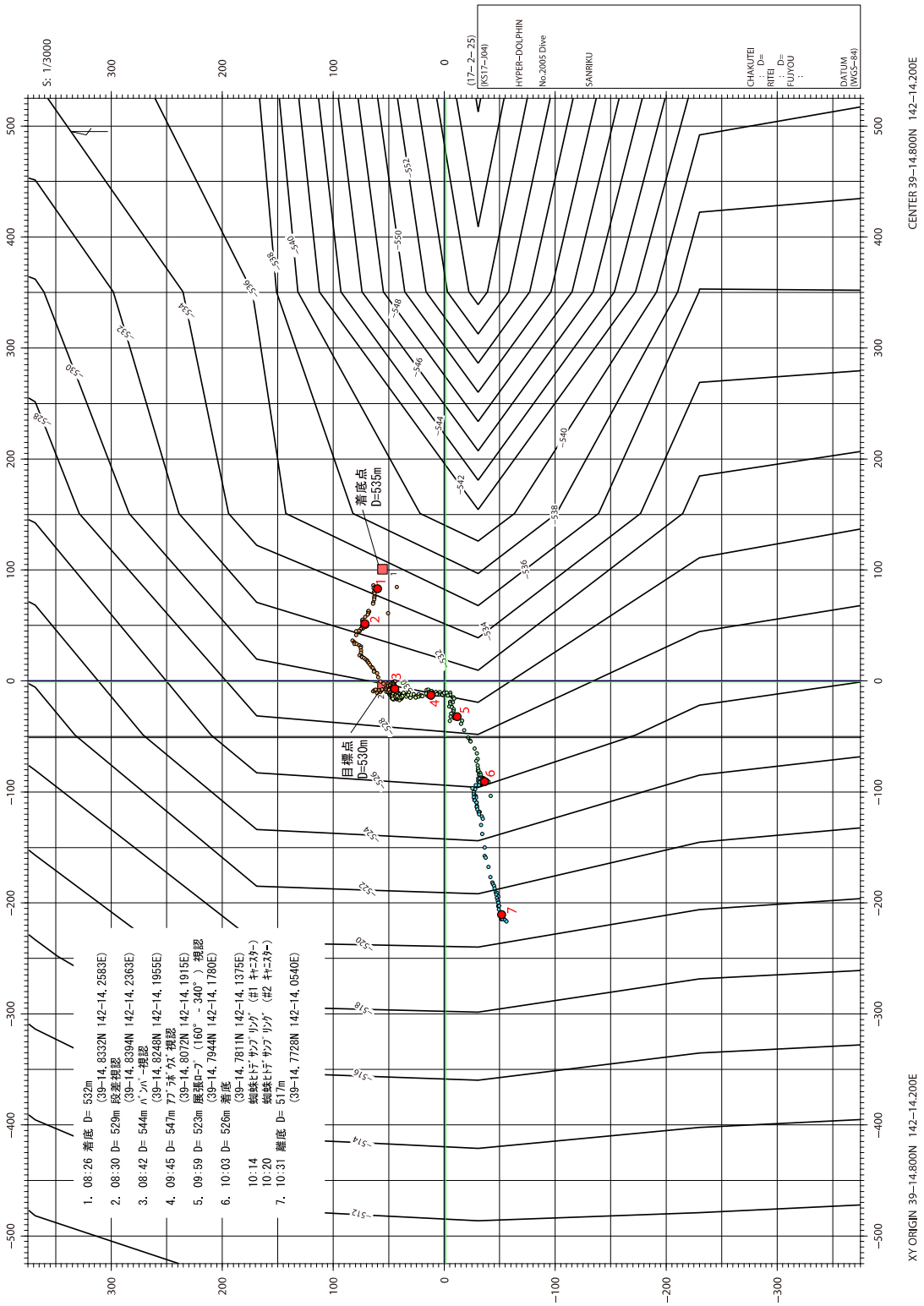
												カ
08:27:23	531.9	39	-	14.8342	N	142	-	14.2557	E			キチジ
08:28:03	531.3	39	-	14.8341	N	142	-	14.2510	E			イソギンチャク、アナゴ、イカ、ハダカイワシ
08:28:44	530.9	39	-	14.8347	N	142	-	14.2484	E			ヒトデ
08:29:19	524	39	-	14.8371	N	142	-	14.2444	E			アナゴ、ウミシダ
08:29:45	523.9	39	-	14.8374	N	142	-	14.2421	E			前方崖、斜面ウミシダ多数、アナゴ
08:30:32	523.3	39	-	14.8397	N	142	-	14.2359	E			イソギンチャク
08:31:06	522	39	-	14.8390	N	142	-	14.2343	E			イソギンチャク上通過
08:31:28	521.8	39	-	14.8377	N	142	-	14.2349	E			キチジ、アナゴ、ヒトデ
08:32:10	523.4	39	-	14.8411	N	142	-	14.2319	E			キチジ、アナゴ、ヒトデ、ウニ、イカ
08:32:48	522.2	39	-	14.8428	N	142	-	14.2292	E			タラ目、イソギンチャク
08:32:57	522.2	39	-	14.8428	N	142	-	14.2292	E			2番に向かう
08:33:20	529.8	39	-	14.8438	N	142	-	14.2243	E			ハダカイワシ、クモヒトデ
08:33:35	530.3	39	-	14.8438	N	142	-	14.2232	E			ウミシダ多数、崖
08:34:24	529.9	39	-	14.8406	N	142	-	14.2191	E			魚、クモヒトデ、キチジ
08:35:32	530.7	39	-	14.8376	N	142	-	14.2128	E			崖通過
08:36:04	532.2	39	-	14.8361	N	142	-	14.2102	E			ヒトデ、ハダカイワシ、ソコダラ
08:38:20	532.3	39	-	14.8274	N	142	-	14.1930	E		275.0	魚、ヒトデ、キチジ、クモヒトデ、ウミシダ
08:40:30	534	39	-	14.8273	N	142	-	14.1963	E	9.0	270.0	ソコダラ、ハダカイワシ
08:41:40	541.6	39	-	14.8244	N	142	-	14.1997	E	3.7	265.0	バンパー視認　ヒトデ、クモヒトデ、ウミシダ
08:43:19	545.8	39	-	14.8247	N	142	-	14.1950	E			キチジ、ハダカイワシ、ゴミ多数、青い合羽
08:44:03	543.1	39	-	14.8247	N	142	-	14.1909	E	6.0	265.0	クモヒトデ多数
08:46:30	543.7	39	-	14.8246	N	142	-	14.1962	E	1.4	209.0	後ろのカメラにバンパー映るように
08:47:20	544.8	39	-	14.8274	N	142	-	14.1931	E	1.5	190.0	バンパー上通過
08:48:30	545.2	39	-	14.8232	N	142	-	14.1922	E			旋回して戻る
08:48:53	544.8	39	-	14.8235	N	142	-	14.1934	E			クモヒトデとカイメン浮いてる
08:49:35	542.8	39	-	14.8255	N	142	-	14.1961	E			ズワイガニ、

08:50:37	546.6	39	-	14.8263	N	142	-	14.1930	E		253.5	バンパー手前に着底D＝545．8、撮影
08:52:10	547.1	39	-	14.8256	N	142	-	14.1957	E			イカ多数、ソコダラ、カニかご？、ゴカイの棲管付着
09:05:22	546.8	39	-	14.8259	N	142	-	14.1930	E			浮上？
09:05:48	546.7	39	-	14.8251	N	142	-	14.1929	E			バンパー前岩にクモヒトデ多数、ウミシダ、キチジ、ソコダラ
09:14:14	546.8	39	-	14.8251	N	142	-	14.1933	E			青い手袋片方
09:15:47	547.2	39	-	14.8254	N	142	-	14.1935	E			浮上
09:17:02	545.7	39	-	14.8256	N	142	-	14.1922	E			バンパー上通過
09:18:21	545.7	39	-	14.8239	N	142	-	14.1907	E			ウミシダ逃走
09:19:17	545.7	39	-	14.8228	N	142	-	14.1904	E		237.0	大きな袋、手袋もう片方、手袋1セット
09:20:58	544.2	39	-	14.8214	N	142	-	14.1900	E			右回頭
09:21:06	544.2	39	-	14.8209	N	142	-	14.1895	E	1.7	211.0	左回頭、前進
09:22:36	544.5	39	-	14.8215	N	142	-	14.1898	E			後進
09:23:33	544.8	39	-	14.8232	N	142	-	14.1910	E		206.0	前進
09:25:08	545.1	39	-	14.8221	N	142	-	14.1909	E	2.8	208.0	後進
09:26:35	544.4	39	-	14.8235	N	142	-	14.1918	E			前進
09:28:25	543.7	39	-	14.8255	N	142	-	14.1907	E	3.0		1m下降、前進
09:30:00	542.9	39	-	14.8249	N	142	-	14.1899	E			イカ
09:30:33	542.1	39	-	14.8232	N	142	-	14.1886	E			下降
09:31:46	543.1	39	-	14.8213	N	142	-	14.1899	E		198.0	後進
09:32:56	541.8	39	-	14.8248	N	142	-	14.1884	E			下降
09:34:36	542.7	39	-	14.8236	N	142	-	14.1908	E			前進
09:35:23	544.2	39	-	14.8222	N	142	-	14.1917	E			上昇
09:35:40	544.1	39	-	14.8242	N	142	-	14.1914	E			前進
09:37:03	544.2	39	-	14.8238	N	142	-	14.1912	E	2.6	208.0	左進
09:37:53	543.1	39	-	14.8224	N	142	-	14.1903	E			ゆっくり前進、高度下げ、バンパー上通過
09:38:55	544.9	39	-	14.8210	N	142	-	14.1900	E			バンパー撮影終了、航走再開
09:39:30	545.7	39	-	14.8203	N	142	-	14.1907	E	2.2	206.0	網かご
09:41:02	546.6	39	-	14.8138	N	142	-	14.1897	E			南西の方へ向かう。
09:41:30	547.1	39	-	14.8150	N	142	-	14.1918	E			キチジ、タラ目、、イソギンチャク目、イカ

09:42:16	547.6	39	-	14.8109	N	142	-	14.1908	E			南の方へ下がる
09:43:09	548.1	39	-	14.8078	N	142	-	14.1945	E			ヒトデ、亀裂の間にアブラボウズ
09:44:42	547.9	39	-	14.8063	N	142	-	14.1911	E			着底。アブラボウズ観察、キチジ、
09:52:09	549.2	39	-	14.8059	N	142	-	14.1919	E	2.9	200.0	観察終了、浮上する。
09:54:26	543.9	39	-	14.8008	N	142	-	14.1931	E			崖にはウミシダ、カイメン、イソギンチャク、クモヒトデが多い
09:57:10	534.4	39	-	14.7962	N	142	-	14.1882	E			アブラボウズが4～5匹あつまる。
09:58:47	528.9	39	-	14.7952	N	142	-	14.1801	E		260.0	ロープのようなものがある。またぐ。
10:01:34	524.5	39	-	14.7823	N	142	-	14.1464	E			イソギンチャク目、ニチリンヒトデ、ズワイガニ、クモヒトデ、ズワイガニ
10:02:30	527.5	39	-	14.7818	N	142	-	14.1427	E			イソギンチャク
10:03:16	526.6	39	-	14.7803	N	142	-	14.1399	E			着底する
10:05:14	527	39	-	14.7793	N	142	-	14.1389	E			浮上、向きかえる
10:06:35	527.1	39	-	14.7807	N	142	-	14.1369	E			着底、スラープガン、1番キャニスタ　クモヒトデサンプリング
10:13:48	527.8	39	-	14.7817	N	142	-	14.1382	E			2 番キャニスタクモヒトデサンプリング
10:21:31	527.9	39	-	14.7821	N	142	-	14.1385	E		267.0	キャニスター3 番にする。航走再開、西に向かって航走、ダーリアイソギンチャク
10:23:54	525.7	39	-	14.7852	N	142	-	14.1279	E			離底予定10:40
10:24:44	525.3	39	-	14.7843	N	142	-	14.1239	E	1.9	268.0	海底にクモヒトデ多い
10:25:38	524.7	39	-	14.7838	N	142	-	14.1195	E			ハダカイワシ、キチジ、イソギンチャク目
10:26:12	523.1	39	-	14.7831	N	142	-	14.1165	E			木材？、ハナギンチャク
10:26:57	520.1	39	-	14.7816	N	142	-	14.1042	E	9.0	270.0	ゴミ。
10:27:31	514	39	-	14.7785	N	142	-	14.0836	E			ハダカイワシ
10:30:03	518.6	39	-	14.7738	N	142	-	14.0589	E			キチジ

10:31:19	518.3	39	-	14.7713	N	142	-	14.0522	E			下向きカメラ外れたか？ぶら下がっている状態かも。緊急離底する。
11:17:47	39.2	39	-	14.7854	N	142	-	14.0319	E			下向きカメラぶら下がった状態で上昇。
11:18:37	38.5	39	-	14.7854	N	142	-	14.0412	E			トラポン視認
11:21:28	17.9	39	-	14.7842	N	142	-	14.0373	E			水面浮上
11:24:12			-				-					浮力材外す。まだカメラ付いている。
11:30:06			-				-					ビークル水面で一度停止、カメラフレームを取る。
11:30:26			-				-					ROV、カメラ揚収成功！！

Dive track HD#2005



5. Shipboard data (Bathymetry, SBP data)

Takafumi Kasaya

We carried out the acoustic survey off Fukushima prefecture where large earthquake occurred with Tsunami event on Nov. 22 th, 2016 as before a pre-survey of the HPD dive. Bathymetric data are obtained by the multibeam echo-sounder SEBAT7125SV2 system with an array of transducers and hydrophones installed along and across keel of the R/V Shinseimaru. The system can transmit 200 – 400 kHz sonar pulse at 1° x 2° resolution at 200 kHz for fore/aft direction, and records the travel time and amplitude of the returning echoes. The swath range is changeable between 45 – 165°, and we fixed the range 150° during this cruise. Sound velocity profiles were obtained from ship-launched XBT measurements for a sound velocity correction. The SBP data are observed by TOPAS PS 18 system with parametric type. Figure x.1 shows the survey are and lines of bathymetry and sub-bottom profiling. On our survey on this cruise, these data were obtained at a speed of about 6 knot. We could obtain enough quality data around the HPD dive area.

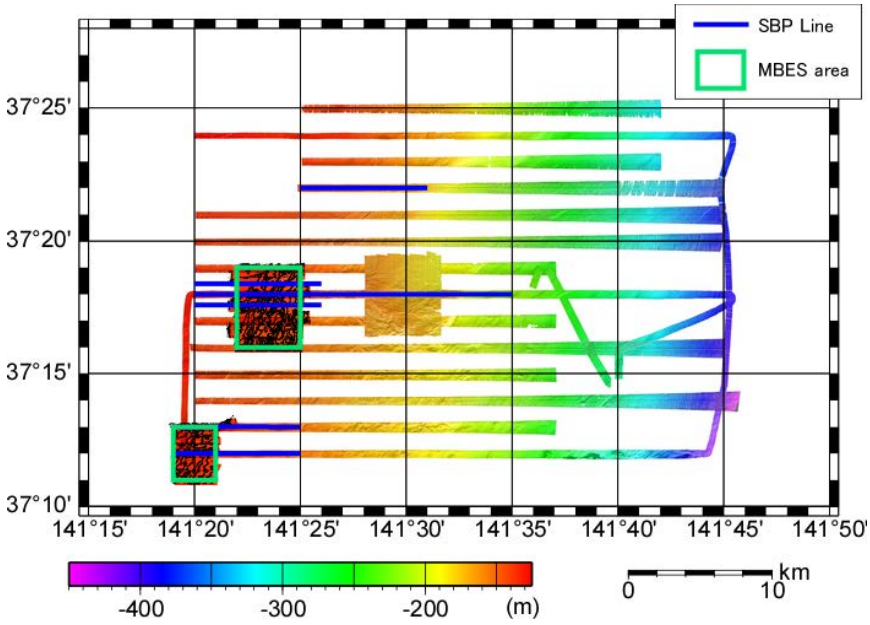


Fig. x.1 Survey area of bathymetric and SBP lines on KS-17-J04 cruise. Background bathymetric data was obtained just after the Off Fukushima earthquake.

6. Aknowledgement

I am deeply thanking for all of the people related to the cruise, especially for skillfull operation of the ROV Hyper-Dolphin, the manager Mr. Y.Ohno, and the operation team, and the R/V Shinseimaru, the captain Mr. R. Yoshida and the crews. This research was funded by the Tohoku Ecosystem-Associated Marine Science. We are also grateful to the project leader, Dr. K Fujikura, other researchers in this project, and the administration staffs.

By Shinji Tsuchida, chief scientist of KS-17-J04 Cruise

Appendix

I. Sample List

I-I. Macro organisms

No.	On board ID	Dive No. (Station No./Traverse Line Name)	Sample Name (English) / Scientific Name	Japanese Name	Identified by	Number of Individuals (Amount	Sampling Method	Fixation	Preservation	Sample Repository Contact Person	Locality	Latitude			Longitude			Depth	Date Collected			
												Deg.	Min.	N/S	Deg.	Min.	E/W	[m]	YYYY	MM	DD	hh:mm:ss
	船上ID（サンプルを識別する記号・番号）＜半角＞	潜航番号(測点名等)＜半角＞	英語で何らかの情報。分かる場合は学名を。＜半角＞	日本語サンプル名、または和名	同定者名＜半角＞	量（個体数など）＜半角＞	採集方法＜半角＞	固定法＜半角＞	保管方法＜半角＞	持帰り後に管理者となる方（保管管理者）＜半角＞	採集地（地点名）＜英語＞	緯度（60進法）			経度（60進法）			採集水深	採集日時			
1	AT1-11-1	AT1-11	Lysianassoidea		Hiroyuki Yokooka	many	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
2	AT2-09-1	AT2-09	Lysianassoidea		Hiroyuki Yokooka	many	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
3	AT2-09-2	AT2-09	Buccinum niponense	ヒメシライトマキ	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
4	MT1-01-1	MT1-01	Lysianassoidea		Hiroyuki Yokooka	many	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
5	BC1-31-1	BC1-31	Lysianassoidea		Hiroyuki Yokooka	many	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
6	AT1-12-1	AT1-12	Simenchelys parasitica	コンゴウアナゴ	Momoco Koiso	6	カメラ餌箱	Frozen	Frozen	Shinji Tsuchida												
7	AT2-10-1	AT2-10	Simenchelys parasitica	コンゴウアナゴ	Momoco Koiso	2	カメラ餌箱	Frozen	Frozen	Shinji Tsuchida												
8	MT1-02-1	MT1-02	Simenchelys parasitica	コンゴウアナゴ	Momoco Koiso	3	カメラ餌箱	Frozen	Frozen	Shinji Tsuchida												
9	MT1-02-2	MT1-02	Lysianassoidea		Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
10	MT1-03-01	MT1-03	Ophiura sarsii	キタクシノハクモヒトデ	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
11	MT1-03-02	MT1-03	Ophiura leptotenia	ホソクシノハクモヒトデ	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
12	MT1-03-03	MT1-03		コブゴカイ科	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
13	MT1-03-04	MT1-03	Brachiopoda	腕足綱	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
14	MT1-03-05	MT1-03		ヒドロ虫綱	Hiroyuki Yokooka	+	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
15	MT1-03-06	MT1-03		カザリゴカイ科	Hiroyuki Yokooka	2	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
16	MT1-03-07	MT1-03	Lysianassoidea		Hiroyuki Yokooka	many	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
17	MT1-03-08	MT1-03		シリス科	Hiroyuki Yokooka	3	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
18	MT1-03-09	MT1-03		ゴカイ科	Hiroyuki Yokooka	3	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
19	MT1-03-10	MT1-03		イソギンチャク目	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
20	MT1-03-11	MT1-03		ヨコエビ亜目	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
21	MT1-03-12	MT1-03		タナイス目	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
22	MT1-03-13	MT1-03		線形動物門	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
23	MT1-03-14	MT1-03		アヤボラ	Hiroyuki Yokooka	1	カメラ餌箱	70%EtOH	70%EtOH	Shinji Tsuchida												
1	1999-1	HPD#1999		貝殻	Takahashi Yoshimi	many	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0046	N	141	23.4827	E	147.9	2017	2	13	10:53:23
2	1999-2	HPD#1999	Polychaeta	多毛綱	Takahashi Yoshimi	1	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
3	1999-3	HPD#1999	Galateid crab	コシオリエビ	Takahashi Yoshimi	4	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
4	1999-4	HPD#1999	Mysidae	アミ科	Takahashi Yoshimi	3	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
5	1999-5	HPD#1999	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	1	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
6	1999-6	HPD#1999	Cumacea	クーマ目	Takahashi Yoshimi	2	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
7	1999-7	HPD#1999	Cumacea	クーマ目	Takahashi Yoshimi	2	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
8	1999-8	HPD#1999	Polychaeta	多毛綱	Takahashi Yoshimi	2	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
9	1999-9	HPD#1999	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	2	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19

10	1999-10	HPD#1999	Mysidae	アミ科	Takahashi Yoshimi	1	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
11	1999-11	HPD#1999	Munnidae	ムンナ科	Takahashi Yoshimi	2	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
12	1999-12	HPD#1999	Asteroidea	ヒトデ綱	Takahashi Yoshimi	1	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
13	1999-13	HPD#1999		貝殻	Takahashi Yoshimi	many	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
14	1999-14	HPD#1999		貝殻	Takahashi Yoshimi	many	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0106	N	141	23.4885	E	144.2	2017	2	13	12:03:30
15	1999-15	HPD#1999	Bivalvia	二枚貝綱	Takahashi Yoshimi	1	Slurp gun	70%Etoh	70%Etoh	Shinji Tsuchida	Off Fukushima	37	18.0719	N	141	24.4198	E	147.9	2017	2	13	16:15:19
1	2000-1	HPD#2000	Naticidae	タマガイ科	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
2	2000-2	HPD#2000		カニ類	Takahashi Yoshimi	2	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
3	2000-3	HPD#2000	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
4	2000-4	HPD#2000	Echinoidea	ウニ綱	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
5	2000-5	HPD#2000	Polychaeta	多毛綱	Takahashi Yoshimi	6	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
6	2000-6	HPD#2000	Polynoidae	ウロコムシ科	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
7	2000-7	HPD#2000	Polychaeta	多毛綱	Takahashi Yoshimi	4	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
8	2000-8	HPD#2000	Galateid crab	コシオリエビ	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
9	2000-9	HPD#2000	Gastropoda	腹足綱	Takahashi Yoshimi	1	Manupulator	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2239	N	141	19.7625	E	141.1	2017	2	14	10:36:50
10	2000-10	HPD#2000	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
11	2000-11	HPD#2000	Bivalvia	二枚貝綱	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
12	2000-12	HPD#2000	Cirratulidae	ミズヒキゴカイ科	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
13	2000-13	HPD#2000	Polynoidae	ウロコムシ科	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
14	2000-14	HPD#2000	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	many	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2307	N	141	19.7668	E	139.5	2017	2	14	10:50:42
15	2000-15	HPD#2000	Bivalvia	二枚貝綱(スイフガイ科？)	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2307	N	141	19.7668	E	139.5	2017	2	14	10:50:42
16	2000-16	HPD#2000	Gastropoda	腹足綱	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2307	N	141	19.7668	E	139.5	2017	2	14	10:50:42
17	2000-18	HPD#2000	Ophiuroidea	クモヒトデ綱	Takahashi Yoshimi	12	Slurp gun	Live		Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
18	2000-19	HPD#2000	Ophiacanthidae	トゲナガクモヒトデ科	Hiroyuki Yokooka	many	Slurp gun	70%EtoH	70%Etoh	Shinji Tsuchida	Off Fukushima	37	12.2278	N	141	19.7653	E	141.9	2017	2	14	10:42:26
19	2000-20	HPD#2000	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	49	Slurp gun	Frozen		Shinji Tsuchida	Off Fukushima	37	12.2307	N	141	19.7668	E	139.5	2017	2	14	10:50:42
1	2001-1	HPD#2001	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
2	2001-2	HPD#2001	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
3	2001-3	HPD#2001	Cumacea	クーマ目	Takahashi Yoshimi	many	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
4	2001-4	HPD#2001	Ostracoda	貝形虫綱	Takahashi Yoshimi	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
5	2001-5	HPD#2001	Polychaeta	多毛綱	Takahashi Yoshimi	3	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
6	2001-6	HPD#2001	Bivalvia	二枚貝綱	Takahashi Yoshimi	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
7	2001-7	HPD#2001	Gastropoda	腹足綱	Takahashi Yoshimi	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
8	2001-8	HPD#2001	Ophiuroidea	クモヒトデ綱	Takahashi Yoshimi	many	Slurp gun	Live		Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
9	2001-9	HPD#2001	Ophiuroidea	クモヒトデ綱	Takahashi Yoshimi	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
10	2001-10	HPD#2001	Asteroidea	ヒトデ綱	Takahashi Yoshimi	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
11	2001-11	HPD#2001	Ophura sarsii	キタクシノハクモヒトデ	Hiroyuki Yokooka	many	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida	Off Minamisanriku cyou	38	30.5956	N	141	57.7593	E	304.9	2017	2	15	12:18:59
1	2002-1	HPD#2002	Polychaeta	多毛綱	Takahashi Yoshimi	6	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
2	2002-2	HPD#2002	Cumacea	クーマ目	Takahashi Yoshimi	3	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13

3	2002-3	HPD#2002	Echinoidea	ウニ綱	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
4	2002-4	HPD#2002	Pectinariidae	ウミイサゴムシ科	Takahashi Yoshimi	4	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
5	2002-5	HPD#2002	Gastropoda	腹足綱	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
6	2002-6	HPD#2002	Gastropoda	腹足綱	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
7	2002-7	HPD#2002	Opheliidae	オフェリアゴカイ科	Takahashi Yoshimi	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
8	2002-8	HPD#2002	Polynoidae	ウロコムシ科	Takahashi Yoshimi	3	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
9	2002-9	HPD#2002	Gammaridea	ヨコエビ亜目	Takahashi Yoshimi	many	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
10	2002-10	HPD#2002	Calanoida	カラヌス目	Takahashi Yoshimi	7	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
11	2002-11	HPD#2002	Mysidae	アミ科	Takahashi Yoshimi	3	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
12	2002-12	HPD#2002	Bivalvia	二枚貝綱	Takahashi Yoshimi	15	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
13	2002-13	HPD#2002	Dentaliida	ツノガイ目	Takahashi Yoshimi	many	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
14	2002-14	HPD#2002	Pycnogonida	ウミグモ綱	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
15	2002-15	HPD#2002	Sagittoidea	ヤムシ綱	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
16	2002-16	HPD#2002	Gastropoda	腹足綱	Takahashi Yoshimi	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
17	2002-17	HPD#2002	Ophiuroidea	クモヒトデ綱	Takahashi Yoshimi	many	Slurp gun	live		Shinji Tsuchida	Off Minamisanrikucyou	38	30.0026	N	142	10.7858	E	608	2017	2	16	12:13
1	2004-1	HPD#2004		ノルマンクモヒトデ	Hiroyuki Yokooka	many	Slurp gun	Live		Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
2	2004-2	HPD#2004		エクマンバージ黒	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:10
3	2004-3	HPD#2004		エクマンバージ青	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:25
4	2004-4	HPD#2004		プンプク目	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
5	2004-5	HPD#2004		ヒドロ虫綱	Hiroyuki Yokooka	uncounta	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
6	2004-6	HPD#2004		クルミガイ目	Hiroyuki Yokooka	3	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
7	2004-7	HPD#2004		ツノガイ綱	Hiroyuki Yokooka	many	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
8	2004-8	HPD#2004		ツキガイ科	Hiroyuki Yokooka	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
9	2004-9	HPD#2004		ニオガイ科	Hiroyuki Yokooka		Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
10	2004-10	HPD#2004		二枚貝綱	Hiroyuki Yokooka	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
11	2004-11	HPD#2004		ムンナ科	Hiroyuki Yokooka	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
12	2004-12	HPD#2004		クーマ目	Hiroyuki Yokooka	2	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
13	2004-13	HPD#2004		カイアシ目	Hiroyuki Yokooka	5	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
14	2004-14	HPD#2004		タテソコエビ科	Hiroyuki Yokooka	2	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
15	2004-15	HPD#2004		ヨコエビ亜目１	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
16	2004-16	HPD#2004		ヨコエビ亜目２	Hiroyuki Yokooka	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
17	2004-17	HPD#2004		ヨコエビ亜目３	Hiroyuki Yokooka	many	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
18	2004-18	HPD#2004		多毛綱（コブゴカイ科?）	Hiroyuki Yokooka	3	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
19	2004-19	HPD#2004		多毛綱（ノリコイソメ科?）	Hiroyuki Yokooka	2	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
20	2004-20	HPD#2004		イソコハクガイ科？	Hiroyuki Yokooka	7	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
21	2004-21	HPD#2004		ゴカイ科	Hiroyuki Yokooka	2	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
22	2004-22	HPD#2004		不明動物	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
23	2004-23	HPD#2004		ミズヒキゴカイ科（Protocirrineris?）	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39

24	2004–24	HPD#2004		ミズヒキゴカイ科(Dodecaceria?)	Hiroyuki Yokooka	3	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
25	2004–25	HPD#2004		ニカイチロリ科	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
26	2004–26	HPD#2004		ヒメエラゴカイ科	Hiroyuki Yokooka	4	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
27	2004–27	HPD#2004		シロガネゴカイ科	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
28	2004–28	HPD#2004		スピオ科	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
29	2004–29	HPD#2004		Euzonus sp.	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
30	2004–30	HPD#2004		ナマコ綱？	Hiroyuki Yokooka	1	Slurp gun	70%EtOH	70%Etoh	Shinji Tsuchida		39	14	8359	142	18	###	789	2017	2	23	11:39
1	2005–1	HPD#2005	Ophiura sarsii	キタクシノハクモヒトデ	Hiroyuki Yokooka	45	Slurp gun	Live		Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
2	2005–2	HPD#2005	Ophiura leptoctenia	ホソクシノハクモヒトデ	Hiroyuki Yokooka	many		Live		Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
3	2005–3	HPD#2005	Ophiolimna bairdi	アカトゲナガクモヒトデ	Hiroyuki Yokooka	5	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
4	2005–4	HPD#2005	Mysidae	アミ科	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
5	2005–5	HPD#2005	Anoura	ヤドカリ亜目	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
6	2005–6	HPD#2005		ウミグモ綱	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
7	2005–7	HPD#2005	Ophiura leptoctenia	ホソクシノハクモヒトデ	Hiroyuki Yokooka	10	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
8	2005–8	HPD#2005		イカ	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
9	2005–9	HPD#2005		カイアシ小	Hiroyuki Yokooka	many	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
10	2005–10	HPD#2005	Cumacea	クーマ目	Hiroyuki Yokooka	10	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
11	2005–11	HPD#2005		ミズムシ亜目	Hiroyuki Yokooka	3	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
12	2005–12	HPD#2005		カイムシ目	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
13	2005–13	HPD#2005		カイアシ大	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
14	2005–14	HPD#2005		ウミノミ科	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
15	2005–15	HPD#2005		ヒサシソコエビ科	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
16	2005–16	HPD#2005	Amhipoda	端脚目	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
17	2005–17	HPD#2005	Ophiuroidea	クモヒトデ綱	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
18	2005–18	HPD#2005		シロガネゴカイ科	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
19	2005–19	HPD#2005	Solenogastres	溝腹亜綱	Hiroyuki Yokooka	1	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
20	2005–20	HPD#2005	Gastropoda	腹足綱	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03
21	2005–21	HPD#2005	Bivalvia	二枚貝綱	Hiroyuki Yokooka	2	Slurp gun	70%EtoH	70%EtoH	Shinji Tsuchida		39	14.7944	N	142	14.1375	E	526	2017	2	25	10:03

I-II. Sediments

Date	Dive	Sampling Point	Depth (m)	Time	Slice	Preservation
2017 2.23	HPD#2004	39˚14.7350'N 142˚18.3981'E	782	9:09	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline
		39˚14.7350'N 142˚18.3981'E	782	9:12	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline
		39˚14.7350'N 142˚18.3981'E	782	9:15	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline
		39˚14.8466'N 142˚18.6321'E	789	10:09	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline
		39˚14.8466'N 142˚18.6321'E	789	10:12	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline
		39˚14.8466'N 142˚18.6321'E	789	10:15	0–3cm/0.5cm, 3–5cm/1cm, 5–15cm/5cm	10% Formaline