



## Yokosuka Cruise Report

YK17-05

SIP Project for Development of New-Generation Research

Protocol for Submarine Resources:

Protocol development for environmental assessment of  
hydrothermal vent area using AUV.

Sagami Bay, Oomuro Hole, Isu-Ogasawara area

(Beyonesu Knoll)

Mar 7, 2017 – Mar 14, 2017

Japan Agency for Marine-Earth Science and Technology

(JAMSTEC)

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## 1. Cruise Information

- **Cruise ID**

YK17-05

- **Name of vessel**

R/V Yokosuka

- **Title of the cruise**

SIP Project for Development of New-Generation Research Protocol for Submarine Resources: Protocol development for environmental assessment of hydrothermal vent area using AUV.

- **Title of the proposal**

Monitoring the hydrothermal ecosystem and assessment of effects of drilling activity

- **Cruise period**

7 to 14 March 2017

- **Ports of call**

Departure : Shimizu, Shizuoka

Arrival : Yokosuka, Kanagawa

- **Research area**

A: Sagami Bay:

[35° 05.0'N, 139° 22.0'E] [35° 05.0'N, 139° 13.0'E]

[35° 02.0'N, 139° 08.0'E] [34° 54.0'N, 139° 13.0'E], Water depth: 900-1500m

B: Oomuro Hole:

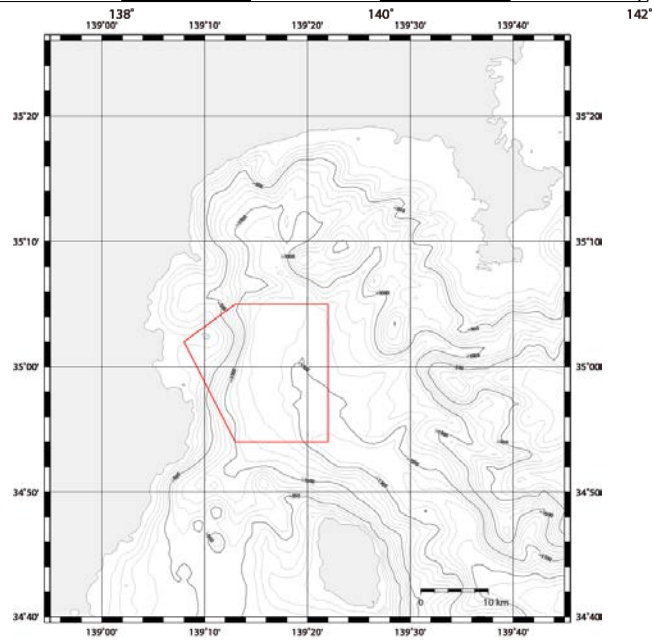
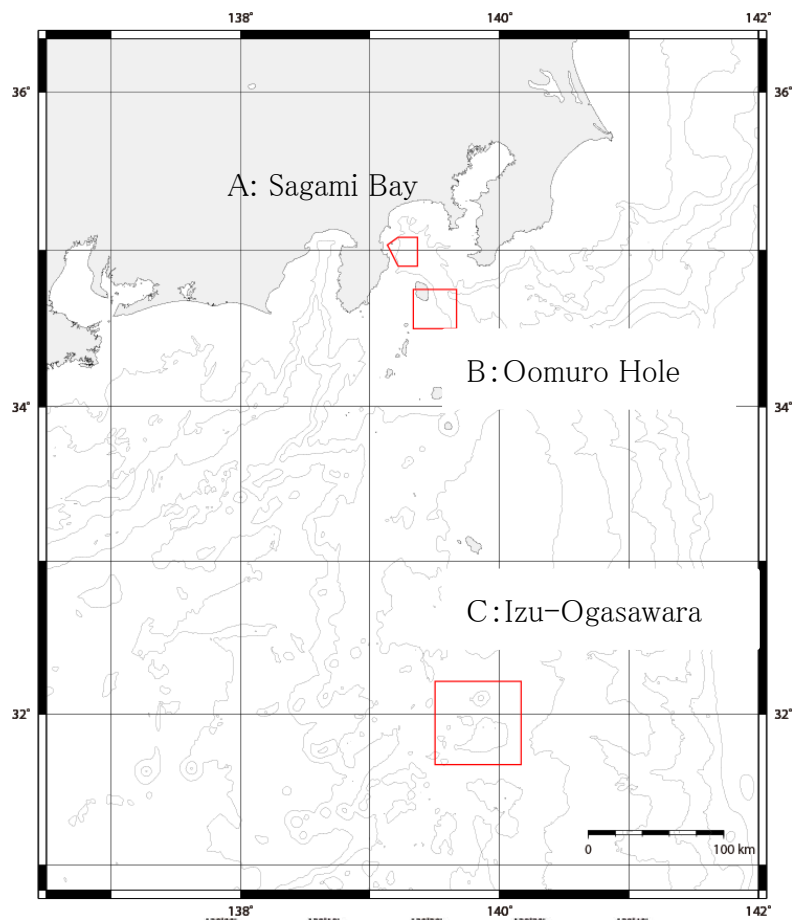
[34°45.0'N,139°20.0'E] [34°30.0'N,139°40.0'E], Water depth: 200-1500m

C: Izu-Ogasawara area

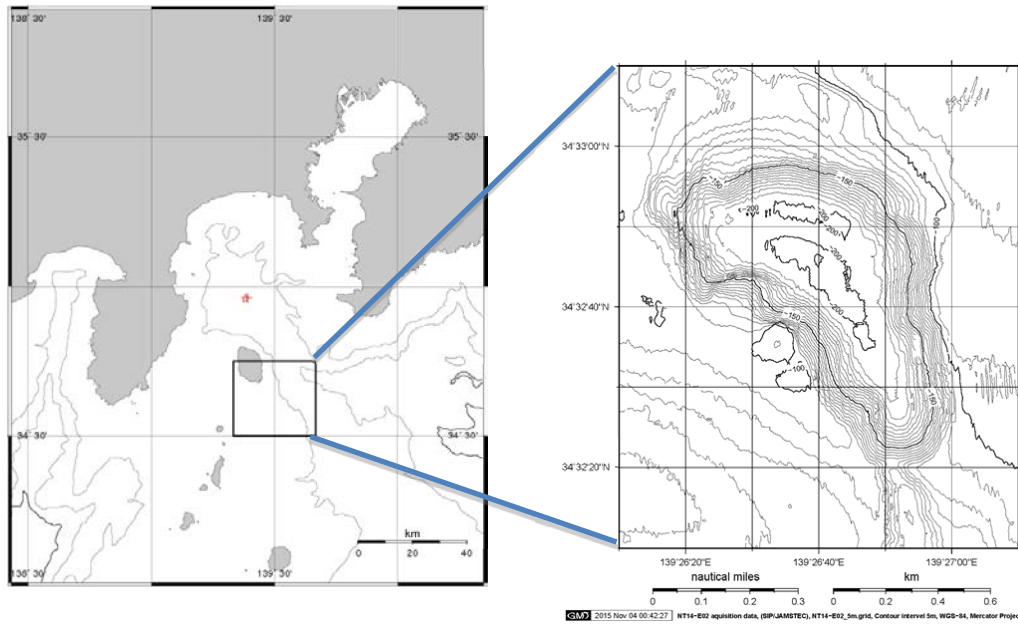
Beyonesu Knoll:

[32°13.0'N, 139°30.0'E] [31°40.0'N,140°10.0'E], Water depth: 100-2000m

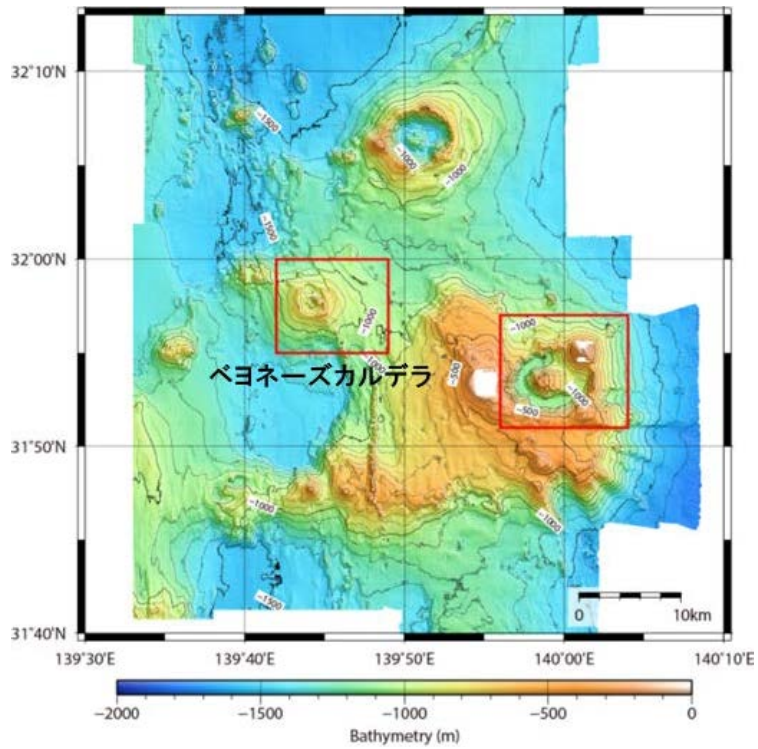
● Research map



Sagami Bay



Izu Ooshima area and Oomuro Hole



Izu-Ogasawara area;  
Beyonesu Knoll and Myoujin-sho Caldera

## 2. Researchers

- Chief Scientist

Hiroyuki YAMAMOTO JAMSTEC

- Representative of the science party

Eiichi KIKAWA JAMSTEC

- Science party

Tetsuya MIWA JAMSTEC

Tatsuhiko FUKUBA JAMSTEC

Tatsuo FUKUHARA JAMSTEC

Yuya TADA JAMSTEC

Junji KANEKO JAMSTEC

Jin-kyu CHOI JAMSTEC

Hiroshi OCHI JAMSTEC

Yutaka OHTA JAMSTEC

Makoto SUGESAWA JAMSTEC

Kiyotaka TANAKA JAMSTEC

Tsuyoshi YOSHIUME JAMSTEC

Yoshinobu NAMBU JAMSTEC

Hiroshi MATSUMOTO JAMSTEC

Kazuhiro KANAYAMA Mitsubishi heavy industries

Hiroyuki MIYAKE Mitsubishi heavy industries

### **Research Engineer**

Shinsuke TOYODA Marine Works Japan, LTD.

Hiroyuki HAYASHI Nippon Marine Enterprises, LTD.

### 3. Observation

#### ● Observation

This cruise aims for collecting the base-line data to develop the environmental assessment protocol combined with autonomous underwater vehicle and oceanographic determination. The AUV Yumeiruka

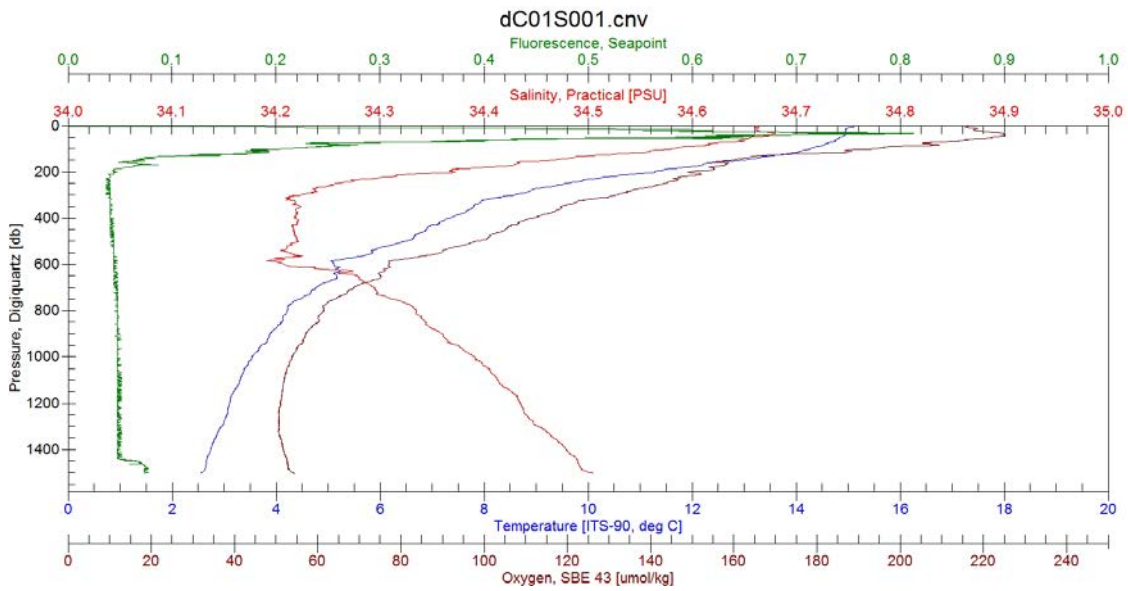
#### ○ Research Schedule

Research schedule implemented on YK17-05 cruise

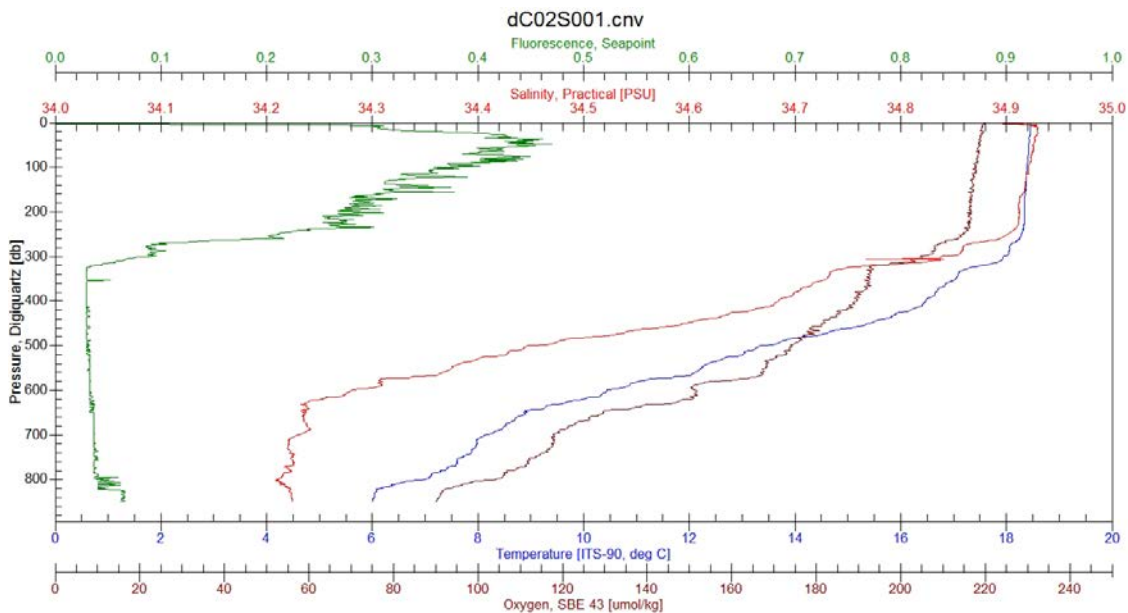
	7-Mar	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	13-Mar
<b>operation</b>	embark	water column		AUV	water column	AUV	water column	disembark
<b>site</b>	Shimizu	Sagami Bay	cancel	Sagami Bay	Bayonesu	Bayonesu	Oomuro Hole	JAMSTEC
latitude		35-00.60 N		31-57.33 N	31-57.33 N	31-57.33 N	34-32.81 N	
longitude		139-19.60 E		139-44.16 E	139-44.16 E	139-44.16 E	139-26.49 E	
depth (m)		1500m		1400m	900m	900m	200m	
<b>Edokko Mark 1</b>								
position					deploy 31-57.25N, 139-44.20 E	recovery		
<b>CTD-DO-water sampling</b>		2 cast			2 cast		2 cast	
<b>FRRF</b>		1 cast			1 cast		1 cast	
<b>VMP-X</b>		1 cast			1 cast		1 cast	
position							34-35.924N, 139-32.183 E depth 860m	
<b>AUV payload plan</b>								
<b>Hybrid-pH-CO2</b>				+		+		
<b>ATP</b>				+		+		
<b>electrometer</b>				+		+		

- Physicochemical profile of water column

### Sagami Bay on March 8

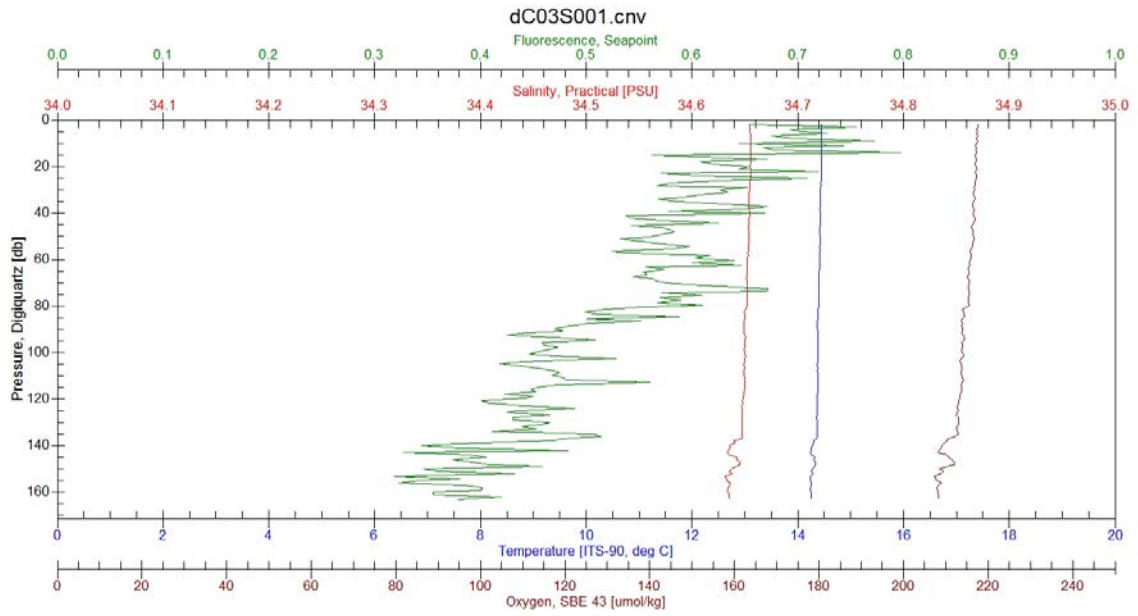


### Beyonesu Knoll on March 11



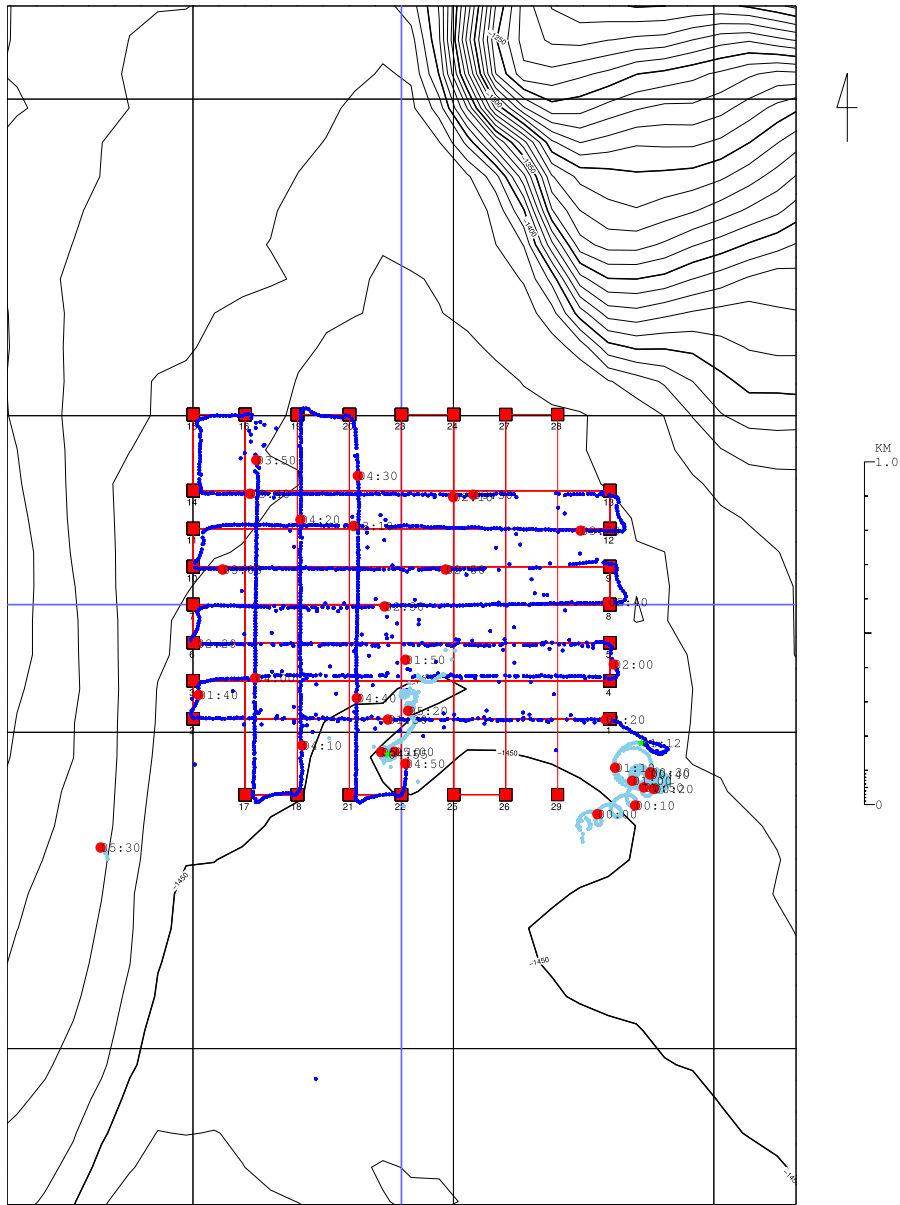


# Oomuro Hole on March 13



○ Dive map of AUV  
 Dive#25 at Sagami Bay

( 1 / 10000 )

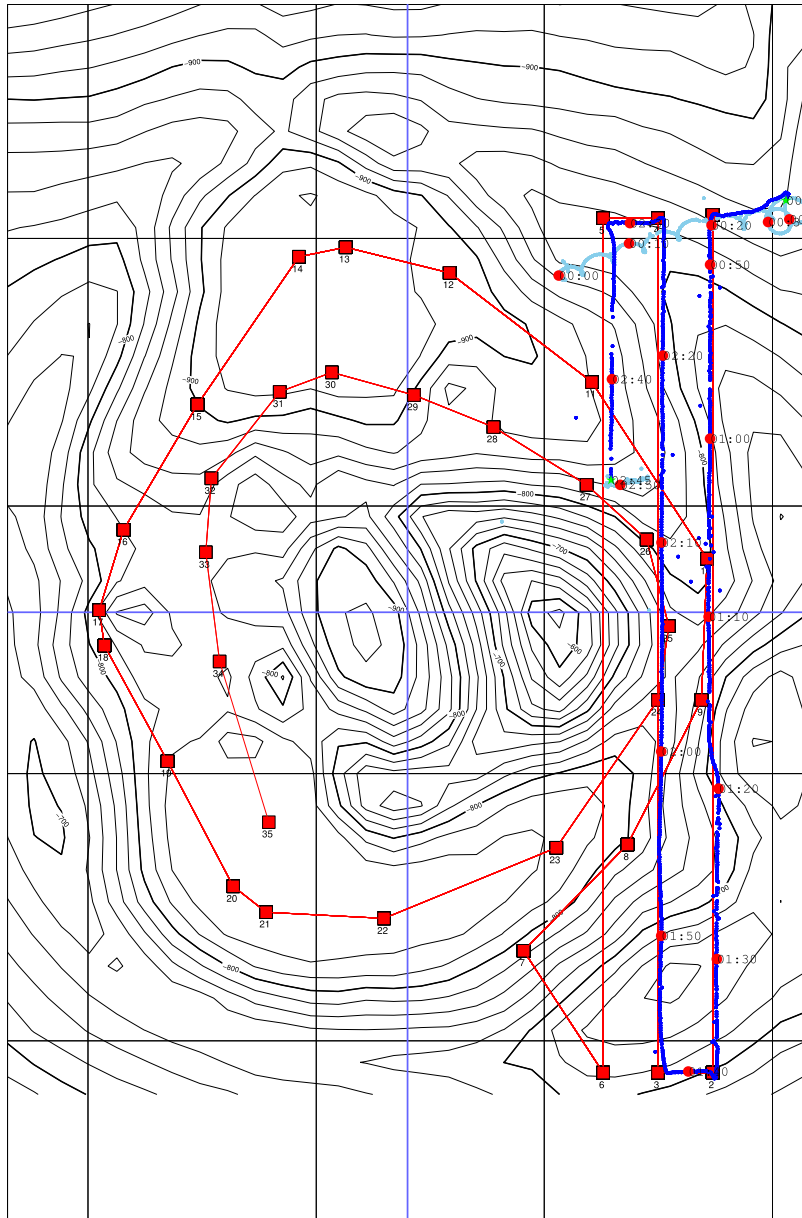


5-05.14700N Lon 139-21.65776E  
 (LL) Lat 35-03.25400N Lon 139-20.14324E

# Dive#26 at Beyonesu Knoll

YUMEIRUKA#26DIVE  
BEYONESU

( 1 / 12000 )



(UR) Lat 31-58.93689N Lon 139-45.07693E  
(LL) Lat 31-56.66411N Lon 139-43.32407E  
017-03-12)

## ○ **Research information**

### **Free-fall observatory**

*T. Miwa, T. Fukuba, T. Fukuhara*

The Edokko Mrk1 which is a free-fall and standalone platform for seafloor observation system, was deployed at Beyonesu Knoll. During 24hr observation, time laps video record and physical properties of benthopelagic zone were recorded, and then recovered from the seafloor by acoustic release system.

Vertical Microstructure Profiler (VMP-X) is a full-depth profiling system to measure the turbulent microstructure. In this cruise, VMP-X could measure the turbulent structure from surface to seafloor at Beyonesu Knoll, Sagami Bay, and Oomuro Hole.

The Fast Repetition Rate Fluorometer (FRRF) is an in situ sensor for determination of potential activity of photosynthesis. In this cruise, FRRF was operated by the CTD winch, and determined from surface to 150m-depth layer.

The RINKO-Profiler is an *in situ* sensor to measure water temperature, salinity, dissolved oxygen, and turbidity etc. The RINKO was installed with Edokko Mrk1 and FRRF.

### **Water column observation**

*Y. Tada, T. Fukuba, J. Choi*

The water samples were collected by CTD carousel sampling system (12L x 12 Niskin bottles) for layers from surface to bottom at the site of the Beyonesu, Sagami-Bay, and Oomuro Hole. The water samples were divided into each sample treatment and preserved for the studies on environmental parameters and micerobial community.

### **Survey by AUV Yumeiruka**

*Y. Ohta, J. Kaneko, T. Yoshiume, Y. Nanbu, H. Ochi,*

*M. Sugawara, K. Tanaka, H. Matsumoto, K. Kanayama. H. Miyake*

The AUV is equipped with the following sensors; interferometry SONAR, sub-bottom profiler, pH/CO<sub>2</sub> sensor (HCS), CTD, electrometer, and fluoro-turbid meter. The dive surveys were carried out at Sagami Bay, and Beyonesu Knoll.

#### **4. Notice on Using**

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

#### **Acknowledgement**

We are grateful thank to all crew of “R/V Yokosuka” for the safe navigation, and great thanks are due to the “AUV Yumeiruka” operation team for the observation of deep-sea hydrothermal field.

## **Appendix:**

### **Onboard crew**

#### **R/V Yokosuka Crew**

Captain	Eiko UKEKURA
Chief Officer	Akihisa TSUJI
2nd Officer	Toshiyo OHARA
3rd Officer	Yumihiko KOBAYASHI
Chief Engineer	Koji FUNAE
1st Engineer	Daisuke GIBU
2nd Engineer	Katsuto YAMAGUCHI
3rd Engineer	Shohei MIYAZAKI
Chief Electronics Operator	Takehito HATTORI
2nd Electronics Operator	Yosuke KOMAKI
3rd Electronics Operator	Ryosuke MATSUI
Boat Swain	Hatsuo ODA
Quarter Master	Kaname HIROSAKI
Quarter Master	Yukito ISHII
Quarter Master	Kosei KAWAMURA
Quarter Master	Shinya UENO
Quarter Master	Jun SHINODA
Sailor	Yuta OHJIRI
No.1 Oiler	Kozo MIURA
Oiler	Shinya SUGI
Oiler	Shota SHIMOHATA
Assistant Oiler	Toru HIDAKA
Assistant Oiler	Seiya WATANABE
Chief Steward	Sueto SASAKI
Steward	Hironobu HODOKUMA
Steward	Yoshio OKADA
Steward	Masanao KUNITA
Steward	Seiya MATSUMOTO

## Shipboard Log of R/V Yokosuka

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
07-Mar-17	11:00	Scientists onboard.		port of shimizu
				35-02.3N, 138-30.6E
				Fine but Cloudy
				SW-5 (Fresh breeze)
				2 (Sea Smooth)
				1 (Low Swell Short or Average)
				Visibly: 8'
08-Mar-17	08:30	Arrived at research area. SAGAMIWAN		East-off IZU
	9:00-9:30	Scientist meeting.		34-46.5N, 139-07.5E
	13:00	Arrived at reserch area.		Fine but Cloudy
	13:35-15:17	Carried out CTD operation. (W.O.:1448m)		WSW-6 (Strong breeze)
	15:37-16:54	Carried out VMP-X		4 (Sea Moderate)
	17:03-18:08	Carried out CTD operation. (W.O.:500m)		2 (Low Swell Long)
	18:37-19:15	Carried out FRRF operation. (W.O.:150m)		Visibly: 8'
09-Mar-17	05:30	Arrived at research area. OOMURODASHI		off IZU-OSHIMA
	8:30-9:45	Scientist meeting.		34-35.0N, 139-31.0E
	10:00-10:40	Carried out FRRF operation. (W.O.:150m)		Fine but Cloudy
	12:30	Com'ced proceeding to SAGAMI-WAN.		WSW-7 (Near gale)
	14:30	Arrived at SAGAMI-WAN		5 (Sea Rough)
	14:42	Released XBT.		3 (Moderate Short)
	18:30-18:45	Scientist meeting.		Visibly: 8'
10-Mar-17	08:47	Hoisted up YUMEIRUA.		SAGAMI-WAN
	08:50	Lunched YUMEIRUKA.		35-04.0N, 139-20.0E
	08:52	Started YUMEIRUKA #25 operation.		Blue sky
	14:39	Floated YUMEIRUKA.		West-4 (Moderate breeze)
	15:03	Recovered YUMEIRUKA & finished the operation.		4 (Sea Moderate)
	16:00	Com'ced proceeding to Beyonesu.		2 (Low Swell Long)
	18:30-18:45	Scientist meeting.		Visibly: 8'
11-Mar-17	06:00	Arrived at research area.		off AOGASHIMA
	08:26	Hoisted up EDOKKO No1		31-57.0N, 139-44.0E
	08:27	Lunched EDOKKO No1		Fine but Cloudy
	8:44-9:54	Carried out CTD operation. (W.O.:850m)		NW-5 (Fresh breeze)
	10:31-11:18	Carried out CTD operation. (W.O.:400m)		4 (Sea Moderate)
	13:00-13:34	Carried out FRRF operation. (W.O.:150m)		2 (Low Swell Long)
	13:51-14:38	Carried out VMP-X operation. (W.O.:150m)		Visibly: 6'
	14:43-14:53	Carried out calibration EDOKKO No1		
	18:30-18:45	Scientist meeting.		
12-Mar-17	06:30	Lunched GAPS.		OFF IZU-OSHIMA OUMURODASHI
	07:41	Lunched HOBALIN(AUV).		34-32.9N, 139-26.5E
	14:44	Recovered GAPS.		Overcast
	14:51	Floated HOBALIN.		NE-3 (Gentle breeze)
	15:06	Recovered HOBALIN.		2 (Sea Smooth)
	15:56	Recovered EDOKKO-1.		1 (Low Swell Short)
				Visibly: 5'
13-Mar-17	06:33	Lunched GAPS.		OFF IZU-OSHIMA OUMURODASHI
	07:58	Lunched HOBALIN(AUV).		34-32.8N, 139-26.5E
	12:57	Recovered GAPS.		Overcast
	13:20	Recovered HOBALIN.		NNE-5 (Fresh breeze)
	16:00	Arrived at off TATEYAMA.		4 (Sea Moderate)
				1 (Low Swell Short)
				Visibly: 5'