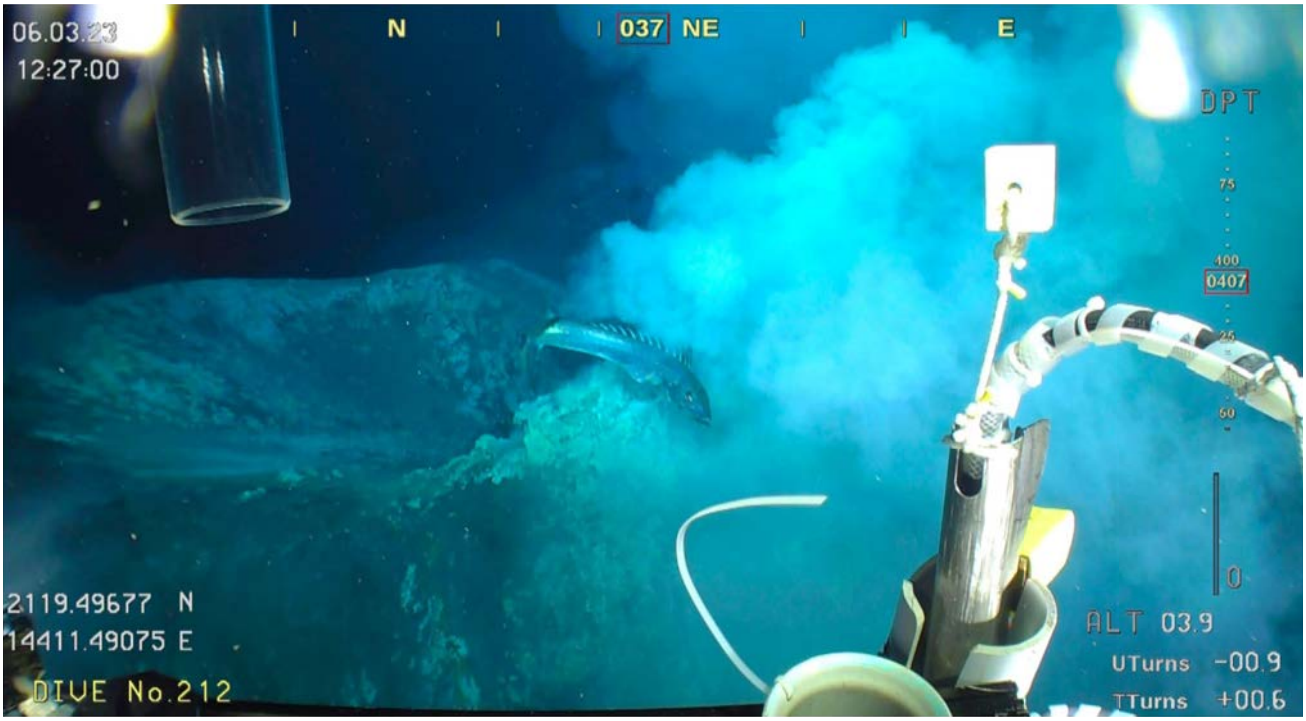
doi : 10.17596/0003463

R/V Kaimei, KM-ROV, and BMS Cruise Report

KM23-05

Geochemical, microbiological and biological processes in abnormal fluid pools of the Mariana Forearc Serpentinite Seamounts and Volcanic Arc hydrothermal systems



March 1, 2023 from JAMSTEC Yokosuka - March 29, 2023 to JAMSTEC Yokosuka

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

Acknowledgements

We are grateful to Captain Mr. N. Kimura, Chief Officer Mr. R. Yamaguchi and Chief Engineer Mr. M. Tsukada for their safe navigation and their skillful handling of “R/V Kaimei”. Great thanks are due to KM-ROV and BMS Operation Manager Mr. A. Miura and KM-ROV and BMS operation team for their operations in sampling. We thank all the JAMSTEC persons who have supported us and this cruise.

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Cruise information

Cruise ID: KM23-05

Vessel: Kaimei

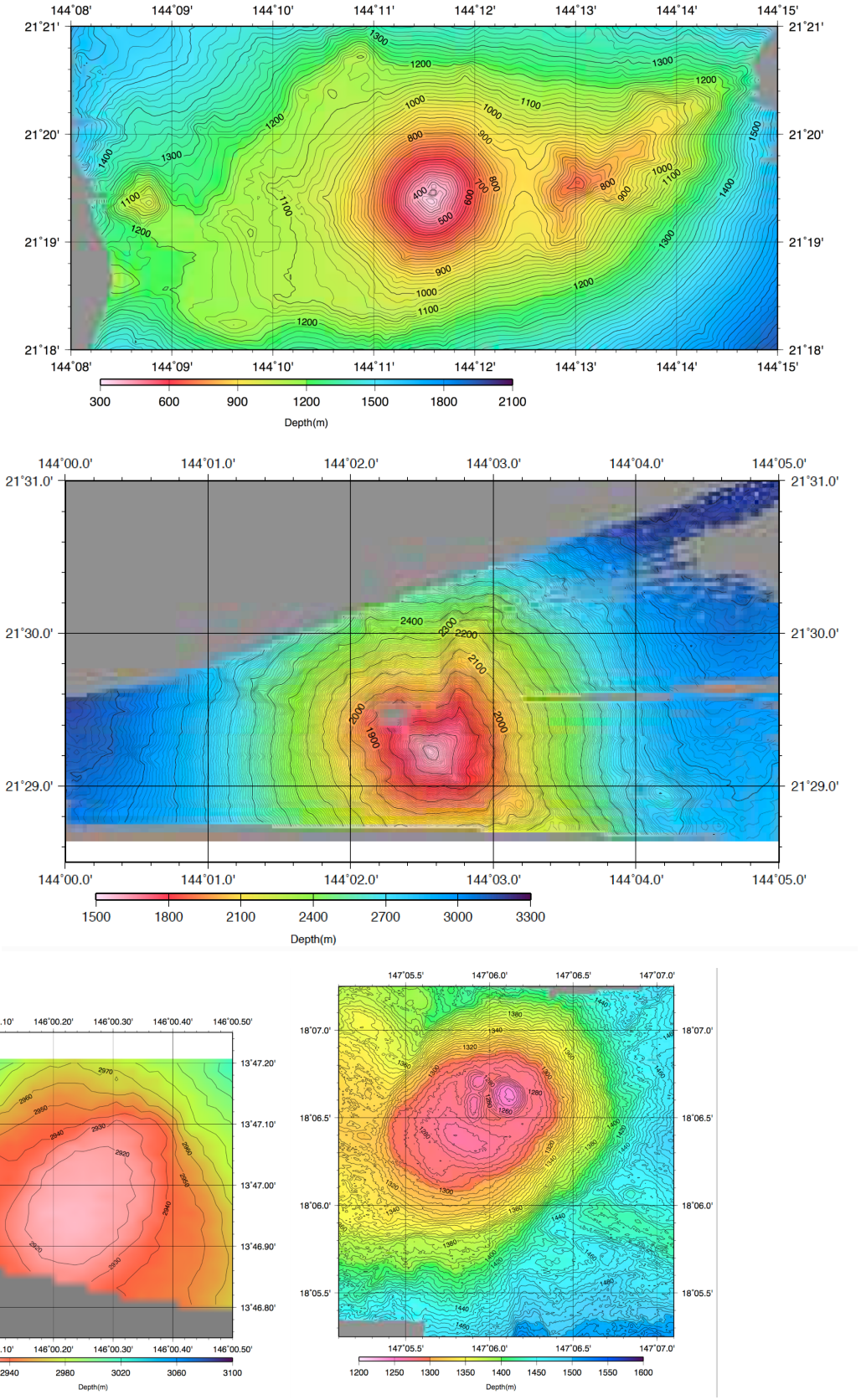
Title of the cruise: Geochemical, microbiological and biological processes in abnormal fluid pools of the Mariana Forearc Serpentinite Seamounts and Vollcanic Arc hydrothermal systems

Cruise period: March 1 – March 29, 2023

Ports of call: JAMSTEC Yokosuka – JAMSTEC Yokosuka, Japan

Research area: NW Eifuku SMt., Daikoku SMt., AsuTesoru SMt., and South Chamorro SMt.

Research maps:



General topographic maps of Daikoku (top), NW Eifuku (middle), South Chamorro (bottom left), and Asút Tesoru Seamounts (bottom right)

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3rd ROV Operator	**TAKEDA KAI**

I. CRUISE SUMMARY

In KM23-05 cruise, we totally conducted 19 dives of KM-ROV and BMS in the NW Eifuku, Daikoku, South Chamorro, Asut Tesoru Seamounts. One of the cruise foci was whether a true active subseafloor microbial ecosystem is present in the extreme alkaline and reductive subseafloor environments of the Mariana Forearc serpentinite seamounts or not. The other one was to justify that the hydrothermal liquid/supercritical CO2 pools host a diversity of feedstock inorganic compounds and building block organic molecules, and abiotic chemical evolution, as a hatchery places for generation of primordial life.

In the NW Eifuku Seamount, we successfully gathered liquid/supercritical CO2 containing other volatiles, directly derived from the pristine magmatic degassing, at the seafloor, and measured the composition by in situ Raman spectroscopy. The Raman spectrometry obtained from genuine liquid/supercritical CO2 without contamination of hydrothermal fluids and seawater was the first example ever. In addition, the depth-spectrometry of the phase transition was also determined by in situ Raman spectroscopy and genuine liquid/supercritical CO2 was sampled by the pressure-conserved sampler. The laboratory measurement of the detail volatile composition will clarify what kinds of chemical species, especially feedstock inorganic compounds and building block organic molecules for prebiotic chemical evolution, are preserved in the genuine liquid/supercritical CO2 of the NW Eifuku Seamount, and are identified by our in situ Raman spectroscopy. Furthermore, we are now planning another similar expedition in the Okinawa Trough in August-September, 2023. The Okinawa Trough has a diversity of deep-sea hydrothermal systems that host large scales of liquid/supercritical CO2 pools in the organics-rich sediments. The geological and geochemical environments of hydrothermal systems between the Okinawa Trough and Mariana Volcanic Arc are quite different. Thus, future comparative study of the chemical composition and isotopic properties between the Okinawa Trough and Mariana Volcanic Arc hydrothermal systems will provide much deeper insight into previous unknown properties and roles of seafloor liquid/supercritical CO2 pools in the primordial ocean and even in the modern ocean.

In the Daikoku Seamount, we also gathered CO2 droplets and bubbles containing other volatiles, directly derived from the pristine magmatic degassing, at the seafloor, and measured the composition by in situ Raman spectroscopy. However, due to the located shallow depth of the hydrothermal field (<430 m), all the CO2 droplets and bubbles were present as gas phase. Although the genuine volcanic gas was sampled and measured by in situ Raman spectroscopy for the first time at the seafloor, investigation of liquid/supercritical CO2 pools was not successful in the Daikoku Seamount hydrothermal field. However, we encountered a big surprise in the Daikoku Seamount. The Daikoku Seamount is famous to host lakes of molten sulfur, specifically 'Sulfur Cauldron' discovered in 2006, and a number of dive surveys have

revealed the significant volcanic activities, including an eruption event in 2014 leading to the formation of a new basin-like crater. During this cruise, we found that the new crater is currently home to a much larger molten sulfur lake than the Sulfur Cauldron, which we named the 'Rengoku' sulfur lake. This discovery was immediately summarized as a manuscript of field observation by the lead authors of Drs. Sawada and Chen, and submitted to an appropriate journal via internet from the ship. Outstanding volume of sulfur supply of the Rengoku sulfur lake and the Daikoku Seamount caldera would support probably entire planktonic, benthic and subseafloor microbial and faunal communities in the seamount. The Daikoku Seamount, because of its shallower depth and enormous volcanic volatile emission, may represent the heaven for hidden biodiversity of microorganisms and metazoans in the ocean supported by volcanic volatiles.

In the South Chamorro Seamount, we successfully obtained the relatively clean core samples of serpentinite mud at deeper than 20 mbsf for onshore microbiological exploration of cultivation and metagenomic approaches through struggling BMS operations, and a plenty of pristine serpentinization-driven fluid through the artificial well established (destroyed) through the previous ODP & IODP expeditions and other dive surveys by the well trained ROV operations. As compared to the previous observation, the H2 concentration in the fluid was increased (>1 mM) and the pore-water H2 concentration was for the first time determined. One of the most important target samples, fluid and pore-water gas samples, was abundantly collected. Future combined microbiological and geochemical investigation will clarify whether a true active subseafloor microbial ecosystem is present in the extreme alkaline and reductive subseafloor environments of the South Chamorro Seamount or not, and whether the simple abundant organic compounds in the serpentinite mud and fluid are derived from abiogenic or biogenic processes, or thermogenic sources. In addition, during this cruise, we successfully re-classified the distribution and composition of chemosynthetic faunal communities in the summit area of the South Chamorro Seamount. Indeed, the distribution and composition of chemosynthetic faunal communities have been never documented as the peer-reviewed scientific article. Thus, the re-classification was immediately summarized as a manuscript of field observation of distribution and brief description of faunal composition by the lead author of Dr. Chen, and submitted to an appropriate journal via internet from the ship.

Finally, in the Asut Tesoru Seamount, we again successfully obtained the relatively clean core samples of serpentinite mud at deeper than 20 mbsf for onshore microbiological exploration of cultivation and metagenomic approaches through struggling BMS operations, and a plenty of pristine serpentinization-driven fluid through the artificial well established in IODP expedition 366 by the well trained ROV operations. Extraordinary high concentration H2, even more abundant concentration, and less abundant hydrocarbons were determined in the Asut Tesoru Seamount as compared to those in the South Chamorro Seamount. The significantly increased H2 concentration in the artificial well fluid than in the pore-water was

common in both the South Chamorro and Asut Tesoru Seamounts. This may be due to the extra amount of H2 production in the artificial wells, e.g., H2 generation during the metal iron of casing pipe and highly alkaline and reductive pore fluid. Anyway, future combined microbiological and geochemical investigation, and comparison between different serpentine seamounts with different geological and geochemical conditions will clarify whether a true active subseafloor microbial ecosystem is present in the extreme alkaline and reductive subseafloor environments of the Mariana Forearc serpentinite seamounts or not, and whether the simple abundant organic compounds found in the Mariana Forearc serpentinite seamounts are derived from abiogenic or biogenic processes, or thermogenic sources. In addition, during this cruise, we successfully found the existence of chemosynthetic faunal species in the summit area of the Asut Tesoru Seamount. Indeed, the discovery of deep-sea chemosynthetic faunal ecosystem associated with seepages of serpentinization-driven fluids was the second example in the Mariana Forearc serpentinite seamounts, the third in the Mariana region, and the fifth in the world. Thus, the discovery was immediately summarized as a manuscript of field observation of distribution and brief description of faunal composition by the lead author of Dr. Chen, and submitted to an appropriate journal via internet from the ship.

What a fruitful expedition this is! This is the simple words for summary of this cruise.

II. INTRODUCTION

General backgrounds & Scientific objectives

The scientific objective of this cruise is to clarify the microbial communities and their biogeochemical processes under the extreme conditions of the Mariana Forearc serpentinite seamounts and the Mariana Volcanic Arc hydrothermal systems. The target seamounts are South Chamorro SMt and Asùt Tesoru SMt in the Mariana Forearc, and NW Eifuku SMt and Daikoku SMt in the Mariana Volcanic Arc. In the South Chamorro and Asùt Tesoru SMts, the primary objective is whether a true active subseafloor microbial ecosystem is present in the extreme alkaline and reductive subseafloor environments or not. In the NW Eifuku and Daikoku SMts, the primary objective is to justify that the hydrothermal liquid/supercritical CO2 pools host a diversity of feedstock inorganic compounds and building block organic molecules, and abiotic chemical evolution, as a hatchery places for generation of primordial life.

In 2016, International Ocean Discovery Program (IODP) expedition 366 was conducted to obtain the samples of serpentinization-derived fluids, rocks and mud in several Mariana Forearc serpentinite seamounts (Fryer et al., 2018; 2020). The geochemistry characterization of the pore-water samples demonstrated that the subseafloor environments of the South Chamorro and Asùt Tesoru SMts are extreme environment of which pH reaches to pH12.5, the strongest hyperalkaline in this planet (Fryer et al., 2018). Meanwhile, the microbiological exploration suggested interesting but somewhat confusing image of the subseafloor biosphere. Based on the microbial activity surveys, we found a tiny but a certain signal of active microbial function but the other molecular and cultivation techniques found no apparent evidence of active microbial populations (Kawagucci et al., 2018; Aoyama et al., 2018). The subseafloor environment under pH12.5 is marginal for the microbial habitability (the highest pH limit for microbial growth is known as pH12.4). If the active microbial communities are present in the habitats, the communities might represent the novel microbial populations and functions beyond the presently known limits of life. However, the core samples obtained and distributed from IODP Expedition 366 were not enough for further detail molecular and cultivation analyses in quantity to clarify whether a true active subseafloor microbial ecosystem is present in the extreme alkaline and reductive subseafloor environments or not.

To clarify these questions, this cruise will focus on multidisciplinary investigation of core samples obtained from Boring Machine System (BMS) equipped with Research Vessel (R/V) Kaimei. The BMS will drill the crest seafloor of the South Chamorro and Asùt Tesoru SMts down to maximally 60 m below seafloor (mbsf) and take core samples onboard. Using the

enough amount of core samples, we will conduct polyphasic geochemical and microbiological analyses to address the above question. In addition, we will conduct other investigations using a Remotely Operative Vehicle (ROV) equipped with R/V Kaimei such as in situ electrochemical analyses of serpentinite fluids and post-IODP seafloor tools, and survey and collection of chemosynthetic animals associated with serpentinite fluid flows.

In the Mariana Volcanic Arc, many deep-sea hydrothermal systems have been identified (Lupton et al., 2006). Some of the deep-sea hydrothermal systems (e.g., NW Eifuku and Daikoku SMts) are known to host discharging liquid/supercritical CO2. These hydrothermal liquid/supercritical CO2 fluids and pools were for the first time found in the deep-sea hydrothermal systems in the Okinawa Trough (Sakai et al., 1990), and the preliminary geochemical and microbiological characterizations were conducted for the hydrothermal liquid/supercritical CO2 pools in the Okinawa Trough hydrothermal systems (Inagaki et al., 2006; Konno et al., 2006). However, the hydrothermal liquid/supercritical CO2 pools in the Mariana Volcanic Arc hydrothermal systems are poorly studied. Recently, the hydrothermal liquid/supercritical CO2 pools have been interested in as the possible hatchery place of prebiotic chemical evolution for the subsequent origin of life in the ancient deep-sea hydrothermal environments (ca. 4 Ga) (Shibuya and Takai, 2022). Nevertheless, there has been little known chemical compositions and reaction behavior of natural liquid/supercritical CO2 fluids and pools. The preliminary data are now obtained from the natural liquid/supercritical CO2 fluids and pools in the Okinawa Trough but no previous study was conducted in those of the Mariana Volcanic Arc.

Thus, this cruise will be focused on multidisciplinary investigation of hydrothermal liquid/supercritical CO2 samples obtained from a ROV equipped with R/V Kaimei. The ROV will dive in the deep-sea hydrothermal vents of the NW Eifuku and Daikoku SMts and take liquid/supercritical CO2 samples onboard. Using the enough amount of liquid/supercritical CO2 samples and surrounding rocks and deposits, we will conduct polyphasic geochemical and microbiological analyses to clarify the microbial community compositions and functions affected by the natural liquid/supercritical CO2 fluids and pools and to address that the hydrothermal liquid/supercritical CO2 pools host a diversity of feedstock inorganic compounds and building block organic molecules, and abiotic chemical evolution, as a hatchery places for generation of primordial life. In addition, we will conduct other investigations using a ROV and R/V KAIMEI such as in-situ Raman spectroscopy of hydrothermal liquid/supercritical CO2 and fluids, and survey and collection of chemosynthetic animals associated with hydrothermal fluid flows.

Totally, this research project will take about 22 days onsite without port call outside Japan and a total of 19 dive operations of KM-ROV and BMS.

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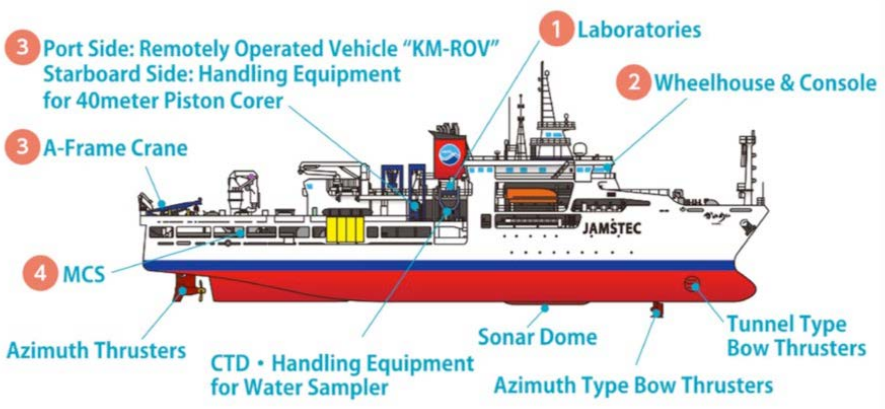
III. EXPLANATORY NOTE

1. Research vessel Kaimei

RV *Kaimei*

State-Of-The-Art Vessel for All-Round Marine Research

Kaimei conducts extensive studies of the seabed and subseafloor that include wide-area surveys for marine resources and distribution, atmospheric and ocean environmental changes associated with global climate change, and disaster prevention and mitigation studies (earthquakes & tsunamis). *Kaimei*'s vast range of add-on scientific equipment facilitates 2D and 3D geophysical surveys, and seafloor samples collection using piston corer (~ 40 meters long) and power grabs. Subseafloor samples are collected with the remotely operated seafloor drilling rig (BMS). The vessel's fully equipped laboratories are also available for analyses of the collected data and samples.



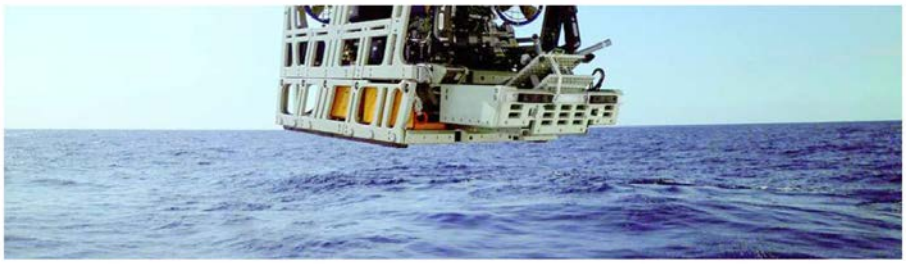
Large equipment such as the BMS and power grab collect seafloor samples and are operated from the A-frame crane on the stern of the ship. A 40 m piston corer to collect geological samples is operated from the starboard side of the ship.

2. Kaimei-ROV (KM-ROV)

KM-ROV

ROV on Autopilot

KM-ROV is an ROV whose mother ship is the research vessel "*Kaimei* ". Like other ROVs such as *KAIKO*, *KM-ROV* uses manipulators while working on the seafloor. The sample basket in the bottom part of the fuselage is retractable in order to facilitate work with manipulators. *KM-ROV* is also excellent at automatic position an attitude control thanks to streamed sensor data such as depth, altitude, and speed. The automatic mode stabilizes the system bearings and is not affected by currents. The built-in camera can be held at a fixed point while examining living creatures or used to stop and focus at a specified distance.



Main equipment

Control panels in the *KM-ROV* command container aboard the *Kaimei*.

IV. DIVE REPORTS

3/4	**KM-ROV#210 DIVE (NW Eifuku SMt)**	**Reported by Dr. Ken Takai**
3/5	**KM-ROV#211 DIVE (Daikoku SMt)**	**Reported by Dr. Ken Takai**
3/6	**KM-ROV#212 DIVE (Daikoku SMt)**	**Reported by Dr. Ken Takai**
3/7	**KM-ROV#213 DIVE (NW Eifuku SMt)**	**Reported by Dr. Ken Takai**
3/9	**KM-ROV#214 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/10	**BMS#19 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/11	**KM-ROV#215 DIVE (South Chamorro SMt)**	**Reported by Dr. Chong Chen**
3/12	**KM-ROV#216 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/13	**BMS#20 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/14	**KM-ROV#217 DIVE (South Chamorro SMt)**	**Reported by Dr. Chong Chen**
3/15	**KM-ROV#218 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/16	**BMS#21 DIVE (South Chamorro SMt)**	**Reported by Dr. Ken Takai**
3/18	**KM-ROV#219 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Ken Takai**
3/19	**BMS#22 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Ken Takai**
3/20	**KM-ROV#220 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Chong Chen**
3/21	**KM-ROV#221 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Ken Takai**
3/22	**BMS#23 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Ken Takai**
3/23	**KM-ROV#222 DIVE (Asút Tesoru SMt)**	**Reported by Dr. Shino Suzuki**
3/25	**KM-ROV#223 DIVE (NW Eifuku SMt)**	**Reported by Dr. Ken Takai**

Dive Report: KM-ROV #210
Date: March 4, 2023
Site: NW Eifuku Seamount, Mariana Arc
On bottom: 09:02; 21˚29.2609N 144˚02.3751E, D=1714 m
Leave bottom: 15:05; 21˚29.2547N 144˚02.4565E, D=1653 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #210 was to explore hydrothermal vents, liquid CO2 pools and iron mats in the NW Eifuku SMt. When the liquid CO2 emissions were found, the liquid CO2 droplets were collected. The liquid CO2 were transported to shallower zones about 500 m,, and then pure liquid CO2 fluid phase and isolated. The pure liquid CO2 were measured by in situ Raman spectrometer to obtain the phase transition signas of liquid CO2 and soluble components in the iquid CO2. In addition, liquid CO2 was collected by pressure-conservative sampler. Chimneys and seawater will be also collected from NW Eifuku SMt hydrothermal field.

Dive summary:
We landed on the larva seafloor about 200 m west from the Champagne site. About 50 m east, we found white smokes and mussels' colonies, which was not reported in 2010 expedition. Around white smokes, lots of mussels and shrimps were. Several individuals of shrimps were sampled. After 50 m running to the east, we arrived at Champagne site. But, there were little liquid CO2 droplets. Here, we collected several individuals of mussels. After observation of Champagne site, wee went to "Cliff House" and it was boring small mussel ccoonies. Via Cliff House, we went to iron mat site on the top of NW Eifuku SMt. At around top of the SMt., we collected seawater by WHATS-3 (4 bottles). We deployed an EMES on iron mat.

To obtain liquid CO2 droplets, we returned to the white smoke site (Cheap Sparking Wine site). We found a small liquid CO2 emission and collected dropets. One third volume was collected. Then, we left the bottom.

At 501 m, the collected liquid CO2 droplets become pure natural liquid CO2. Fortunately, Raman spectrum of pure natural liquid CO2 was measured and samples of pure natural liquid CO2 were successfully obtained.

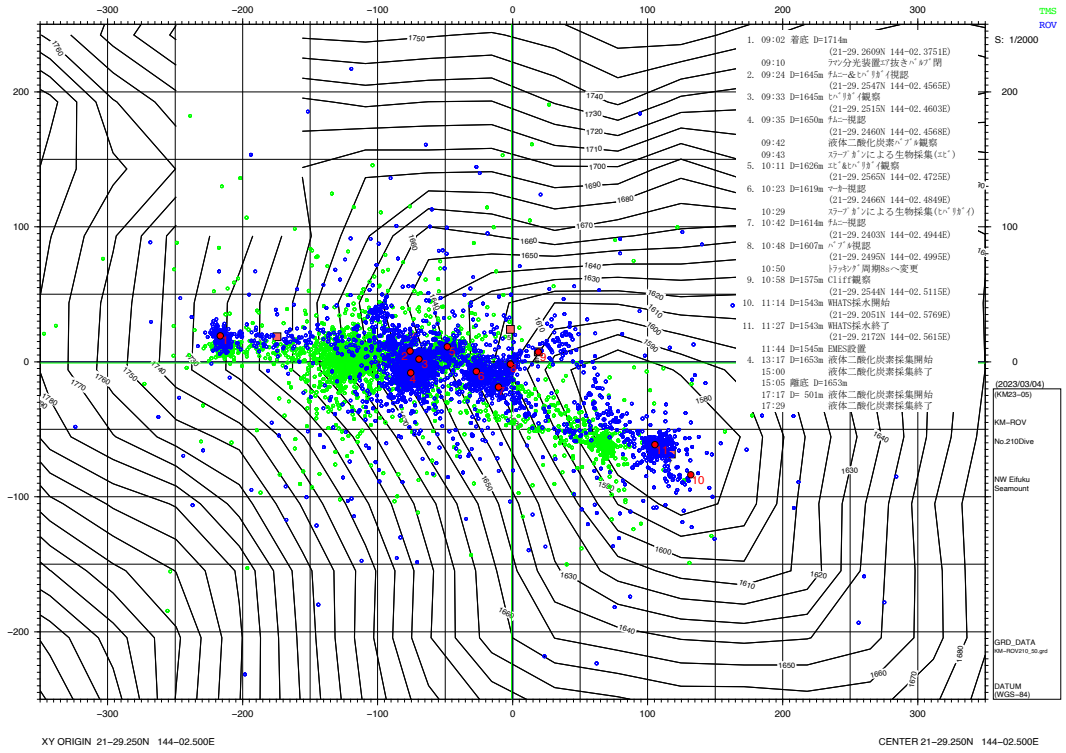
Payloads:
- Suction sampler with single chamber
- WHATS-3
- Sample box

- *In situ* Raman spectrometer
- Liquid CO2 sampler
- D-POTE
- Electrotrophic microbial enrichment system (EMES)

Event list:

09:02	21˚29.2609N, 144˚02.3751E	Depth=1714 m	Landing
09:24	21˚29.2547N, 144˚02.4565E	Depth=1645 m	White smoke & mussels' colonies
09:35	21˚29.2460N 144˚02.4568E	Depth=1650 m	Cheap sparking wine site & Sampling shrimps & mussels
10:23	21˚29.2466N 144˚02.4849E	Depth=1619 m	Sampling mussels
10:58	21˚29.2544N 144˚02.5115E	Depth=1575 m	Cliff House
11:27	21˚29.2172N 144˚02.5615E	Depth=1543 m	WHATS sampling (seawater above iron mat x 4 bottles)
11:44	21˚29.2172N 144˚02.5615E	Depth=1543 m	deployment of EMES
13:17	21˚29.2460N 144˚02.4568E	Depth=1653 m	sampling liquid CO2
15:00	21˚29.2460N 144˚02.4568E	Depth=1653 m	finish sampling liquid CO2
17:11		Depth=501 m	phase separation and raman spectroscopy and sampling pure liquid CO2

Dive Track:


TMS
ROV
S: 1/2000
1. 09:02 着底 D=1714m
(21-29.2609N 144-02.3751E)
09:10 ﾌｧﾝ分光装置ﾛｯｸ抜きﾊﾞﾙﾌﾞ開
2. 09:24 D=1645m ﾁﾑﾆｰ&ﾋﾞﾃﾞｨ視認
(21-29.2547N 144-02.4565E)
3. 09:33 D=1645m ﾋﾞﾃﾞｨ観察
(21-29.2515N 144-02.4603E)
4. 09:35 D=1650m ﾁﾑﾆｰ視認
(21-29.2460N 144-02.4568E)
09:42 液体二酸化炭素ﾊﾞﾌﾞﾙ観察
09:43 ｽﾗｰﾌﾟ ｶﾞﾝによる生物採集(ｴﾋﾞ)
5. 10:11 D=1626m ｴﾋﾞ&ﾋﾞﾃﾞｨ観察
(21-29.2566N 144-02.4725E)
6. 10:23 D=1619m ﾏｰｶｰ視認
(21-29.2466N 144-02.4849E)
10:29 ｽﾗｰﾌﾟ ｶﾞﾝによる生物採集(ﾋﾞﾃﾞｨ)
7. 10:42 D=1614m ﾁﾑﾆｰ視認
(21-29.2403N 144-02.4944E)
8. 10:48 D=1607m ﾊﾞﾌﾞﾙ視認
(21-29.2495N 144-02.4995E)
10:50 ﾄﾗｯｷﾝｸﾞ周期8sへ変更
9. 10:58 D=1575m Cliff観察
(21-29.2544N 144-02.5115E)
10. 11:14 D=1543m WHATS採水開始
(21-29.2051N 144-02.5769E)
11. 11:27 D=1543m WHATS採水終了
(21-29.2172N 144-02.5615E)
11:44 D=1545m EMES設置
4. 13:17 D=1653m 液体二酸化炭素採集開始
15:00 液体二酸化炭素採集終了
15:05 離底 D=1653m
17:17 D= 501m 液体二酸化炭素採集開始
17:29 液体二酸化炭素採集終了
(2023/03/04)
(KM23-05)
KM-ROV
No.210Dive
NW Eifuku
Seamount
GRD_DATA
KM-ROV210_50.grd
DATUM
(WGS-84)
XY ORIGIN 21-29.250N 144-02.500E
CENTER 21-29.250N 144-02.500E

Dive Report: KM-ROV #211
Date: March 5, 2023
Site: Daikoku Seamount, Mariana Arc
On bottom: 08:27; 21˚19.4833N, 144˚11.4509E, D=409 m
Leave bottom: 14:36; 21˚19.4926N, 144˚11.4904E, D=414 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #211 was to explore hydrothermal vents, liquid CO2 pools and sulfur chimneys in the Daikoku SMt. When the liquid CO2 emissions were found, the liquid CO2 droplets were collected. The pure liquid CO2 fluid phase and isolated. The pure liquid CO2 were measured by in situ Raman spectrometer to obtain the phase transition signals of liquid CO2 and soluble components in the iquid CO2. In addition, liquid CO2 was collected by pressure-conservative sampler. Chimneys, seawater and animals will be also collected from Daikoku SMt hydrothermal field.

Dive summary:
We landed on the northeastern slope of the Daikoku SMt. After several 10 meters running to the east, we found the white smoker chimney and CO2 bubbles (droplets) emission. At the site, we collected a handful sulfur crust. Near the first white smoke site, we found another white smoker chimneys. Here, wee collected a piece of chimney sample. In addition, near the white smokers, we found relatively flat pumice sediments. On the sediments, lots of flat fishes lied. We collected several individuals of sole fishes.

After fish sampling, we headed to the rim of crater (top of the Daikoku SMt.). In the southwest cliff of the craters, it was reported that there were abundant tube worm colonies. Finally, we found several living individuals at the expected location. We collected the tube worm individuals.

At last, we moved to go the first site of white smoker chimney and CO2 bubbles (droplets) emission. The CO2 bubbles (droplets) were collected but the collected fluid seemed to be gas phase. The collected gas was obtained in two bottles.

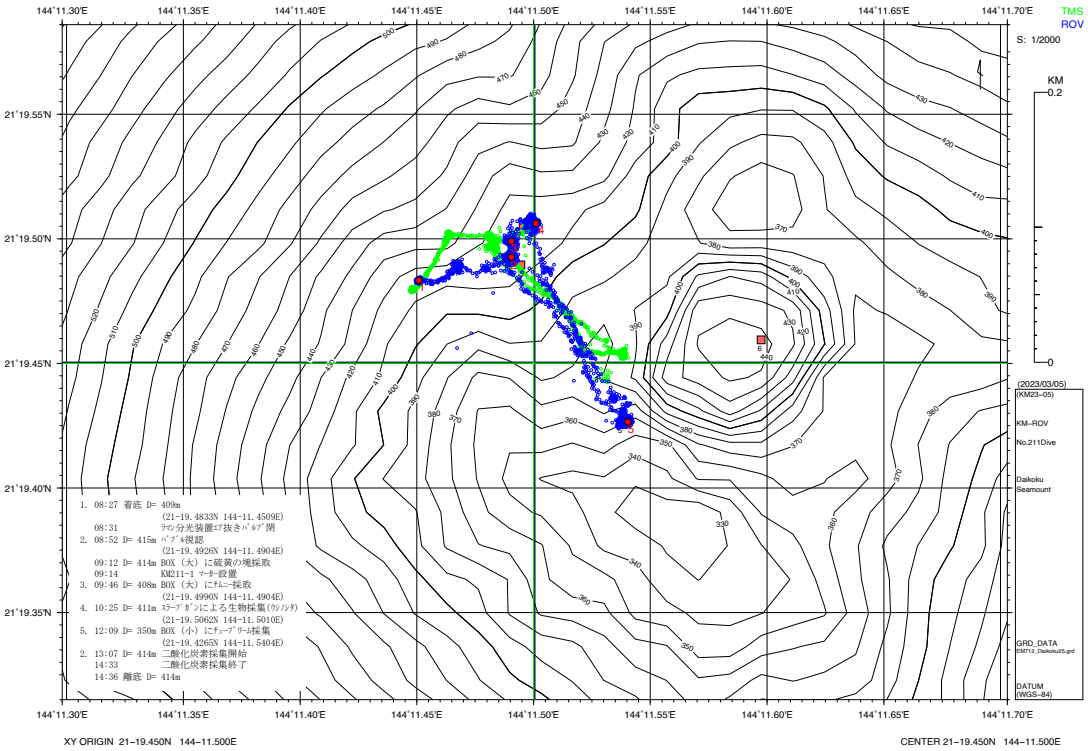
Payloads:
- Suction sampler with single chamber
- WHATS-3
- Sample box x 2
- *In situ* Raman spectrometer

- Liquid CO2 sampler
- D-POTE
- Kumade

Event list:

08:27	21˚19.4833N, 144˚11.4509E	Depth=409 m	Landing
08:52	21˚19.4926N, 144˚11.4904E	Depth=415 m	White smoker, chimney & CO2 bubbles
09:12	21˚19.4926N, 144˚11.4904E	Depth=415 m	Sampling a sulfur crust & deploymemt of KM211-1 Marker
09:46	21˚19.4990N, 144˚11.4904E	Depth=408 m	Another white smoker & chimney
10:02	21˚19.5062N, 144˚11.5010E	Depth=411 m	Arrive at Fish Spa and sampling sole fishes
12:09	21˚19.4265N, 144˚11.5404E	Depth=350 m	Finding tube worm colonies and sampling
13:07	21˚19.4926N, 144˚11.4904E	Depth=415 m	Collecting CO2 bubbles & Raman spectroscopy
14:36	21˚19.4926N, 144˚11.4904E	Depth=415 m	Left bottom

Dive Track:


144°11.30'E
144°11.35'E
144°11.40'E
144°11.45'E
144°11.50'E
144°11.55'E
144°11.60'E
144°11.65'E
144°11.70'E
21°19.55'N
21°19.50'N
21°19.45'N
21°19.40'N
21°19.35'N
TMS
ROV
S: 1/2000
KM
0.2
0
1. 08:27 着底 D= 409m
(21-19.4833N 144-11.4509E)
08:31 ﾌｧﾝ分光装置ｴｱ抜きﾊﾞﾙﾌﾞ閉
2. 08:52 D= 415m ﾊﾞﾌﾞﾙ視認
(21-19.4926N 144-11.4904E)
09:12 D= 414m BOX（大）に硫黄の塊採取
09:14 KM211-1 マーカー設置
3. 09:46 D= 408m BOX（大）にｶﾙﾆ採取
(21-19.4990N 144-11.4904E)
4. 10:25 D= 411m ｽﾗｰﾌﾟｶﾞﾝによる生物採集(ｸﾗｼﾏﾀ)
(21-19.5062N 144-11.5010E)
5. 12:09 D= 350m BOX（小）にﾁｭｰﾌﾞﾜｰﾑ採集
(21-19.4265N 144-11.5404E)
2. 13:07 D= 414m 二酸化炭素採集開始
14:33 二酸化炭素採集終了
14:36 離底 D= 414m
(2023/03/05)
(KM23-05)
KM-ROV
No.211Dive
Daikoku
Seamount
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 21-19.450N 144-11.500E
CENTER 21-19.450N 144-11.500E

Dive Report: KM-ROV #212
Date: March 6, 2023
Site: Daikoku Seamount, Mariana Arc
On bottom: 08:27; 21˚19.4833N, 144˚11.4509E, D=409 m
Leave bottom: 14:36; 21˚19.4926N, 144˚11.4904E, D=414 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #212 was to explore hydrothermal vents and sulfur chimneys in the Daikoku SMt. Chimneys, seawater and animals will be collected from Daikoku SMt hydrothermal field.

Dive summary:
We landed on the northeastern slope of the Daikoku SMt as we did in KM-ROV#211. Before landing, we collected a Niskin water sampler. Around here, several species of animals were collected. Then, we found an active tube colony. We collected animals inside the tube worm colony. Then, we moved to the white smoker site (KM-ROV marker 211-1). First, we collected the sulfur chimney on the white smoker. Then, we tried to obtain the white smoke by WHATS sampler, but the inlet pipe was choked with sulfur grains and sands. Thus, we tried to collect sole fishes around here. Then, we tried to obtain the core sample of the white smoker chimney. Unfortunately, the core sampling failed.

We moved to the crater of the Daikoku SMt. Inside the crater, there was dense turbidity of hydrothermal plumes or volcanic gas. We tried to land on the bottom seafloor but there was no visibility (later, it was found that KM-ROV landed on the surface of liquid sulfur pond in the crater).

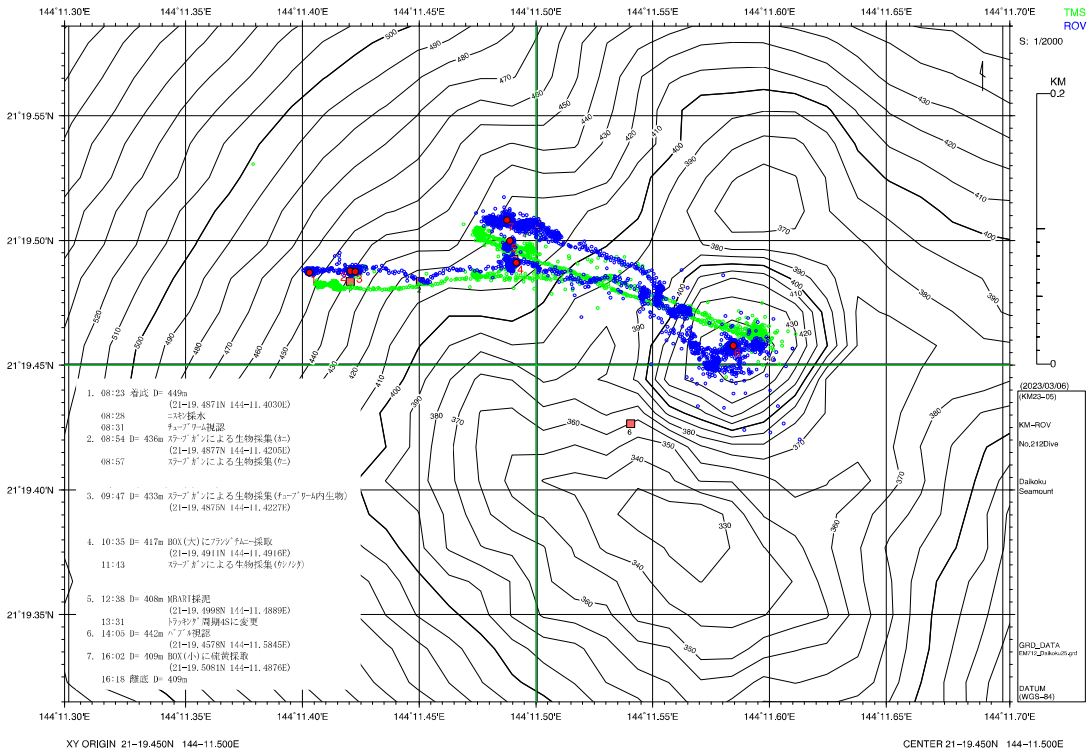
Finally, we moved back to Fish Spa site to look for gastropods. But no sample was collected.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- Sample box x 2
- D-POTE
- Kumade
- Bag sampler
- MBARI corer

Event list:

08:23	21˚19.4871N, 144˚11.4030E	Depth=449 m	Landing
08:54	21˚19.4877N, 144˚11.4205E	Depth=436 m	Sampling shrimps, sea archin
09:47	21˚19.4875N, 144˚11.4227E	Depth=433 m	Sampling animals in tube warm colony
10:35	21˚19.4911N, 144˚11.4916E	Depth=417 m	Sampling sulfur chimney & WHATS#1 sampling (Failed)
11:43	21˚19.4911N, 144˚11.4916E	Depth=417 m	Sampling sole fishes
12:38	21˚19.4998N, 144˚11.4889E	Depth=408 m	Tried to obtain MBARI corer in sulfur chimney (Failed)
14:05	21˚19.4578N, 144˚11.5845E	Depth=442 m	touch down on the surface liquid sulfur pond in the crater
16:18	21˚19.5081N, 144˚11.4876E	Depth=409 m	Moving to Fish Spa & Leaving the bottom

Dive Track:


144°11.30'E
144°11.35'E
144°11.40'E
144°11.45'E
144°11.50'E
144°11.55'E
144°11.60'E
144°11.65'E
144°11.70'E
TMS
ROV
S: 1/2000
KM
0.2
0
21°19.55'N
21°19.50'N
21°19.45'N
21°19.40'N
21°19.35'N
1. 08:23 着底 D= 449m
(21-19.4871N 144-11.4030E)
08:28 ﾆｽｷﾝ採水
08:31 ﾁｭｰﾌﾞﾀｰﾑ視認
2. 08:54 D= 436m ｽﾃｰﾌﾞﾎﾞﾝによる生物採集(ｶﾆ)
(21-19.4877N 144-11.4205E)
08:57 ｽﾃｰﾌﾞﾎﾞﾝによる生物採集(ｶﾆ)
3. 09:47 D= 433m ｽﾃｰﾌﾞﾎﾞﾝによる生物採集(ﾁｭｰﾌﾞﾀｰﾑ内生物)
(21-19.4875N 144-11.4227E)
4. 10:35 D= 417m BOX(大)にﾌﾞﾗﾝﾌﾞﾁﾆｰ採取
(21-19.4911N 144-11.4916E)
11:43 ｽﾃｰﾌﾞﾎﾞﾝによる生物採集(ｶﾆﾊｻﾐ)
5. 12:38 D= 408m MBARI採泥
(21-19.4998N 144-11.4889E)
13:31 ﾄﾗﾝｽﾎﾟﾝﾀﾞ電源ONに変更
6. 14:05 D= 442m ﾍﾞﾝﾄｽ視認
(21-19.4578N 144-11.5845E)
7. 16:02 D= 409m BOX(小)に硫黄採取
(21-19.5081N 144-11.4876E)
16:18 離底 D= 409m
(2023/03/06)
(KM23-05)
KM-ROV
No.212Dive
Daikoku
Seamount
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 21-19.450N 144-11.500E
CENTER 21-19.450N 144-11.500E

Dive Report: KM-ROV #213
Date: March 7, 2023
Site: NW Eifuku Seamount, Mariana Arc
On bottom: 09:02; 21˚29.2609N 144˚02.3751E, D=1714 m
Leave bottom: 15:05; 21˚29.2547N 144˚02.4565E, D=1653 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #213 was to explore hydrothermal vents, Chimneys, hydrothermall fluids, animals, iron mats and seawater will be collected from NW Eifuku SMt hydrothermal field.

Dive summary:
We landed on the pillow larva seafloor about 200 m west from the cheap sparking wine site. We found lots squad lobsters and collected shrimps and other animals by suction sampler. We also collected a rock with animals here. 10 m above the colony, we found a chimney and white smoker (cheap sparkling wine site). We collected white smoke by WHATS sampler (bottle #1). Max. temperature was 32 ˚C. 10m eats, we found a number of sulfur chimneys but no apparent CO2 droplets were observed. When we arrived at Champagne site, we found a new CO2 droplet emission, which is an excellent candidate for the next liquid CO2 sampling. At the Champagne site, we collected hydrothermal fluid (bottle #2). Max temperature was 146 ˚C.

Finally, we moved to iron mat site. We obtained the ambient seawater by Niskin water sampler and recovered the EMES. We collected the iron mat sediments by Makita's corer.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- Sample box x 2
- Makita's corer
- MBARI corer
- D-POTE

Event list:

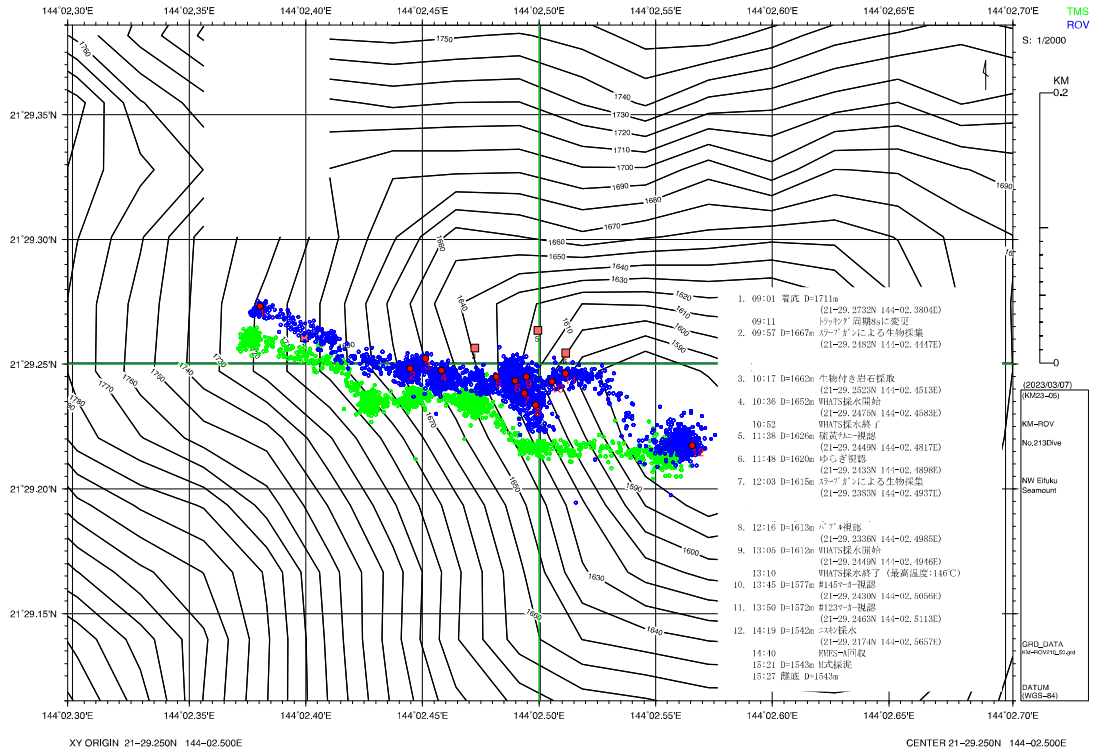
09:01	21˚29.2732N, 144˚02.3804E	Depth=1711 m	Landing
09:57	21˚29.2482N, 144˚02.4447E	Depth=1667 m	Sampling squad lobsters, other animals
10:17	21˚29.2523N, 144˚02.4513E	Depth=1662 m	Sampling a rock with animals
10:36	21˚29.2475N, 144˚02.4583E	Depth=1652 m	Sampling hydrothermal fluid in CSW site (WHATS#1)
12:03	21˚29.2383N, 144˚02.4937E	Depth=1615 m	Sampling shells on the rock

12:16 21°29.2336N, 144°02.4985E Depth=1613 m A new LCO2 droplet emission

13:05 21°29.2449N, 144°02.4946E Depth=1612 m Sampling hydrothermal fluid in Chamgpagne site (WHATS#2; failed)

14:19 21°29.2174N, 144°02.5657E Depth=1542 m Sampling seawater by Niskin sampler, recovery of EMES, collection of iron mat by Makita's corer, and leaving bottom

Dive Track:


144°02.30'E
144°02.35'E
144°02.40'E
144°02.45'E
144°02.50'E
144°02.55'E
144°02.60'E
144°02.65'E
144°02.70'E
TMS
ROV
S: 1/2000
KM
0.2
0
21°29.35'N
21°29.30'N
21°29.25'N
21°29.20'N
21°29.15'N
1. 09:01 着底 D=1711m
(21-29.2732N 144-02.3804E)
09:11 ﾄﾗｯｷﾝｸﾞ高解ssに変更
2. 09:57 D=1667m ｽﾃｰﾌﾞﾎﾞﾝによる生物採集
(21-29.2482N 144-02.4447E)
3. 10:17 D=1662m 生物付き岩石採取
(21-29.2523N 144-02.4513E)
4. 10:36 D=1652m WHATS採水開始
(21-29.2478N 144-02.4583E)
10:52 WHATS採水終了
5. 11:38 D=1626m 確認ﾋﾞｰ視認
(21-29.2449N 144-02.4817E)
6. 11:48 D=1620m ゆらぎ観測
(21-29.2433N 144-02.4898E)
7. 12:03 D=1615m ｽﾃｰﾌﾞﾎﾞﾝによる生物採集
(21-29.2383N 144-02.4937E)
8. 12:16 D=1613m ﾊﾞﾌﾞﾙ視認
(21-29.2336N 144-02.4985E)
9. 13:05 D=1612m WHATS採水開始
(21-29.2419N 144-02.4946E)
13:10 WHATS採水終了（最高温度:146℃）
10. 13:45 D=1577m #145ﾏｰｶｰ視認
(21-29.2430N 144-02.5056E)
11. 13:50 D=1572m #123ﾏｰｶｰ視認
(21-29.2462N 144-02.5113E)
12. 14:19 D=1542m ﾆｽｷﾝ採水
(21-29.2174N 144-02.5657E)
14:40 FMFS一式回収
15:21 D=1543m MC採泥
15:27 離底 D=1543m
(2023/03/07)
(KM23-05)
KM-ROV
No.213Dive
NW Eifuku
Seamount
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 21-29.250N 144-02.500E
CENTER 21-29.250N 144-02.500E

Dive Report: KM-ROV #214
Date: March 9, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: 11:07; 13˚46.9438N, 146˚00.2301E, D=2919 m
Leave bottom: 14:55; 13˚47.0734N, 146˚00.1727E, D=2949 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #214 was to check the landscape of summit area of South Chamorro SMt. Appropriate location of BMS operation was checked and animals were sampled. EMES was also deployed in the reentry cone.

Dive summary:
We landed on the serpentinite crust of the summit of South Chamorro Seamount. At the landing point, we observed mussels in the narrow gaps. At around landing point, we observed weight of 6K and lots of animals. We returned to the 6K weight marker site and collected animals. We tried to sample a rock but we failed. We also collected several tube worms and crusts. KM-ROV Marker#214-1 was deployed.

We found Kaiko Marker and HyperDophin Marker at 10 m southeast from KM-ROV Marker#214-1. Mussels and clams were collected.

We moved to the CORK and Fryer sites. We found 6K#74 Marker and animal colonies. We tested the robustness of seafloor. But the slope was steep.

Finally, we arrived at CORK site. We tested the robustness of seafloor. It seemed to be good for BMS operation. We deployed an EMES on the ROV platform and checked the pipe with white serpentinized fluid.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- EMES
- Markers x 2
- Seafloor robustness tester
- D-POTE

Event list:

11:07 13˚46.9438N, 146˚00.2301E Depth=2919 m Landing

11:16 13˚46.9419N, 146˚00.2328E Depth=2921 m Mussel colonies (BMS site 3)

11:33 13˚46.9359N, 146˚00.2277E Depth=2920 m Mussel colonies, sampling mussels & tube worms, try & error of rocks, deployment of KM-ROV Marker#214-1 (BMS site 2)

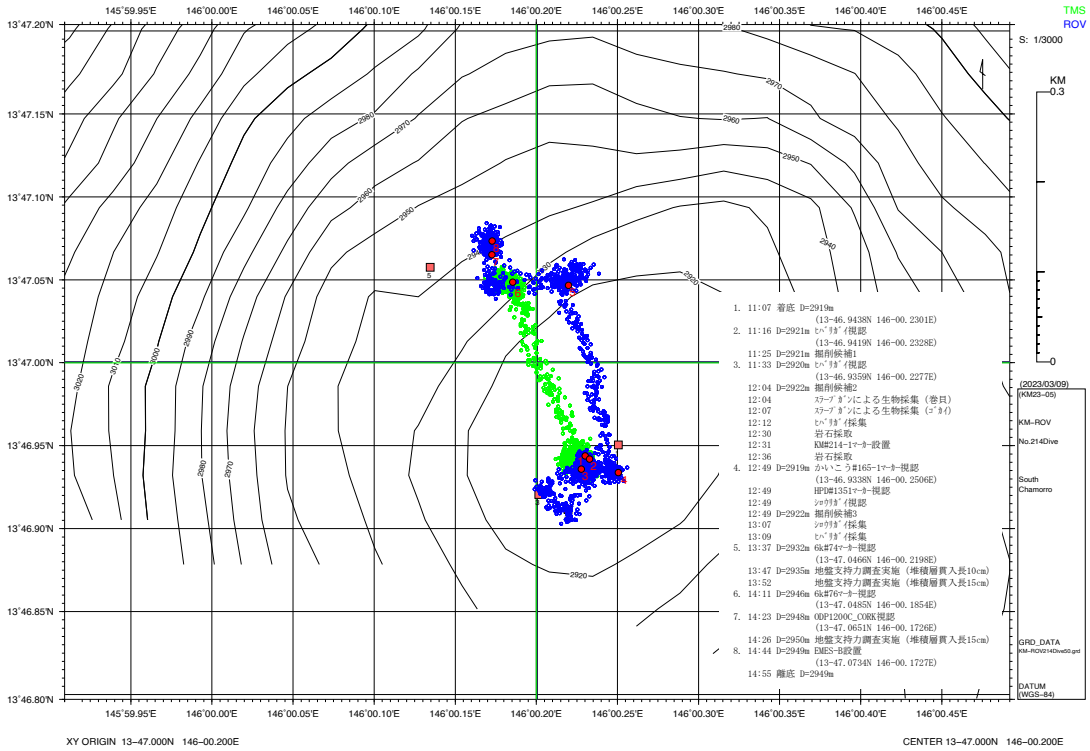
12:49 13˚46.9338N, 146˚00.2506E Depth=2919 m Mussel and clam colonies, sampling mussels & clams, Kaiko Marker#165-1, HPD Marker#1351 (BMS site 3)

13:37 13˚47.0466N, 146˚00.2198E Depth=2932 m 6K Marker #74 (mussel colony)

14:11 13˚47.0485N, 146˚00.1854E Depth=2946 m 6K Marker #76 (bore hole of ODP#195)

14:44 13˚47.0734N 146˚00.1727E Depth=2949 m Re-entry cone of ODP 195 Hole 1200C, seafloor check, deployment of EMES, leaving bottom

Dive Track:

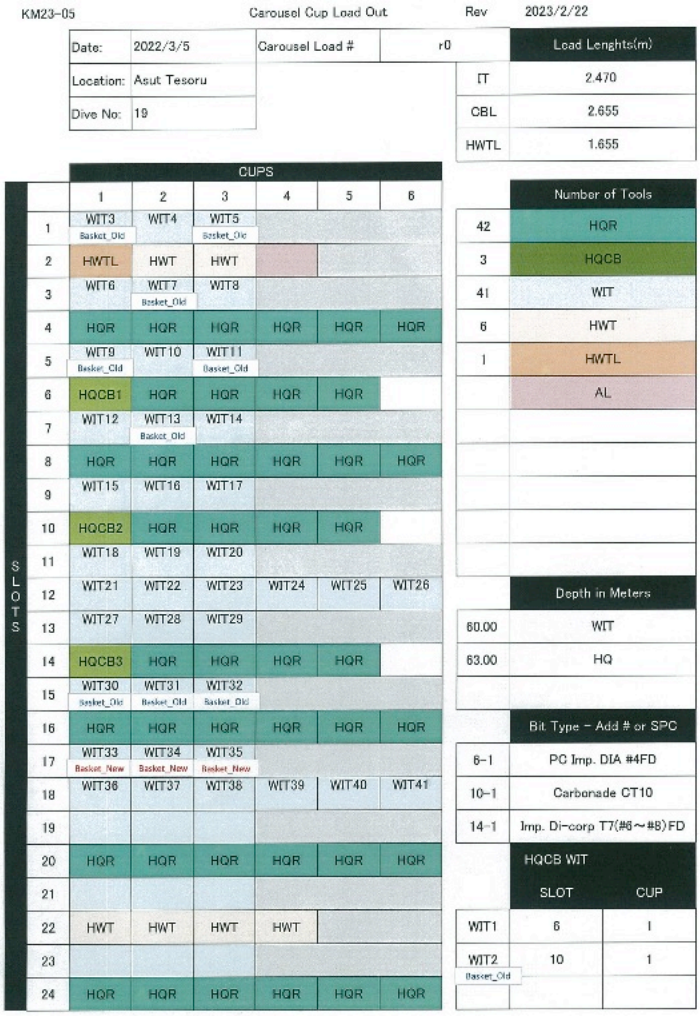

TMS
ROV
S: 1/3000
KM
0.3
0
145°59.95'E
146°00.00'E
146°00.05'E
146°00.10'E
146°00.15'E
146°00.20'E
146°00.25'E
146°00.30'E
146°00.35'E
146°00.40'E
146°00.45'E
13°47.20'N
13°47.15'N
13°47.10'N
13°47.05'N
13°47.00'N
13°46.95'N
13°46.90'N
13°46.85'N
13°46.80'N
1. 11:07 着底 D=2919m
(13-46.9438N 146-00.2301E)
2. 11:16 D=2921m ﾋﾞﾃﾞｵ視認
(13-46.9419N 146-00.2328E)
11:25 D=2921m 掘削候補1
3. 11:33 D=2920m ﾋﾞﾃﾞｵ視認
(13-46.9359N 146-00.2277E)
12:04 D=2922m 掘削候補2
12:04 ｽﾃｰﾌﾞ ｶﾞﾝによる生物採集（巻貝）
12:07 ｽﾃｰﾌﾞ ｶﾞﾝによる生物採集（ｺﾞｶｲ）
12:12 ﾋﾞﾃﾞｵ採集
12:30 岩石採取
12:31 KM#214-1ﾏｰｶｰ設置
12:36 岩石採取
4. 12:49 D=2919m かいこう#165-1ﾏｰｶｰ視認
(13-46.9338N 146-00.2506E)
12:49 HPD#1351ﾏｰｶｰ視認
12:49 ｼｮｳｼｶﾞｲ視認
12:49 D=2922m 掘削候補3
13:07 ｼｮｳｼｶﾞｲ採集
13:09 ﾋﾞﾃﾞｵ採集
5. 13:37 D=2932m 6k#74ﾏｰｶｰ視認
(13-47.0466N 146-00.2198E)
13:47 D=2935m 地盤支持力調査実施（堆積層貫入長10cm）
13:52 地盤支持力調査実施（堆積層貫入長15cm）
6. 14:11 D=2946m 6k#76ﾏｰｶｰ視認
(13-47.0485N 146-00.1854E)
7. 14:23 D=2948m ODP1200C_CORK視認
(13-47.0651N 146-00.1726E)
14:26 D=2950m 地盤支持力調査実施（堆積層貫入長15cm）
8. 14:44 D=2949m EMES-B設置
(13-47.0734N 146-00.1727E)
14:55 離底 D=2949m
(2023/03/09)
(KM23-05)
KM-ROV
No.214Dive
South
Chamorro
GRD_DATA
KM-ROV214Dive50.grd
DATUM
(WGS-84)
XY ORIGIN 13-47.000N 146-00.200E
CENTER 13-47.000N 146-00.200E

Dive Report: BMS #19
Date: March 10-11, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: March 10, 10:42; 13˚46.9316N, 146˚00.2491E, D=2910 m
Leave bottom: March 11, 07:16; 13˚46.9363N, 146˚00.2486E, D=2910 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *BMS #19* was to obtain the serpentinite mud and rock cores at the SUMMIT site of the South Chamorro Seamount.

Dive summary:
We landed near the animal (mussel & clam) community (Kaiko's and HyperDolphin's markers) and started to drill and core at Hole A. After about 5 m drilling and coring at Hole A, we moved to 10 m west from Hole A and started to drill and core at Hole B down to 5 m blsf. Next, we moved to 5 m south from Hole A and started to drill and core at Hole C down to 20 m blsf. Finally, we moved to 5 m north from Hole A and started to drill and core at Hole D down to 12.5 m blsf, and then, we left bottom.

Payloads:



KM23-05 Carousel Cup Load Out Rev 2023/2/22

Date:	2022/3/5
Location:	Asut Tesoru
Dive No:	19
Carousel Load #	r0

Load Lenghts(m)	
IT	2.470
CBL	2.655
HWTL	1.655

CUPS

SLOTS	1	2	3	4	5	6
1	WIT3 Basket_Old	WIT4	WIT5 Basket_Old			
2	HWTL	HWT	HWT			
3	WIT6	WIT7 Basket_Old	WIT8			
4	HQR	HQR	HQR	HQR	HQR	HQR
5	WIT9 Basket_Old	WIT10	WIT11 Basket_Old			
6	HQCB1	HQR	HQR	HQR	HQR	
7	WIT12	WIT13 Basket_Old	WIT14			
8	HQR	HQR	HQR	HQR	HQR	HQR
9	WIT15	WIT16	WIT17			
10	HQCB2	HQR	HQR	HQR	HQR	
11	WIT18	WIT19	WIT20			
12	WIT21	WIT22	WIT23	WIT24	WIT25	WIT26
13	WIT27	WIT28	WIT29			
14	HQCB3	HQR	HQR	HQR	HQR	
15	WIT30 Basket_Old	WIT31 Basket_Old	WIT32 Basket_Old			
16	HQR	HQR	HQR	HQR	HQR	HQR
17	WIT33 Basket_New	WIT34 Basket_New	WIT35 Basket_New			
18	WIT36	WIT37	WIT38	WIT39	WIT40	WIT41
19						
20	HQR	HQR	HQR	HQR	HQR	HQR
21						
22	HWT	HWT	HWT	HWT		
23						
24	HQR	HQR	HQR	HQR	HQR	HQR

Number of Tools	
42	HQR
3	HQCB
41	WIT
6	HWT
1	HWTL
	AL

Depth in Meters	
60.00	WIT
63.00	HQ

Bit Type - Add # or SPC	
6-1	PC Imp. DIA #4FD
10-1	Carbonade CT10
14-1	Imp. Di-corp T7(#6～#8)FD

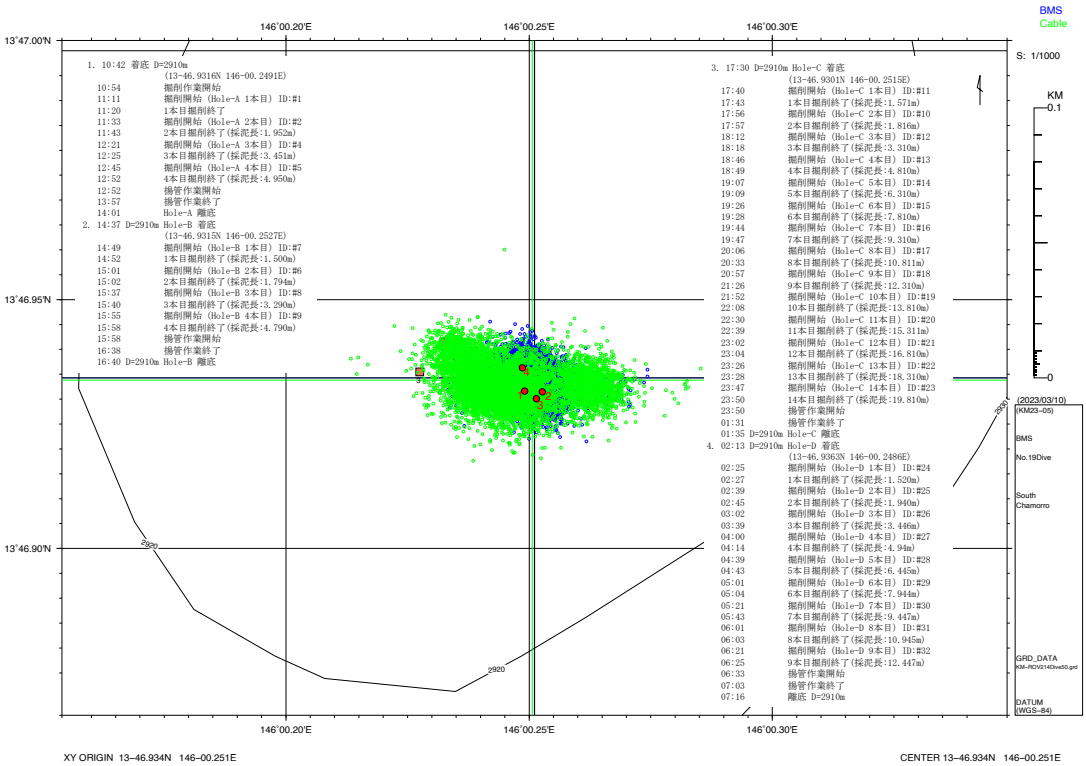
HQCB WIT	SLOT	CUP
WIT1	6	1
WIT2 Basket_Old	10	1

Event list:

March 10 10:42	13°46.9316N, 146°00.2491E	Depth=2910 m	Landing at Hole A
March 10 11:11	13°46.9316N, 146°00.2491E	Depth=2910 m	Start drilling & coring (Hole A)
March 10 13:57	13°46.9316N, 146°00.2491E	Depth=2910 m	Finish drilling & coring (Hole A)
March 10 14:37	13°46.9315N, 146°00.2527E	Depth=2910 m	Landing at Hole B
March 10 14:49	13°46.9315N, 146°00.2527E	Depth=2910 m	Start drilling & coring (Hole B)
March 10 15:58	13°46.9315N, 146°00.2527E	Depth=2910 m	Finish drilling & coring (Hole B)
March 10 17:30	13°46.9301N, 146°00.2515E	Depth=2910 m	Landing at Hole C
March 10 17:40	13°46.9301N, 146°00.2515E	Depth=2910 m	Start drilling & coring (Hole C)
March 10 23:50	13°46.9301N, 146°00.2515E	Depth=2910 m	Finish drilling & coring (Hole C)
March 11 02:13	13°46.9363N, 146°00.2486E	Depth=2910 m	Landing at Hole D
March 11 02:25	13°46.9363N, 146°00.2486E	Depth=2910 m	Start drilling & coring (Hole D)
March 11 06:25	13°46.9363N, 146°00.2486E	Depth=2910 m	Finish drilling & coring (Hole D)

March 11 07:16 13˚46.9363N, 146˚00.2486E Depth=2910 m Leaving bottom

Dive Track:


BMS
Cable
146°00.20'E
146°00.25'E
146°00.30'E
13°47.00'N
13°46.95'N
13°46.90'N
1. 10:42 着底 D=2910m
(13-46.9316N 146-00.2491E)
10:54 掘削作業開始
11:11 掘削開始 (Hole-A 1本目) ID:#1
11:20 1本目掘削終了
11:33 掘削開始 (Hole-A 2本目) ID:#2
11:43 2本目掘削終了(採泥長:1.952m)
12:21 掘削開始 (Hole-A 3本目) ID:#4
12:25 3本目掘削終了(採泥長:3.451m)
12:45 掘削開始 (Hole-A 4本目) ID:#5
12:52 4本目掘削終了(採泥長:4.950m)
12:52 揚管作業開始
13:57 揚管作業終了
14:01 Hole-A 離底
2. 14:37 D=2910m Hole-B 着底
(13-46.9315N 146-00.2527E)
14:49 掘削開始 (Hole-B 1本目) ID:#7
14:52 1本目掘削終了(採泥長:1.500m)
15:01 掘削開始 (Hole-B 2本目) ID:#6
15:02 2本目掘削終了(採泥長:1.794m)
15:37 掘削開始 (Hole-B 3本目) ID:#8
15:40 3本目掘削終了(採泥長:3.290m)
15:55 掘削開始 (Hole-B 4本目) ID:#9
15:58 4本目掘削終了(採泥長:4.790m)
15:58 揚管作業開始
16:38 揚管作業終了
16:40 D=2910m Hole-B 離底
3. 17:30 D=2910m Hole-C 着底
(13-46.9301N 146-00.2515E)
17:40 掘削開始 (Hole-C 1本目) ID:#11
17:43 1本目掘削終了(採泥長:1.571m)
17:56 掘削開始 (Hole-C 2本目) ID:#10
17:57 2本目掘削終了(採泥長:1.816m)
18:12 掘削開始 (Hole-C 3本目) ID:#12
18:18 3本目掘削終了(採泥長:3.310m)
18:46 掘削開始 (Hole-C 4本目) ID:#13
18:49 4本目掘削終了(採泥長:4.810m)
19:07 掘削開始 (Hole-C 5本目) ID:#14
19:09 5本目掘削終了(採泥長:6.310m)
19:26 掘削開始 (Hole-C 6本目) ID:#15
19:28 6本目掘削終了(採泥長:7.810m)
19:44 掘削開始 (Hole-C 7本目) ID:#16
19:47 7本目掘削終了(採泥長:9.310m)
20:06 掘削開始 (Hole-C 8本目) ID:#17
20:33 8本目掘削終了(採泥長:10.811m)
20:57 掘削開始 (Hole-C 9本目) ID:#18
21:26 9本目掘削終了(採泥長:12.310m)
21:52 掘削開始 (Hole-C 10本目) ID:#19
22:08 10本目掘削終了(採泥長:13.810m)
22:30 掘削開始 (Hole-C 11本目) ID:#20
22:39 11本目掘削終了(採泥長:15.311m)
23:02 掘削開始 (Hole-C 12本目) ID:#21
23:04 12本目掘削終了(採泥長:16.810m)
23:26 掘削開始 (Hole-C 13本目) ID:#22
23:28 13本目掘削終了(採泥長:18.310m)
23:47 掘削開始 (Hole-C 14本目) ID:#23
23:50 14本目掘削終了(採泥長:19.810m)
23:50 揚管作業開始
01:31 揚管作業終了
01:35 D=2910m Hole-C 離底
4. 02:13 D=2910m Hole-D 着底
(13-46.9363N 146-00.2486E)
02:25 掘削開始 (Hole-D 1本目) ID:#24
02:27 1本目掘削終了(採泥長:1.520m)
02:39 掘削開始 (Hole-D 2本目) ID:#25
02:45 2本目掘削終了(採泥長:1.940m)
03:02 掘削開始 (Hole-D 3本目) ID:#26
03:39 3本目掘削終了(採泥長:3.446m)
04:00 掘削開始 (Hole-D 4本目) ID:#27
04:14 4本目掘削終了(採泥長:4.94m)
04:39 掘削開始 (Hole-D 5本目) ID:#28
04:43 5本目掘削終了(採泥長:6.445m)
05:01 掘削開始 (Hole-D 6本目) ID:#29
05:04 6本目掘削終了(採泥長:7.944m)
05:21 掘削開始 (Hole-D 7本目) ID:#30
05:43 7本目掘削終了(採泥長:9.447m)
06:01 掘削開始 (Hole-D 8本目) ID:#31
06:03 8本目掘削終了(採泥長:10.945m)
06:21 掘削開始 (Hole-D 9本目) ID:#32
06:25 9本目掘削終了(採泥長:12.447m)
06:33 揚管作業開始
07:03 揚管作業終了
07:16 離底 D=2910m
2920
2920
2920
S: 1/1000
KM
0.1
0
(2023/03/10)
(KM23-05)
BMS
No.19Dive
South
Chamorro
GRD_DATA
KM-ROV214Dive50.grd
DATUM
(WGS-84)
XY ORIGIN 13-46.934N 146-00.251E
CENTER 13-46.934N 146-00.251E

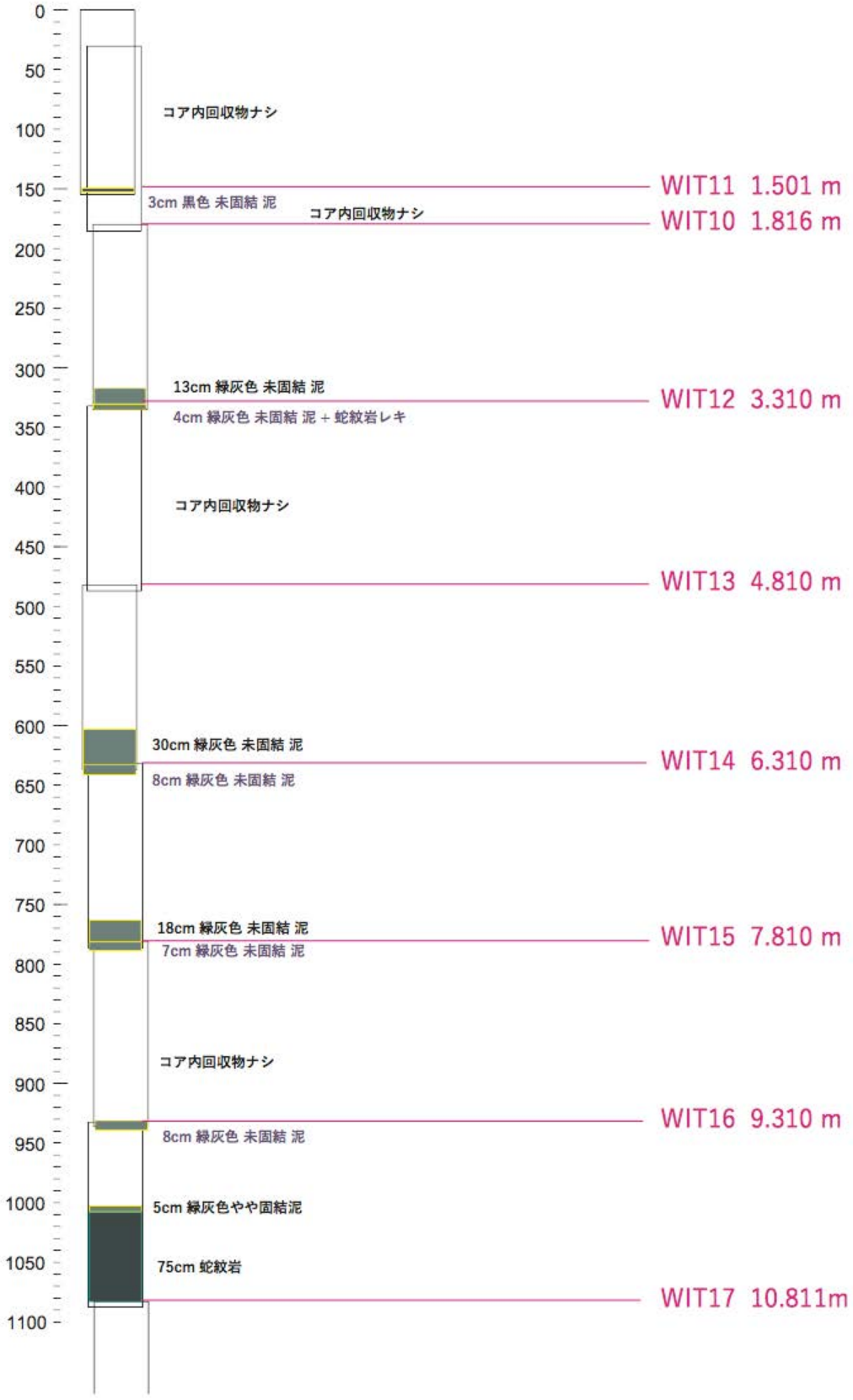
Core recovery:

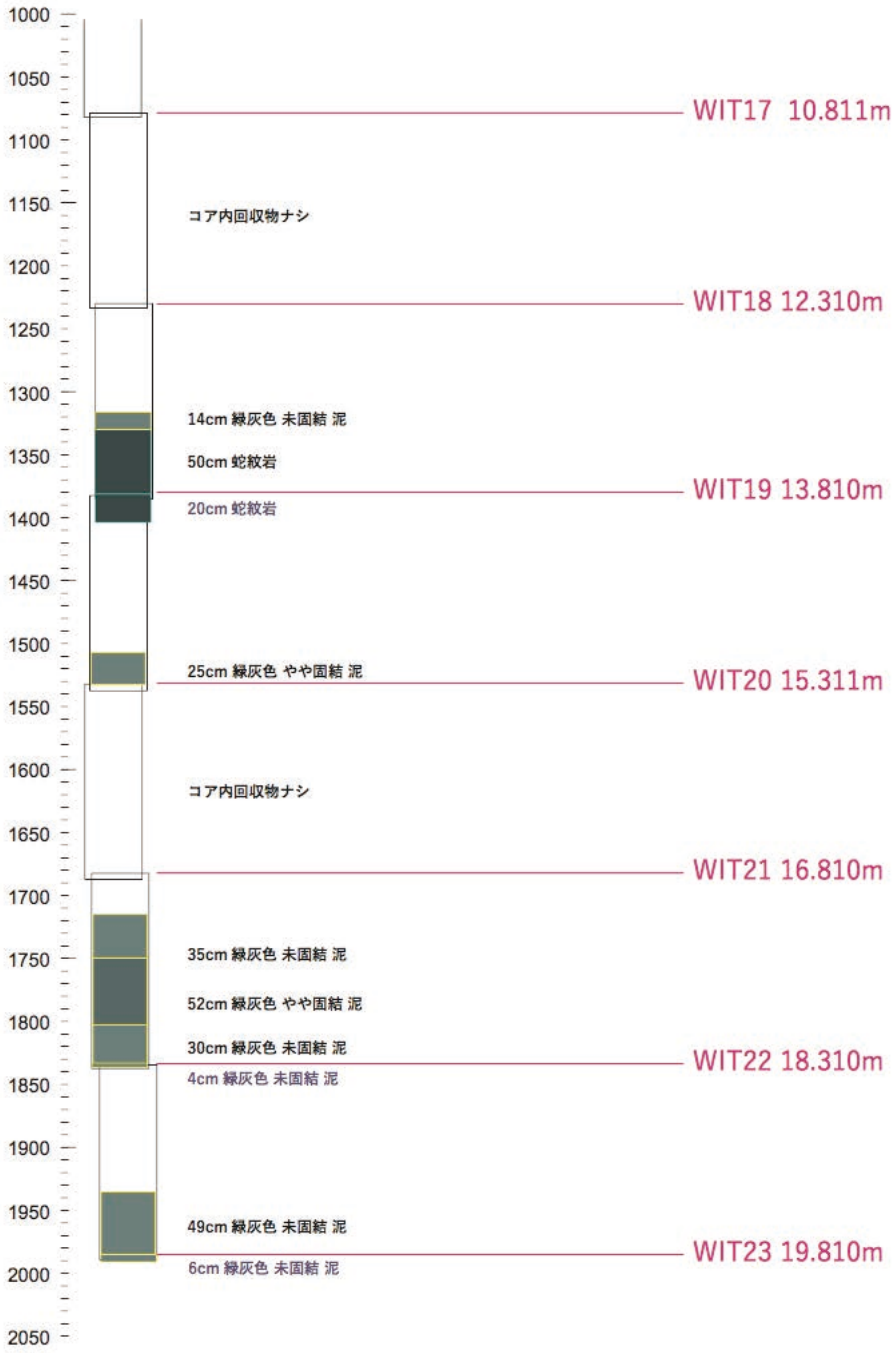
Hole A

Hole B

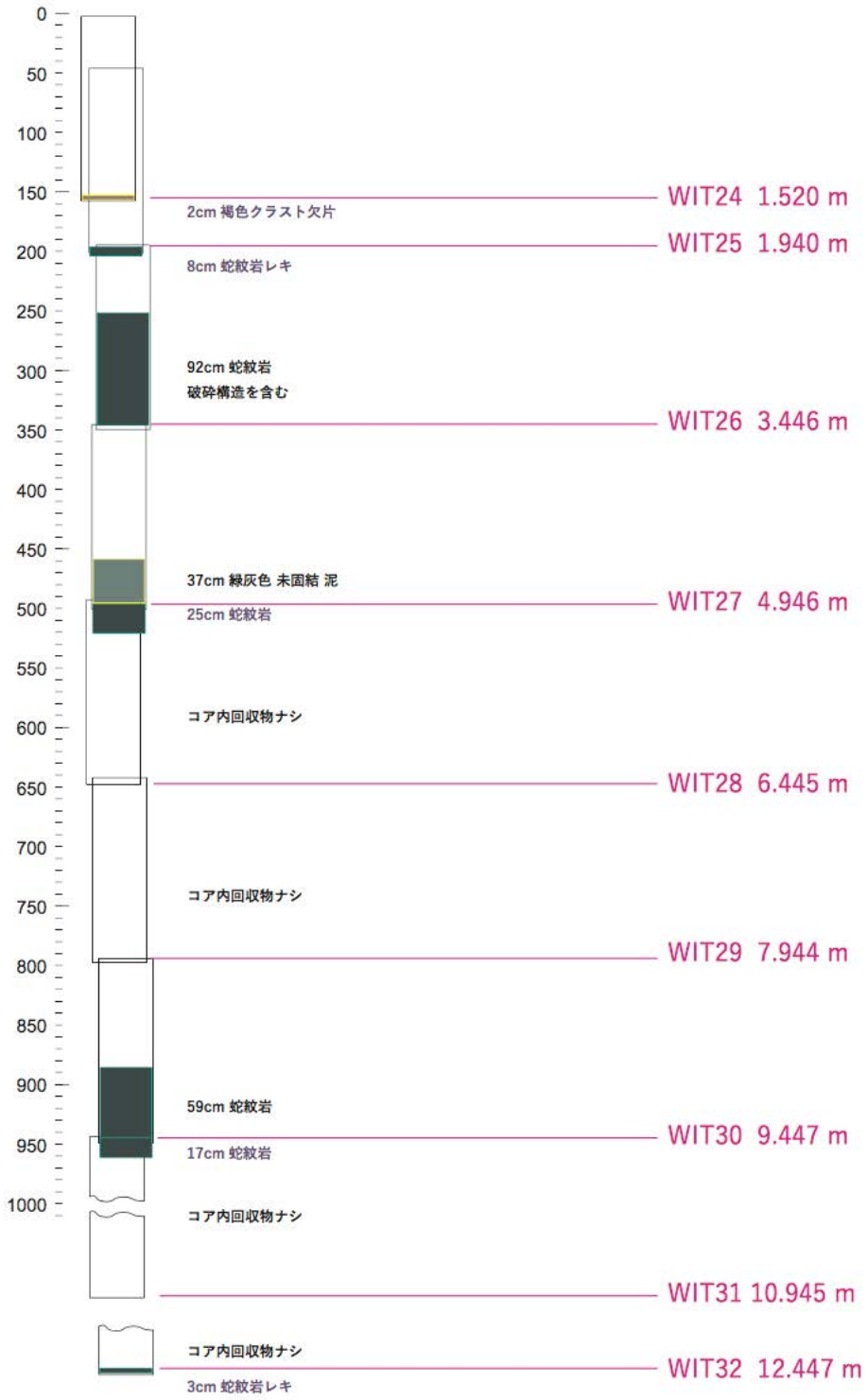

0
50
100
150
200
250
300
350
400
450
500
9cm 黒色 未固結 泥
5cm 黒色 未固結 泥
コア内回収物ナシ
WIT07 1.500 m
WIT06 1.794 m
コア内回収物ナシ
WIT08 3.290 m
コア内回収物ナシ
WIT09 4.790 m
3cm 緑灰色 未固結 泥

Hole C


0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
コア内回収物ナシ
3cm 黒色 未固結 泥
コア内回収物ナシ
13cm 緑灰色 未固結 泥
4cm 緑灰色 未固結 泥＋蛇紋岩レキ
コア内回収物ナシ
30cm 緑灰色 未固結 泥
8cm 緑灰色 未固結 泥
18cm 緑灰色 未固結 泥
7cm 緑灰色 未固結 泥
コア内回収物ナシ
8cm 緑灰色 未固結 泥
5cm 緑灰色やや固結泥
75cm 蛇紋岩
WIT11 1.501 m
WIT10 1.816 m
WIT12 3.310 m
WIT13 4.810 m
WIT14 6.310 m
WIT15 7.810 m
WIT16 9.310 m
WIT17 10.811m


1000
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
WIT17 10.811m
コア内回収物ナシ
WIT18 12.310m
14cm 緑灰色 未固結 泥
50cm 蛇紋岩
WIT19 13.810m
20cm 蛇紋岩
25cm 緑灰色 やや固結 泥
WIT20 15.311m
コア内回収物ナシ
WIT21 16.810m
35cm 緑灰色 未固結 泥
52cm 緑灰色 やや固結 泥
30cm 緑灰色 未固結 泥
WIT22 18.310m
4cm 緑灰色 未固結 泥
49cm 緑灰色 未固結 泥
WIT23 19.810m
6cm 緑灰色 未固結 泥

Hole D


0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
2cm 褐色クラスト欠片
8cm 蛇紋岩レキ
92cm 蛇紋岩
破砕構造を含む
37cm 緑灰色 未固結 泥
25cm 蛇紋岩
コア内回収物ナシ
コア内回収物ナシ
59cm 蛇紋岩
17cm 蛇紋岩
コア内回収物ナシ
コア内回収物ナシ
3cm 蛇紋岩レキ
WIT24 1.520 m
WIT25 1.940 m
WIT26 3.446 m
WIT27 4.946 m
WIT28 6.445 m
WIT29 7.944 m
WIT30 9.447 m
WIT31 10.945 m
WIT32 12.447 m

Dive Report: KM-ROV #215
Date: March 11, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: 11:44 D=2957m (13-47.0741N 146-00.1390E)
Leave bottom: 15:42 D=2922m (13-46.9359N 146-00.2458E)
Observer: Chong CHEN (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #215 was to check the drilling sites drilled during BMS#19, as well as to measure the electric potential of the IODP CORK on the South Chamorro Seamount, collect water, animal, and rock samples.

Dive summary:
We landed about 50 m west of the CORK at the re-entry cone of ODP 195 Hole 1200C (11:44). Once the vehicle was stable, we moved towards the CORK and arrived on 11:53. We hovered about 3 m above the CORK pipe and shook the ROV's heading from left to right in order to fully exchange the water inside the Niskin bottle, and then successfully took reference seawater sample using the Niskin (12:00). We proceeded to relocate the EMES device deployed on the CORK platform during *KM-ROV* Dive #214 to the nearby seafloor (12:18) because it was a hinderance to the D-POTE measurement. We placed the electrode of D-POTE inside the tip of the CORK pipe, and measured the electric potential (12:43-12:48). We also conducted D-POTE measurements on the CORK platform (12:52-12:55), and then attempted to measure the rusty base of the re-entry cone but the program shutdown for some reason (13:02). Finally the software restarted at 13:15 and measurement was taken. However, there appears to have been a problem with the connection and the measurements were likely unreliable.

After these activities at CORK, we left CORK and moved to Fryer Site where we rapidly found the Shinkai6500 marker (13:30). We landed on the brucite rock with animals, and sampled 1 x *Colossendeis* sea spider, 2 x vesicomyid clam, some *Desbruyeresia chamorrensis* snails, *Phyllochaetopterus* worms, and some *Bathyacmaea* mussels (13:40-14:00). With these sampling complete, we left Fryer Site (14:02) and headed to Summit Site where drilling was conducted at four points during BMS #19 the previous day.

We located the Summit Site *Hyper-Dolphin* and *KAIKO* markers and immediately saw some squarish markings on the nearby seafloor – landing marks of the BMS (14:30). Going towards the markings, we found a large volume of BMS drill cuttings filling what used to be small, sharply cut 'valleys' (14:37). Though we could not visually confirm drill holes, these may have been filled by the cuttings. A number of *Munidopsis* squat lobsters were found on the cuttings,

and we sampled 4 specimens using suction sampler (14:42). After that, we found a few live clusters of *Bathymodiolus* mussels and vesicomyid clams around the markers, and proceeded to sample 2 x vesicomyid clams and ~5 x *Bathymodiolus* mussels using the suction sampler (15:00). Finally, we used the manipulator arm to squash some *Bathymodiolus* mussels and placed them in RNAlater solution inside the RNA fixation box (small) (15:35). After that, as we were already slightly over the scheduled time to leave the bottom, we immediate left bottom at 15:42.

Payloads:

- Suction sampler with single chamber
- RNA fixation box (small)
- Sample box (large) x 1
- Sample box (small) x 1
- WHATS-III
- EMES
- Markers x 2
- D-POTE with pistol-type electrode
- Niskin (5L) x 1
- MAKITA-type pushcore x 1
- MBARI-type pushcore x 1

Event list:

12:00 Niskin Sampled D=2943m (13-47.0800N 146-00.1632E)

12:18 Moved EMES D=2951m (13-47.0800N 146-00.1632E)

12:44 Measuring D-Pote on tip of CORK D=2946m (13-47.0800N 146-00.1632E)

12:52 Measuring D-Pote on CORK platform D=2948m (13-47.0800N 146-00.1632E)

13:02 Measuring D-Pote on base of CORK D=2951m (13-47.0800N 146-00.1632E)

13:58 Suction sampling of animals at Fryer Site D=2935m (13-47.0504N 146-00.2181E)

14:07 Visual of Shinkai6500 ballasts D=2925m (13-47.0303N 146-00.2236E)

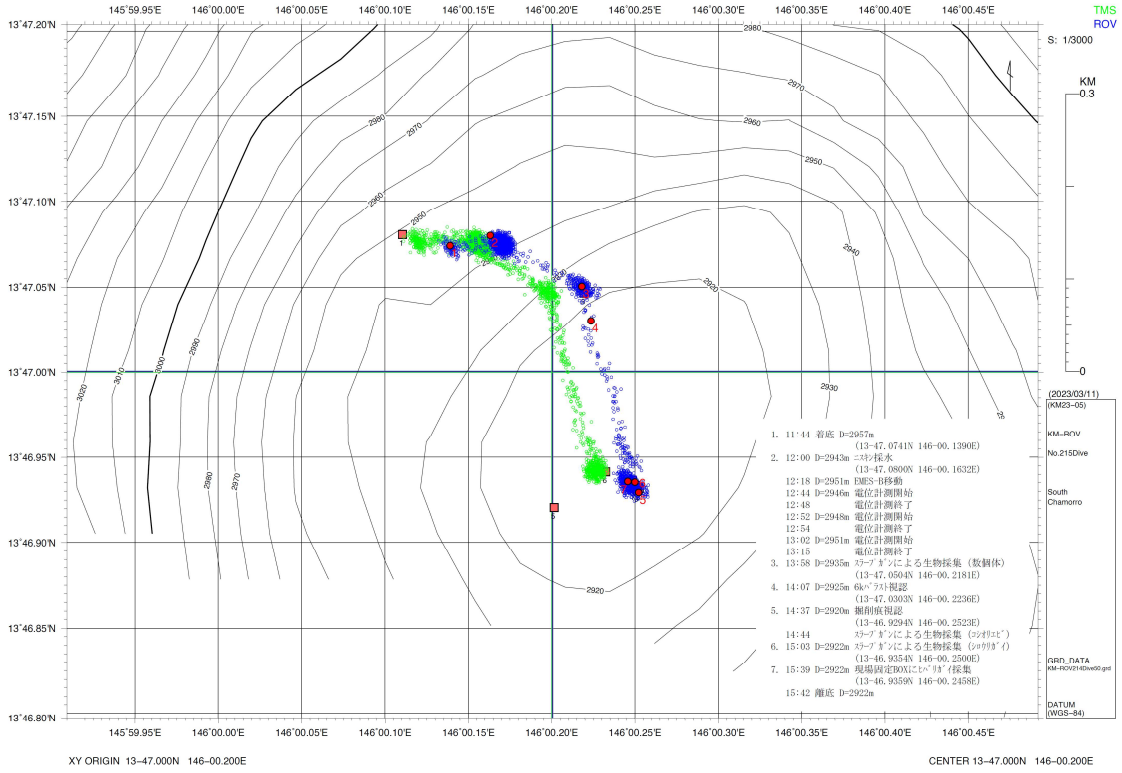
14:37 Finding BMS drill cuttings D=2920m (13-46.9294N 146-00.2523E)

14:44 Suction sampling of squat lobsters D=2920m (13-46.9294N 146-00.2523E)

15:03 Suction sampling of bivalves D=2922m (13-46.9354N 146-00.2500E)

15:39 Sampling *Bathymodiolus* into RNA fixation box D=2922m (13-46.9359N 146-00.2458E)

Dive Track:


TMS
ROV
S: 1/3000
KM
0.3
0
(2023/03/11)
(KM23-05)
KM-ROV
No.215Dive
South
Chamorro
GRD_DATA
KM-ROV21-Dive00.grd
DATUM
(WGS-84)
1. 11:44 着底 D=2957m
(13-47.0741N 146-00.1390E)
2. 12:00 D=2943m ﾆｽﾝ採水
(13-47.0800N 146-00.1632E)
12:18 D=2951m EMES-B移動
12:44 D=2946m 電位計測開始
12:48 電位計測終了
12:52 D=2948m 電位計測開始
12:54 電位計測終了
13:02 D=2951m 電位計測開始
13:16 電位計測終了
3. 13:58 D=2935m ｽﾗｰﾌﾟｶﾞﾝによる生物採集（数個体）
(13-47.0504N 146-00.2181E)
4. 14:07 D=2925m 6kﾍﾞｰｽﾄ視認
(13-47.0303N 146-00.2236E)
5. 14:37 D=2920m 掘削底視認
(13-46.9294N 146-00.2523E)
14:44 ｽﾗｰﾌﾟｶﾞﾝによる生物採集（ｺﾝｵﾘｽﾋﾞ）
6. 15:03 D=2922m ｽﾗｰﾌﾟｶﾞﾝによる生物採集（ｼｮｳｶﾘｶﾞｲ）
(13-46.9354N 146-00.2500E)
7. 15:39 D=2922m 現場固定BOXにﾊﾞｲﾘｶﾞｲ採集
(13-46.9359N 146-00.2438E)
15:42 離底 D=2922m
XY ORIGIN 13-47.000N 146-00.200E
CENTER 13-47.000N 146-00.200E

Dive Report: KM-ROV #216
Date: March 12, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: 09:30; 13˚47.0774N, 146˚00.1229E, D=2958 m
Leave bottom: 15:00; 13˚47.0774N, 146˚00.1229E, D=2946 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #216 was to obtain the serpentinite fluid that flowed from the CORK of ODP#195 1200C.

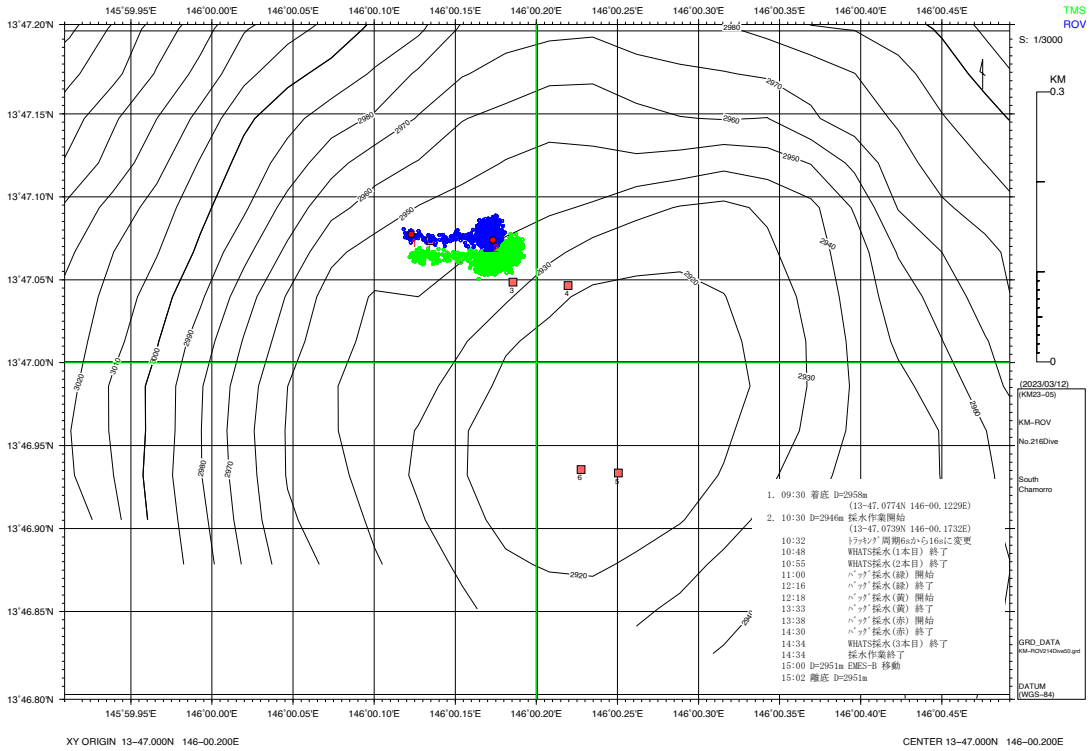
Dive summary:
We landed near the CORK and tried to put the WHATS sampler inlet to the effluent pipe. We started to collect serpentinite fluid by WHATS#1&#2 and the ORP fluid was measured by D-POTE. Then we collected 60 L of fluid by Bag sampler. EMES was moved just beneath the CORK. Then, we left bottom.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- Bag sampler
- D-POTE

Event list:

09:30	13˚47.0774N, 146˚00.1229E	Depth=2958 m	Landing
10:30	13˚47.0739N, 146˚00.1732E	Depth=2946 m	Start fluid sampling by WHATS & Bag
15:00	13˚47.0739N, 146˚00.1732E	Depth=2946 m	Finish fluid sampling by WHATS & Bag, move the EMES, leaving bottom

Dive Track:


TMS
ROV
S: 1/3000
KM
0.3
0
(2023/03/12)
(KM23-05)
KM-ROV
No.216Dive
South
Chamorro
GRD_DATA
KM-ROV214Dive50.grd
DATUM
(WGS-84)
1. 09:30 着底 D=2958m
(13-47.0774N 146-00.1229E)
2. 10:30 D=2946m 採水作業開始
(13-47.0739N 146-00.1732E)
10:32 ﾄﾗｯｷﾝｸﾞ周期6sから16sに変更
10:48 WHATS採水(1本目) 終了
10:55 WHATS採水(2本目) 終了
11:00 ﾍﾞｯﾄﾞ採水(緑) 開始
12:16 ﾍﾞｯﾄﾞ採水(緑) 終了
12:18 ﾍﾞｯﾄﾞ採水(黄) 開始
13:33 ﾍﾞｯﾄﾞ採水(黄) 終了
13:38 ﾍﾞｯﾄﾞ採水(赤) 開始
14:30 ﾍﾞｯﾄﾞ採水(赤) 終了
14:34 WHATS採水(3本目) 終了
14:34 採水作業終了
15:00 D=2951m EMES-B 移動
15:02 離底 D=2951m
XY ORIGIN 13-47.000N 146-00.200E
CENTER 13-47.000N 146-00.200E

Dive Report: BMS #20
Date: March 13, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: March 13, 09:54; 13˚47.0688N, 146˚00.1762E, D=2939 m
Leave bottom: March 13, 15:47; 13˚47.0688N, 146˚00.1762E, D=2939 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *BMS #20* was to obtain the serpentinite mud and rock cores at the ODP site of the South Chamorro Seamount.

Dive summary:
We landed at 10 m south of the ODP 1200C re-entry cone and started to drill and core at Hole A. When the drill bit reached to 11 mbsf, the BMS cable winch had problems. Then, we left bottom.

Payloads:

KM23-05 Carousel Cup Load Out Rev 2023/2/22

Date:	2022/3/5
Location:	Asut Tesoru
Dive No:	19
Carousel Load #	r0

Load Lenghts(m)	
IT	2.470
CBL	2.655
HWTL	1.655

SLOTS	CUPS 1	2	3	4	5	6
1	WIT3 Basket_Old	WIT4	WIT5 Basket_Old			
2	HWTL	HWT	HWT			
3	WIT6	WIT7 Basket_Old	WIT8			
4	HQR	HQR	HQR	HQR	HQR	HQR
5	WIT9 Basket_Old	WIT10	WIT11 Basket_Old			
6	HQCB1	HQR	HQR	HQR	HQR	
7	WIT12	WIT13 Basket_Old	WIT14			
8	HQR	HQR	HQR	HQR	HQR	HQR
9	WIT15	WIT16	WIT17			
10	HQCB2	HQR	HQR	HQR	HQR	
11	WIT18	WIT19	WIT20			
12	WIT21	WIT22	WIT23	WIT24	WIT25	WIT26
13	WIT27	WIT28	WIT29			
14	HQCB3	HQR	HQR	HQR	HQR	
15	WIT30 Basket_Old	WIT31 Basket_Old	WIT32 Basket_Old			
16	HQR	HQR	HQR	HQR	HQR	HQR
17	WIT33 Basket_New	WIT34 Basket_New	WIT35 Basket_New			
18	WIT36	WIT37	WIT38	WIT39	WIT40	WIT41
19						
20	HQR	HQR	HQR	HQR	HQR	HQR
21						
22	HWT	HWT	HWT	HWT		
23						
24	HQR	HQR	HQR	HQR	HQR	HQR

Number of Tools	
42	HQR
3	HQCB
41	WIT
6	HWT
1	HWTL
	AL

Depth in Meters	
60.00	WIT
63.00	HQ

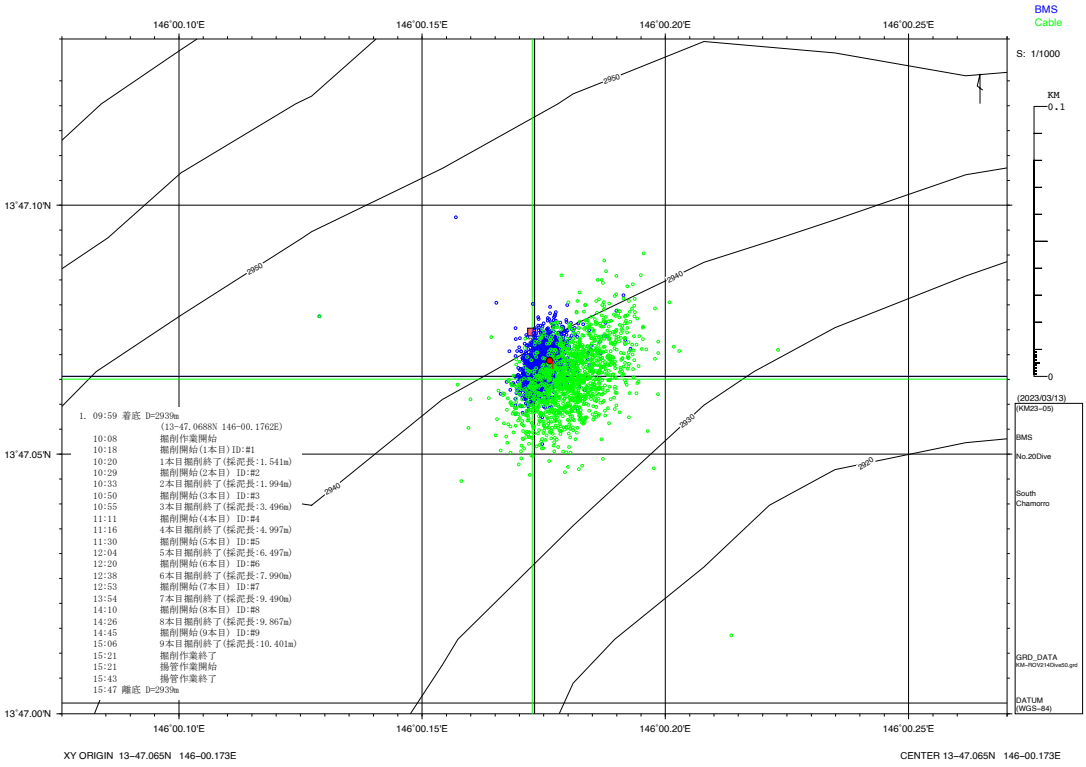
Bit Type - Add # or SPC	
6-1	PC Imp. DIA #4FD
10-1	Carbonade CT10
14-1	Imp. Di-corp T7(#6～#8)FD

HQCB WIT	SLOT	CUP
WIT1	6	1
WIT2 Basket_Old	10	1

Event list:

March 13 09:54	13˚47.0688N, 146˚00.1762E	Depth=2939 m	Landing at Hole A
March 13 10:18	13˚47.0688N, 146˚00.1762E	Depth=2939 m	Start drilling & coring (Hole A)
March 13 15:21	13˚47.0688N, 146˚00.1762E	Depth=2939 m	Finish drilling & coring (Hole A)
March 13 15:47	13˚47.0688N, 146˚00.1762E	Depth=2939 m	Leaving bottom

Dive Track:


BMS
Cable
S: 1/1000
KM
0.1
0
146°00.10'E
146°00.15'E
146°00.20'E
146°00.25'E
13°47.10'N
13°47.05'N
13°47.00'N
2950
2940
2930
2920
1. 09:59 着底 D=2939m
(13-47.0688N 146-00.1762E)
10:08 掘削作業開始
10:18 掘削開始(1本目) ID:#1
10:20 1本目掘削終了(採泥長:1.541m)
10:29 掘削開始(2本目) ID:#2
10:33 2本目掘削終了(採泥長:1.994m)
10:50 掘削開始(3本目) ID:#3
10:55 3本目掘削終了(採泥長:3.496m)
11:11 掘削開始(4本目) ID:#4
11:16 4本目掘削終了(採泥長:4.997m)
11:30 掘削開始(5本目) ID:#5
12:04 5本目掘削終了(採泥長:6.497m)
12:20 掘削開始(6本目) ID:#6
12:38 6本目掘削終了(採泥長:7.990m)
12:53 掘削開始(7本目) ID:#7
13:54 7本目掘削終了(採泥長:9.490m)
14:10 掘削開始(8本目) ID:#8
14:26 8本目掘削終了(採泥長:9.867m)
14:45 掘削開始(9本目) ID:#9
15:06 9本目掘削終了(採泥長:10.401m)
15:21 掘削作業終了
15:21 揚管作業開始
15:43 揚管作業終了
15:47 離底 D=2939m
(2023/03/13)
(KM23-05)
BMS
No.20Dive
South
Chamorro
GRD_DATA
KM-RDV21HDive00.grd
DATUM
(WGS-84)
XY ORIGIN 13-47.065N 146-00.173E
CENTER 13-47.065N 146-00.173E

Core Recovery:

Hole A

Dive Report: KM-ROV #217
Date: March 14, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: 09:37 D=2953 m, 13-47.0806N 146-00.1025E
Leave bottom: 15:06 D=2921 m, 13-46.9376N 146-00.2288E
Observer: Chong CHEN (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #215 was to check the drilling sites drilled during BMS#19 and #20, as well as to measure the electric potential of the IODP CORK on the South Chamorro Seamount, collect water, animal, and rock samples. Also, we suspect that what we have been calling the 'Fryer Site' is not the true Fryer Site (i.e., the *Shinkai6500* Dive 351 marker) but another nearby site, so we aimed to find the original Dive 351 marker to confirm its locality.

Dive summary:
We landed about 150 m west of the CORK at the re-entry cone of ODP 195 Hole 1200C (11:37). Once the vehicle was stable, we moved towards the CORK. At 09:50, about 40 m away from CORK, we found a clear edge where the ODP cuttings began to cover the seafloor. We landed there and measured the depth of the cuttings by 50 cm MBARI corer; sediment depth was about 20 cm (10:03). Then we moved 10 m towards the CORK and did the same; sediment depth was about 30 cm (10:18). We arrived at the CORK on 10:22, and then again measured the depth of the cuttings at the base of the CORK it was over 50 cm. A thin crust (~1 cm) had formed on the sediment surface, while immediately below it was whitish serpentinite mud cuttings from ODP. The 50 cm MBARI core containing sediments from all three coring events were recovered (10:34). Next, we hovered about 5 m above the CORK pipe and shook the ROV's heading from left to right in order to fully exchange the water inside the Niskin bottle, and then successfully took reference seawater sample using the Niskin (10:41). We proceeded to D-POTE measurements. We first placed the electrode of D-POTE inside the tip of the CORK pipe, and measured the electric potential (11:01-11:03). Then we did the same for the CORK platform (11:07-11:12), rusty chain on the platform (11:22-11:25), sides of the re-entry cone (11:29-11:35), and finally the base of the re-entry cone (11:41-11:48).

After these activities at CORK, we left CORK and moved towards the BMS drill hole of BMS #20. We found the BMS#20 hole at the center of a small mound about 10 m southeast of the CORK (11:55). The hole itself was filled in by cuttings, but we could identify it by the mound and also the landing marks of the BMS. Then we started to move towards Fryer Site where we rapidly found the Shinkai6500 marker (12:12). We landed near brucite with animals, and attempted to sample brucite using the MAKITA-type corer, but the trigger closed as we tried to remove it

from the sheath (12:25). We sampled 5x *Bathymodiolus* mussels and 1x *Phyllochaetopterus* tubed worm into the RNAlater fixation box (12:35-12:50). With these sampling complete, we left (12:52) and headed to the suspected location of the *Shinkai6500* #351 marker.

We soon found the true #351 marker about 50 m southwest of what we have been calling the Fryer Site, revealing that it was not the true Fryer Site (13:08) – now named the "Yohey Site" to avoid confusion. Some live vesicomyid clams were found, so we collected two into RNAlater fixation box (13:30), although unfortunately one fell out of the box. We also found a *Shinkai6500* marker, and the number could be confirmed as #74 (13:47). Therefore, the marker at Yohey Site is not #74 as previously thought, but instead it must be #75.

After clarifying the location of the true Fryer Site, we navigated towards the Summit Site, where we attempted to sample some *Bathymodiolus* and vesicomyid clams but could not find a colony at a location suitable for landing and sampling (14:35). As such, we decided to go to the *KM-ROV* marker placed on dive #214 where some bivalves were seen. Soon we found the *KM-ROV* marker and some animal colonies around it, where we landed and sampled *Bathymodiolus* and vesicomyid clams using the suction sampler (14:55). Finally, we moved a couple of meters to collect two *Phymorhynchus* snails (15:00) and as we were already slightly over the scheduled time to leave the bottom when the sampling completed, we immediate left bottom at 15:06.

Payloads:

- Suction sampler with single chamber
- RNA fixation box (small)
- Sample box (large) x 1
- Sample box (small) x 1
- WHATS-III
- Markers x 2
- D-POTE with pistol-type electrode
- Niskin (5L) x 1
- MAKITA-type pushcore x 1
- MBARI-type pushcore (50 cm) x 1

Event list:

10:10 Checking OPD cuttings depth #1 D=2952m (13-47.0813N 146-00.1585E)

10:18 Checking OPD cuttings depth #2 D=2952m (13-47.0793N 146-00.1660E)

10:26 Checking OPD cuttings depth #3 D=2951m (13-47.0742N 146-00.1674E)

10:40 Niskin sampling complete D=2941m (13-47.0742N 146-00.1674E)

11:01 D-Pote measurement start D=2948m (13-47.0739N 146-00.1732E)

11:49 D-Pote measurement finish D=2948m (13-47.0739N 146-00.1732E)

11:55 Drill hole of BMS#20 sighted D=2949m (13-47.0705N 146-00.1757E)

12:50 Sampling *Bathymodiolus* into RNA fixation box D=2935m (13-47.0497N 146-00.2204E)

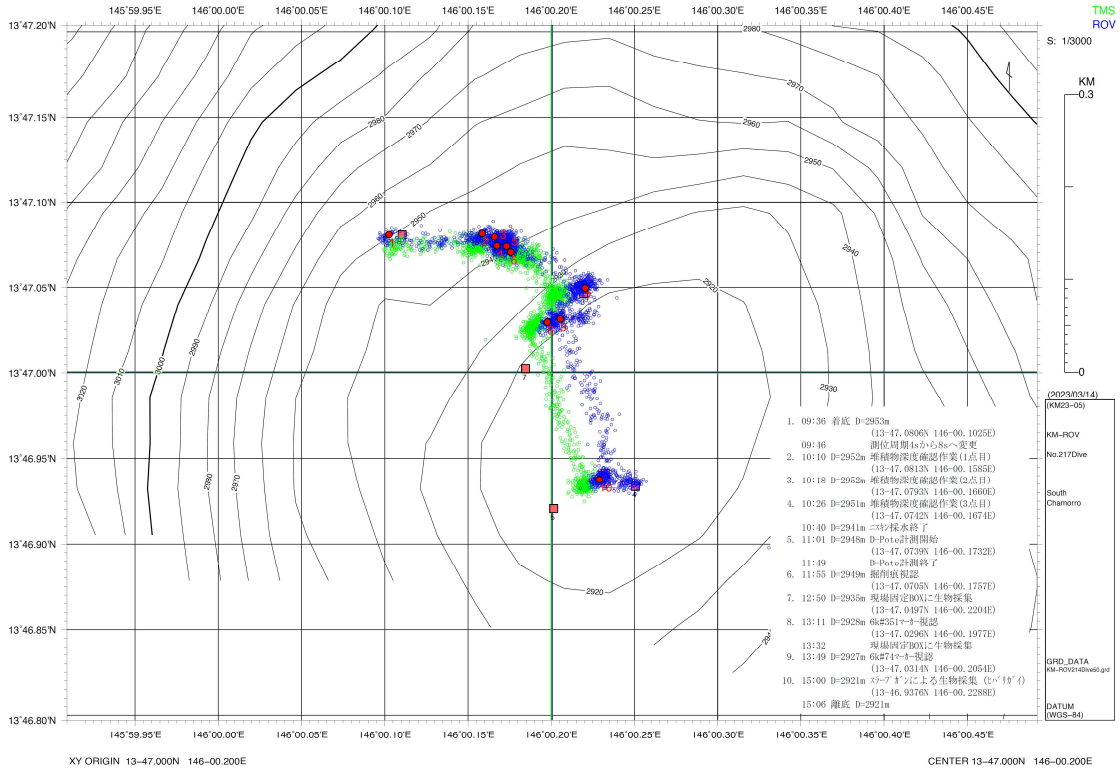
13:11 *Shinkai6500* Dive 351 marker sighted D=2928m (13-47.0296N 146-00.1977E)

13:32 Sampling vesicomyid clam into RNA fixation box D=2928m (13-47.0296N 146-00.1977E)

13:49 *Shinkai6500* Marker #74 sighted D=2927m (13-47.0314N 146-00.2054E)

15:00 Sampling *Bathymodiolus* into suction sampler D=2921m (13-46.9376N 146-00.2288E)

Dive Track:


145°59.95'E
146°00.00'E
146°00.05'E
146°00.10'E
146°00.15'E
146°00.20'E
146°00.25'E
146°00.30'E
146°00.35'E
146°00.40'E
146°00.45'E
13°47.20'N
13°47.15'N
13°47.10'N
13°47.05'N
13°47.00'N
13°46.95'N
13°46.90'N
13°46.85'N
13°46.80'N
TMS
ROV
S: 1/3000
KM
0.3
0
1. 09:36 着底 D=2953m
(13-47.0806N 146-00.1025E)
09:46 測位周期4sから8sへ変更
2. 10:10 D=2952m 堆積物深度確認作業(1点目)
(13-47.0813N 146-00.1585E)
3. 10:18 D=2952m 堆積物深度確認作業(2点目)
(13-47.0793N 146-00.1660E)
4. 10:26 D=2951m 堆積物深度確認作業(3点目)
(13-47.0742N 146-00.1674E)
10:40 D=2941m ﾆｽﾝ採水終了
5. 11:01 D=2948m D-Pote計測開始
(13-47.0739N 146-00.1732E)
11:49 D-Pote計測終了
6. 11:55 D=2949m 掘削痕視認
(13-47.0705N 146-00.1757E)
7. 12:50 D=2935m 現場固定BOXに生物採集
(13-47.0497N 146-00.2204E)
8. 13:11 D=2928m 6k#351ﾏｰｶｰ視認
(13-47.0296N 146-00.1977E)
13:32 現場固定BOXに生物採集
9. 13:49 D=2927m 6k#74ﾏｰｶｰ視認
(13-47.0314N 146-00.2054E)
10. 15:00 D=2921m ｽﾗｰﾌﾟｶﾞﾝによる生物採集 (ﾋﾞﾍﾟﾀﾞｲ)
(13-46.9376N 146-00.2288E)
15:06 離底 D=2921m
(2023/03/14)
(KM23-05)
KM-ROV
No.217Dive
South
Chamorro
GRD_DATA
KM-ROV214Dive60.grd
DATUM
(WGS-84)
XY ORIGIN 13-47.000N 146-00.200E
CENTER 13-47.000N 146-00.200E

Dive Report: KM-ROV #218
Date: March 15, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: 09:30; 13˚47.0798N, 146˚00.0964E, D=2955 m
Leave bottom: 14:51; 13˚47.0739N, 146˚00.1732E, D=2946 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #218 was to obtain the serpentinite fluid that flowed from the CORK of ODP#195 1200C.

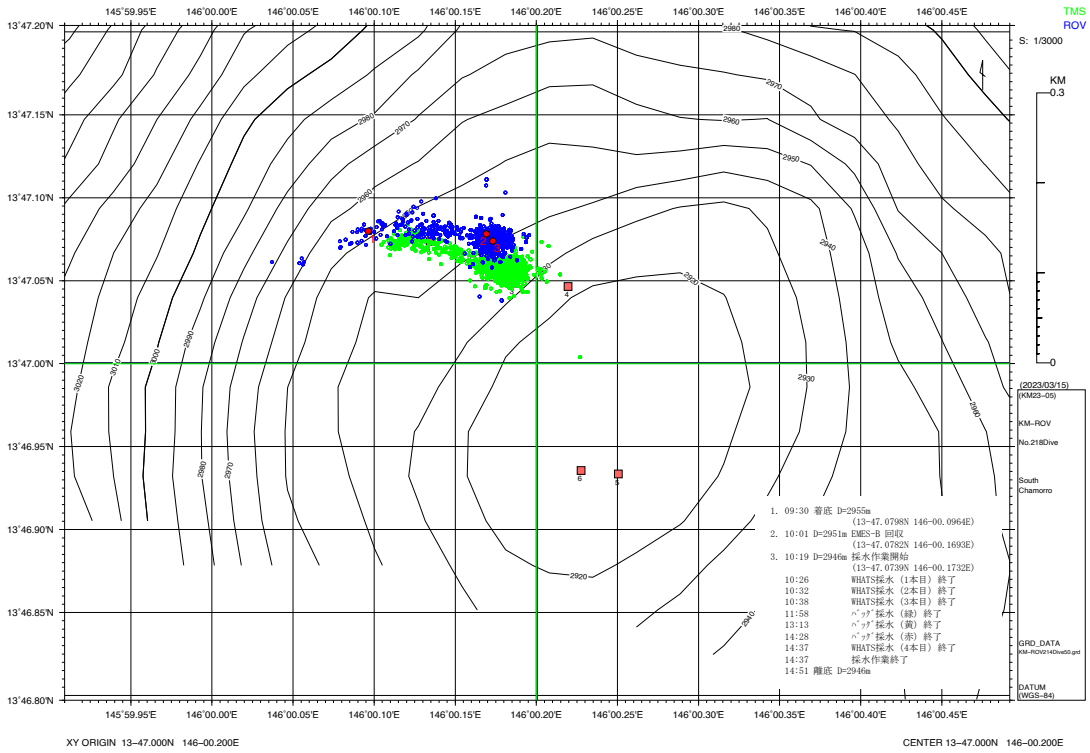
Dive summary:
We landed at 100 m west of the CORK and head to the CORK site and EMES deployed for 7 days. We recovered the EMES in the sample box. We collected the fluid by WHATS #1-#3 and the ORP fluid was measured by D-POTE. Then we collected 60 L of fluid by Bag sampler. Then, we left bottom.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- Bag sampler
- D-POTE

Event list:

09:30	13˚47.0798N, 146˚00.0964E	Depth=2955 m	Landing
10:01	13˚47.0782N, 146˚00.1693E	Depth=2951 m	Recovery of EMES
10:19	13˚47.0739N, 146˚00.1732E	Depth=2946 m	Start fluid sampling
14:51	13˚47.0739N, 146˚00.1732E	Depth=2946 m	Finish fluid sampling by WHATS & Bag, leaving bottom

Dive Track:


TMS
ROV
S: 1/3000
KM
0.3
0
(2023/03/15)
(KM23-05)
KM-ROV
No.218Dive
South
Chamorro
1. 09:30 着底 D=2955m
(13-47.0798N 146-00.0964E)
2. 10:01 D=2951m EMES-B 回収
(13-47.0782N 146-00.1693E)
3. 10:19 D=2946m 採水作業開始
(13-47.0739N 146-00.1732E)
10:26 WHATS採水（1本目）終了
10:32 WHATS採水（2本目）終了
10:38 WHATS採水（3本目）終了
11:58 ﾊﾞｯﾄﾞ採水（緑）終了
13:13 ﾊﾞｯﾄﾞ採水（黄）終了
14:28 ﾊﾞｯﾄﾞ採水（赤）終了
14:37 WHATS採水（4本目）終了
14:37 採水作業終了
14:51 離底 D=2946m
GRD_DATA
KM-ROV214Dive50.grd
DATUM
(WGS-84)
145°59.95'E
146°00.00'E
146°00.05'E
146°00.10'E
146°00.15'E
146°00.20'E
146°00.25'E
146°00.30'E
146°00.35'E
146°00.40'E
146°00.45'E
13°47.20'N
13°47.15'N
13°47.10'N
13°47.05'N
13°47.00'N
13°46.95'N
13°46.90'N
13°46.85'N
13°46.80'N
XY ORIGIN 13-47.000N 146-00.200E
CENTER 13-47.000N 146-00.200E

Dive Report: BMS #21
Date: March 16-17, 2023
Site: South Chamorro Seamount, Mariana Forearc
On bottom: March 16, 15:30; 13˚46.9402N, 146˚00.2361E, D=2910 m
Leave bottom: March 17, 07:58; 13˚46.9402N, 146˚00.2361E, D=2910 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *BMS #21* was to obtain the serpentinite mud and rock cores at the SUMMIT site of the South Chamorro Seamount.

Dive summary:
We landed at 5 m east of KM-ROV marker 124-1 and started to drill and core at Hole A. When the drill bit reached to 33 mbsf, we stopped to drill and left bottom.

Payloads:

KM23-05 Carousel Cup Load Out Rev 2023/3/15

Date:	2022/3/16	Carousel Load #	r0
Location:	South Chamorro		
Dive No:	21		

Lead Lenghts(m)	
IT	2.470
CBL	2.655
HWTL	1.655

SLOTS	CUPS 1	2	3	4	5	6
1	WIT3	WIT4	WIT5			
2	HWTL	HWT	HWT			
3	WIT6	WIT7	WIT8			
4	HQR	HQR	HQR	HQR	HQR	HQR
5	WIT9	WIT10	WIT11			
6	HQCB1	HQR	HQR	HQR	HQR	
7	WIT12	WIT13	WIT14			
8	HQR	HQR	HQR	HQR	HQR	HQR
9	WIT15	WIT16	WIT17			
10	HQCB2	HQR	HQR	HQR	HQR	
11	WIT18	WIT19	WIT20			
12	WIT21	WIT22	WIT23	WIT24	WIT25	WIT26
13	WIT27	WIT28	WIT29			
14	HQCB3	HQR	HQR	HQR	HQR	
15	WIT30	WIT31	WIT32			
16	HQR	HQR	HQR	HQR	HQR	HQR
17	WIT33	WIT34	WIT35			
18	WIT36	WIT37	WIT38	WIT39	WIT40	WIT41
19						
20	HQR	HQR	HQR	HQR	HQR	HQR
21						
22	HWT	HWT	HWT	HWT		
23						
24	HQR	HQR	HQR	HQR	HQR	HQR

	Number of Tools
42	HQR
3	HQCB
41	WIT
6	HWT
1	HWTL
	AL

	Depth in Meters
60.00	WIT
63.00	HQ

	Bit Type – Add # or SPC
6-1	Carbonade CT10
10-1	Carbonade CT10
14-1	Imp. Di-corp T7(#6～#8)FD

HQCB WIT	SLOT	CUP
WIT1	6	1
WIT2	10	1

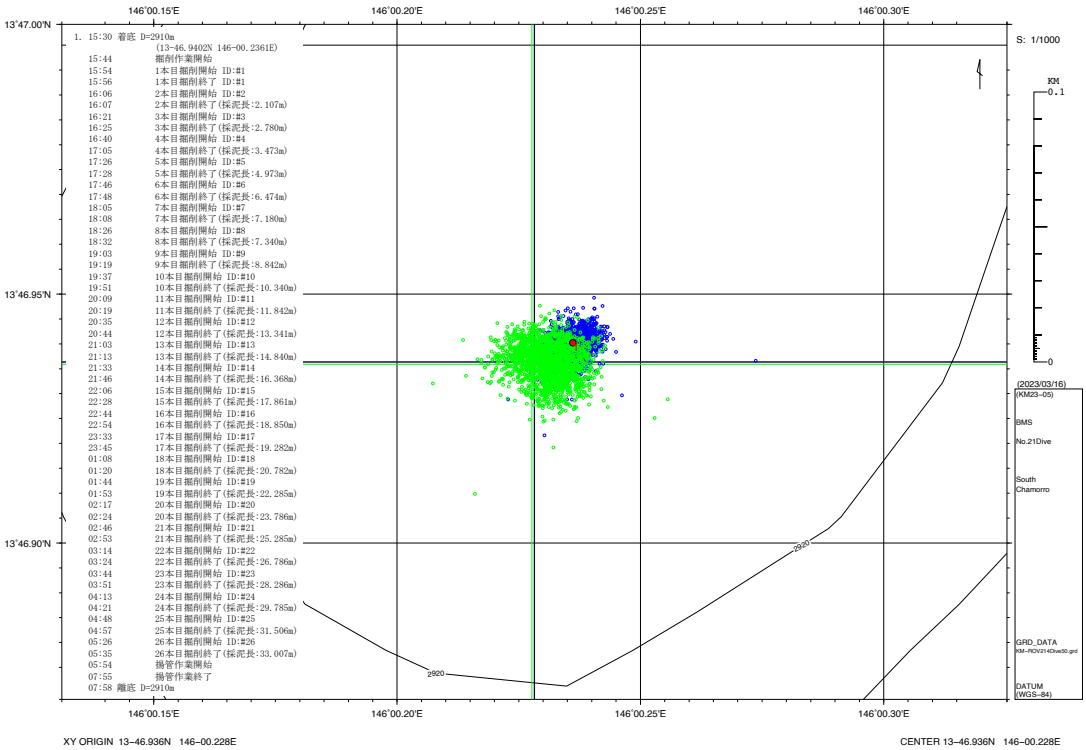
Event list:

March 16 15:30 13°46.9402N, 146°00.2361E Depth=2910 m Landing at Hole A

March 16 15:44 13°46.9402N, 146°00.2361E Depth=2910 m Start drilling & coring (Hole A)

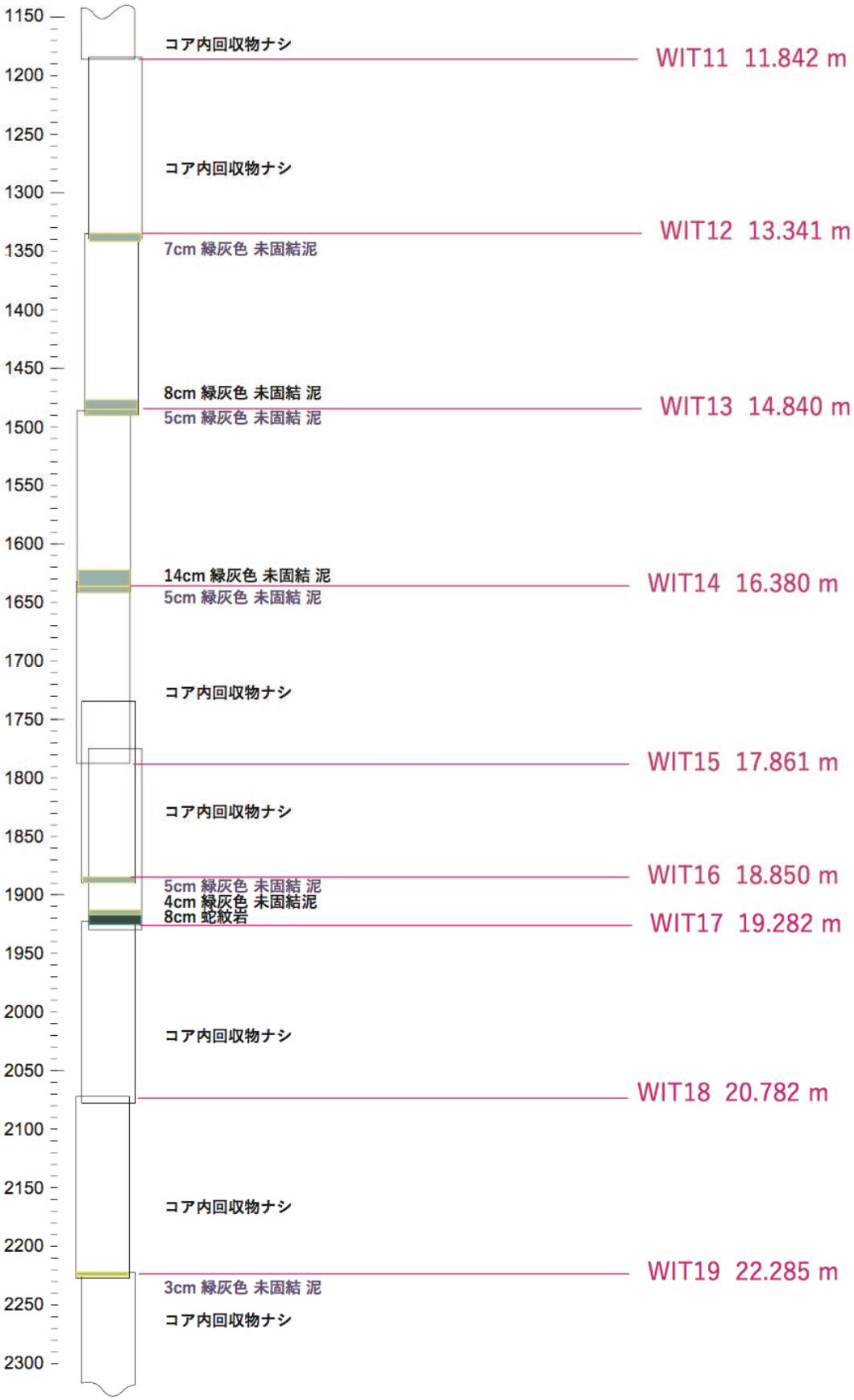
March 17 05:35	13˚46.9402N, 146˚00.2361E	Depth=2910 m	Finish drilling & coring (Hole A)
March 17 07:58	13˚46.9402N, 146˚00.2361E	Depth=2910 m	Leaving bottom

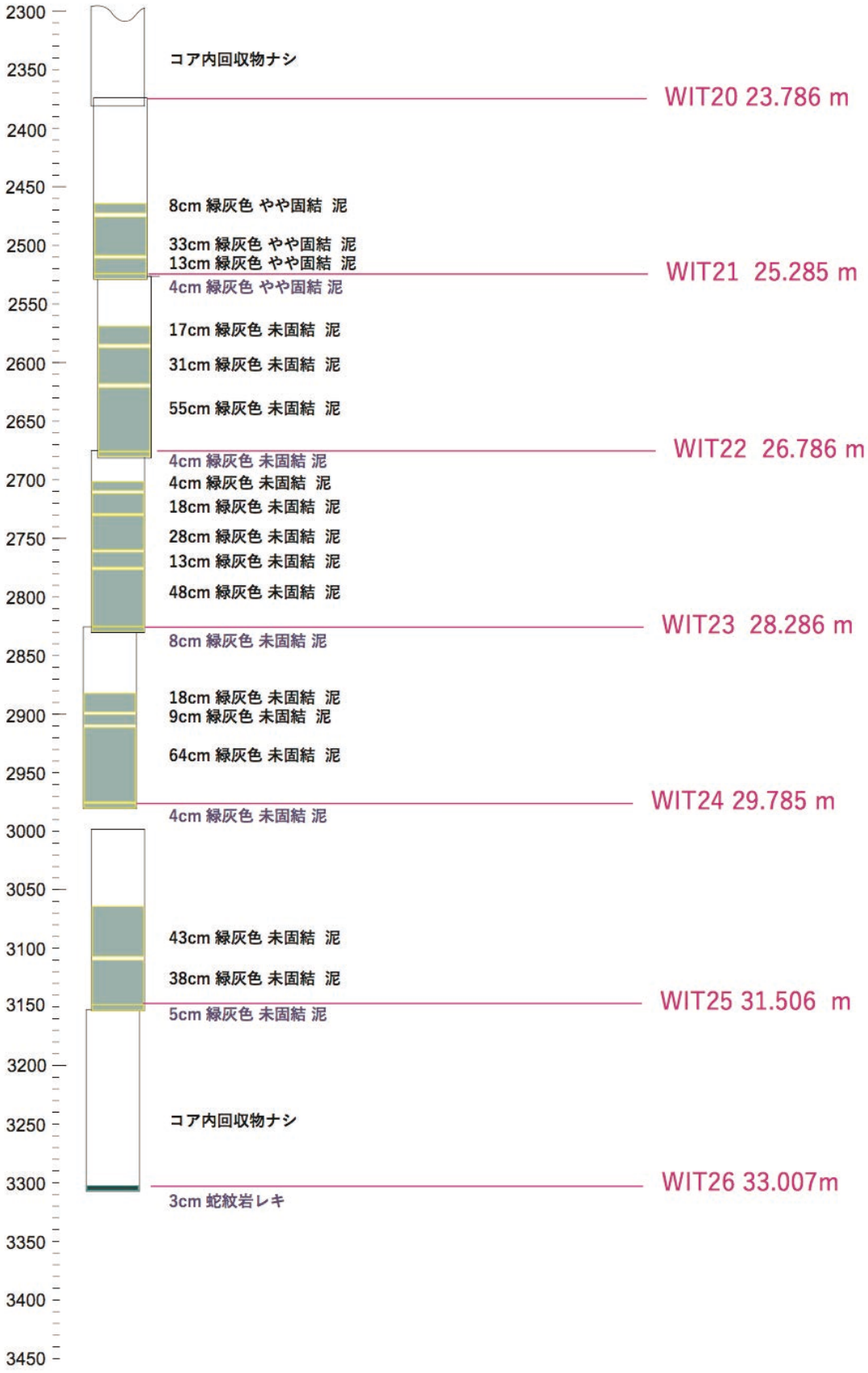
Dive Track:


146°00.15'E
146°00.20'E
146°00.25'E
146°00.30'E
13°47.00'N
13°46.95'N
13°46.90'N
1. 15:30 着底 D=2910m
(13-46.9402N 146-00.2361E)
15:44 掘削作業開始
15:54 1本目掘削開始 ID:#1
15:56 1本目掘削終了 ID:#1
16:06 2本目掘削開始 ID:#2
16:07 2本目掘削終了(採泥長:2.107m)
16:21 3本目掘削開始 ID:#3
16:25 3本目掘削終了(採泥長:2.780m)
16:40 4本目掘削開始 ID:#4
17:05 4本目掘削終了(採泥長:3.473m)
17:26 5本目掘削開始 ID:#5
17:28 5本目掘削終了(採泥長:4.973m)
17:46 6本目掘削開始 ID:#6
17:48 6本目掘削終了(採泥長:6.474m)
18:05 7本目掘削開始 ID:#7
18:08 7本目掘削終了(採泥長:7.180m)
18:26 8本目掘削開始 ID:#8
18:32 8本目掘削終了(採泥長:7.340m)
19:03 9本目掘削開始 ID:#9
19:19 9本目掘削終了(採泥長:8.842m)
19:37 10本目掘削開始 ID:#10
19:51 10本目掘削終了(採泥長:10.340m)
20:09 11本目掘削開始 ID:#11
20:19 11本目掘削終了(採泥長:11.842m)
20:35 12本目掘削開始 ID:#12
20:44 12本目掘削終了(採泥長:13.341m)
21:03 13本目掘削開始 ID:#13
21:13 13本目掘削終了(採泥長:14.840m)
21:33 14本目掘削開始 ID:#14
21:46 14本目掘削終了(採泥長:16.368m)
22:06 15本目掘削開始 ID:#15
22:28 15本目掘削終了(採泥長:17.861m)
22:44 16本目掘削開始 ID:#16
22:54 16本目掘削終了(採泥長:18.850m)
23:33 17本目掘削開始 ID:#17
23:45 17本目掘削終了(採泥長:19.282m)
01:08 18本目掘削開始 ID:#18
01:20 18本目掘削終了(採泥長:20.782m)
01:44 19本目掘削開始 ID:#19
01:53 19本目掘削終了(採泥長:22.285m)
02:17 20本目掘削開始 ID:#20
02:24 20本目掘削終了(採泥長:23.786m)
02:46 21本目掘削開始 ID:#21
02:53 21本目掘削終了(採泥長:25.285m)
03:14 22本目掘削開始 ID:#22
03:24 22本目掘削終了(採泥長:26.786m)
03:44 23本目掘削開始 ID:#23
03:51 23本目掘削終了(採泥長:28.286m)
04:13 24本目掘削開始 ID:#24
04:21 24本目掘削終了(採泥長:29.785m)
04:48 25本目掘削開始 ID:#25
04:57 25本目掘削終了(採泥長:31.506m)
05:26 26本目掘削開始 ID:#26
05:35 26本目掘削終了(採泥長:33.007m)
05:54 揚管作業開始
07:55 揚管作業終了
07:58 離底 D=2910m
2920
2920
S: 1/1000
KM
0.1
0
(2023/03/16)
(KM23-05)
BMS
No.21Dive
South
Chamorro
GRD_DATA
KM-ROV21#Dive50.grd
DATUM
(WGS-84)
XY ORIGIN 13-46.936N 146-00.228E
CENTER 13-46.936N 146-00.228E

Core Recovery:

Hole A


1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100
2150
2200
2250
2300
コア内回収物ナシ
WIT11 11.842 m
コア内回収物ナシ
WIT12 13.341 m
7cm 緑灰色 未固結泥
8cm 緑灰色 未固結 泥
5cm 緑灰色 未固結 泥
WIT13 14.840 m
14cm 緑灰色 未固結 泥
5cm 緑灰色 未固結 泥
WIT14 16.380 m
コア内回収物ナシ
WIT15 17.861 m
コア内回収物ナシ
WIT16 18.850 m
5cm 緑灰色 未固結 泥
4cm 緑灰色 未固結泥
8cm 蛇紋岩
WIT17 19.282 m
コア内回収物ナシ
WIT18 20.782 m
コア内回収物ナシ
WIT19 22.285 m
3cm 緑灰色 未固結 泥
コア内回収物ナシ


2300
2350
2400
2450
2500
2550
2600
2650
2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3200
3250
3300
3350
3400
3450
コア内回収物ナシ
WIT20 23.786 m
8cm 緑灰色 やや固結 泥
33cm 緑灰色 やや固結 泥
13cm 緑灰色 やや固結 泥
WIT21 25.285 m
4cm 緑灰色 やや固結 泥
17cm 緑灰色 未固結 泥
31cm 緑灰色 未固結 泥
55cm 緑灰色 未固結 泥
WIT22 26.786 m
4cm 緑灰色 未固結 泥
4cm 緑灰色 未固結 泥
18cm 緑灰色 未固結 泥
28cm 緑灰色 未固結 泥
13cm 緑灰色 未固結 泥
48cm 緑灰色 未固結 泥
WIT23 28.286 m
8cm 緑灰色 未固結 泥
18cm 緑灰色 未固結 泥
9cm 緑灰色 未固結 泥
64cm 緑灰色 未固結 泥
WIT24 29.785 m
4cm 緑灰色 未固結 泥
43cm 緑灰色 未固結 泥
38cm 緑灰色 未固結 泥
WIT25 31.506 m
5cm 緑灰色 未固結 泥
コア内回収物ナシ
WIT26 33.007m
3cm 蛇紋岩レキ

Dive Report: KM-ROV #219
Date: March 18, 2023
Site: Asut Tesoru Seamount, Mariana Forearc
On bottom: 13:36; 18˚06.5629N, 147˚06.1103E, D=1246 m
Leave bottom: 15:55; 18˚06.6165N 147˚06.1348E, D=1240 m
Observer: Ken Takai (JAMSTEC)

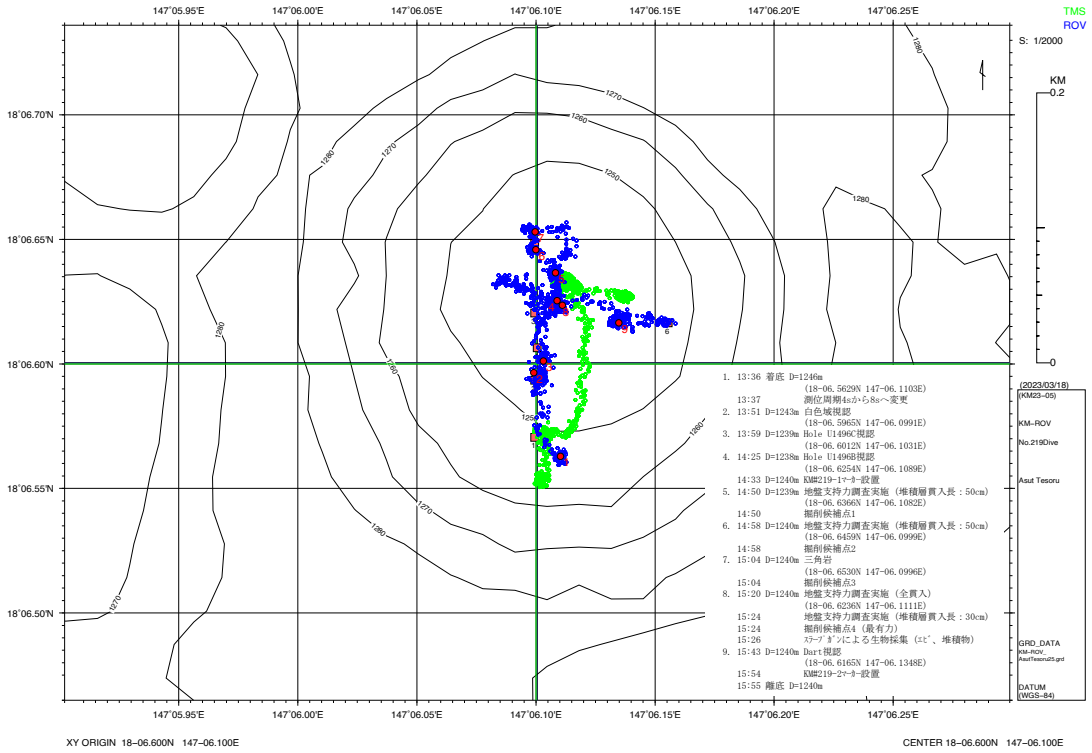
Objectives:
The objective of *KM-ROV* Dive #219 was to observe the seafloor of summit of the Asut Tesoru Seamount where IODP #366 drilled several holes.

Dive summary:
We landed at 50 m south of IODP Site#1496 holes and head to IODP Hole 1496. We found a borehole of IODP Hole 1496A. Near IODP Hole 1496A, we found a potential natural mud flow site. Then, at 10 m north, we found the re-entry cone and CORK Lite of IODP Hole 1496C. At 10 m north from IODP Hole 1496C, we found IODP Hole 1496B and deployed marker #KM-ROV-219-1. The summit was very flat at depths of 1239-40 m. Finally, we returned to IODP Hole 1496B and check the robustness of the seafloor and collected several animals. Then, we found DART, deployed a marker KM-ROV-219-2 and left the bottom.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- D-POTE

Event list:
13:36 18˚06.5629N, 147˚06.1103E Depth=1246 m Landing
13:51 18˚06.5965N, 147˚06.0991E Depth=1243 m Finding borehole of Hole 1496A and serpentinite fluid emission and brucite-carbonate structure
13:59 18˚06.6012N, 147˚06.1031E Depth=1239 m Finding CORK-Lite and re-entry cone of Hole 1496C
14:25 18˚06.6254N, 147˚06.1089E Depth=1238 m Finding borehole of Hole 1496B and serpentinite fluid emission and brucite-carbonate structure
15:20 18˚06.6236N, 147˚06.1111E Depth=1240 m Robustness check of BMS site, deployment of KM-ROV-219-1 marker, and collection of animals
15:43 18˚06.6165N 147˚06.1348E Depth=1240 m Finding of DART and deployment of KM-ROV-219-2 marker
15:55 18˚06.6165N 147˚06.1348E Depth=1240 m Finish fluid sampling by WHATS & Bag, leaving bottom

Dive Track:


147°05.95'E
147°06.00'E
147°06.05'E
147°06.10'E
147°06.15'E
147°06.20'E
147°06.25'E
18°06.70'N
18°06.65'N
18°06.60'N
18°06.55'N
18°06.50'N
TMS
ROV
S: 1/2000
KM
0.2
0
1. 13:36 着底 D=1246m
(18-06.5629N 147-06.1103E)
13:37 測位周期4sから8sへ変更
2. 13:51 D=1243m 白色城視認
(18-06.5965N 147-06.0991E)
3. 13:59 D=1239m Hole U1496C視認
(18-06.6012N 147-06.1031E)
4. 14:25 D=1238m Hole U1496B視認
(18-06.6254N 147-06.1089E)
14:33 D=1240m KM#219-1マーカー設置
5. 14:50 D=1239m 地盤支持力調査実施（堆積層貫入長：50cm）
(18-06.6366N 147-06.1082E)
14:50 掘削候補点1
6. 14:58 D=1240m 地盤支持力調査実施（堆積層貫入長：50cm）
(18-06.6459N 147-06.0999E)
14:58 掘削候補点2
7. 15:04 D=1240m 三角岩
(18-06.6530N 147-06.0996E)
15:04 掘削候補点3
8. 15:20 D=1240m 地盤支持力調査実施（全貫入）
(18-06.6236N 147-06.1111E)
15:24 地盤支持力調査実施（堆積層貫入長：30cm）
15:24 掘削候補点4（最有力）
15:26 ｽﾗｰﾌﾟｶﾞﾝによる生物採集（ｴﾋﾞ、堆積物）
9. 15:43 D=1240m Dart視認
(18-06.6165N 147-06.1348E)
15:54 KM#219-2ﾏｰｶｰ設置
15:55 離底 D=1240m
(2023/03/18)
(KM23-05)
KM-ROV
No.219Dive
Asut Tesoru
GRD_DATA
KM-ROV_
AsuTesoru25.grd
DATUM
(WGS-84)
XY ORIGIN 18-06.600N 147-06.100E
CENTER 18-06.600N 147-06.100E

Dive Report: BMS #22
Date: March 19-20, 2023
Site: Asut Tesoru Seamount, Mariana Forearc
On bottom: March 19, 10:10; 18˚06.6535N, 147˚06.1001E, D=1234 m
Leave bottom: March 20, 05:46; 18˚06.6583N, 147˚06.1156E, D=1234 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *BMS #22* was to obtain the serpentinite mud and rock cores at summit of the Asut Tesoru Seamount.

Dive summary:
We landed at 10 m north of IODP 366 Hole 1496B (KM-ROV marker 128-1) and started to drill and core at Hole A down to approx. 16 mbsf. When the drill bit reached to 16 mbsf, BMS sunk into the serpentinite mud and we stopped to drill at Hole A. Then we searched for next hole site, but most of the places around IODP 366 Hole 1496B was soften and made BMS sunk into mud. Finallly, we found a good location for drill at 5 m northeast from Hole A. We started to drill and core at Hole B down to approx. 11 mbsf. Lots of oil droplets leaked from a relief valve of oil pomp at AM2:00. Thus, we stopped to drill and left bottom.

Payloads:

KM23-05 Carousel Cup Load Out Rev 2023/3/18

Date:	2022/3/19	Carousel Load #	r0
Location:	Asut Tesoru		
Dive No:	22		

Lead Lenghts(m)	
IT	2.470
CBL	2.655
HWTL	1.655

SLOTS	CUPS 1	2	3	4	5	6
1	WIT3	WIT4	WIT5			
2	HWTL	HWT	HWT			
3	WIT6	WIT7	WIT8			
4	HQR	HQR	HQR	HQR	HQR	HQR
5	WIT9	WIT10	WIT11			
6	HQCB1	HQR	HQR	HQR	HQR	
7	WIT12	WIT13	WIT14			
8	HQR	HQR	HQR	HQR	HQR	HQR
9	WIT15	WIT16	WIT17			
10	HQCB2	HQR	HQR	HQR	HQR	
11	WIT18	WIT19	WIT20			
12	WIT21	WIT22	WIT23	WIT24	WIT25	WIT26
13	WIT27	WIT28	WIT29			
14	HQCB3	HQR	HQR	HQR	HQR	
15	WIT30	WIT31	WIT32			
16	HQR	HQR	HQR	HQR	HQR	HQR
17	WIT33	WIT34	WIT35			
18	WIT36	WIT37	WIT38	WIT39	WIT40	WIT41
19						
20	HQR	HQR	HQR	HQR	HQR	HQR
21						
22	HWT	HWT	HWT	HWT		
23						
24	HQR	HQR	HQR	HQR	HQR	HQR

	Number of Tools
42	HQR
3	HQCB
41	WIT
6	HWT
1	HWTL
	AL

	Depth in Meters
60.00	WIT
63.00	HQ

	Bit Type – Add # or SPC
6-1	Carbonade CT10
10-1	Carbonade CT10
14-1	Imp. Di-corp T7(#6～#8)FD

HQCB WIT	SLOT	CUP
WIT1	6	1
WIT2	10	1

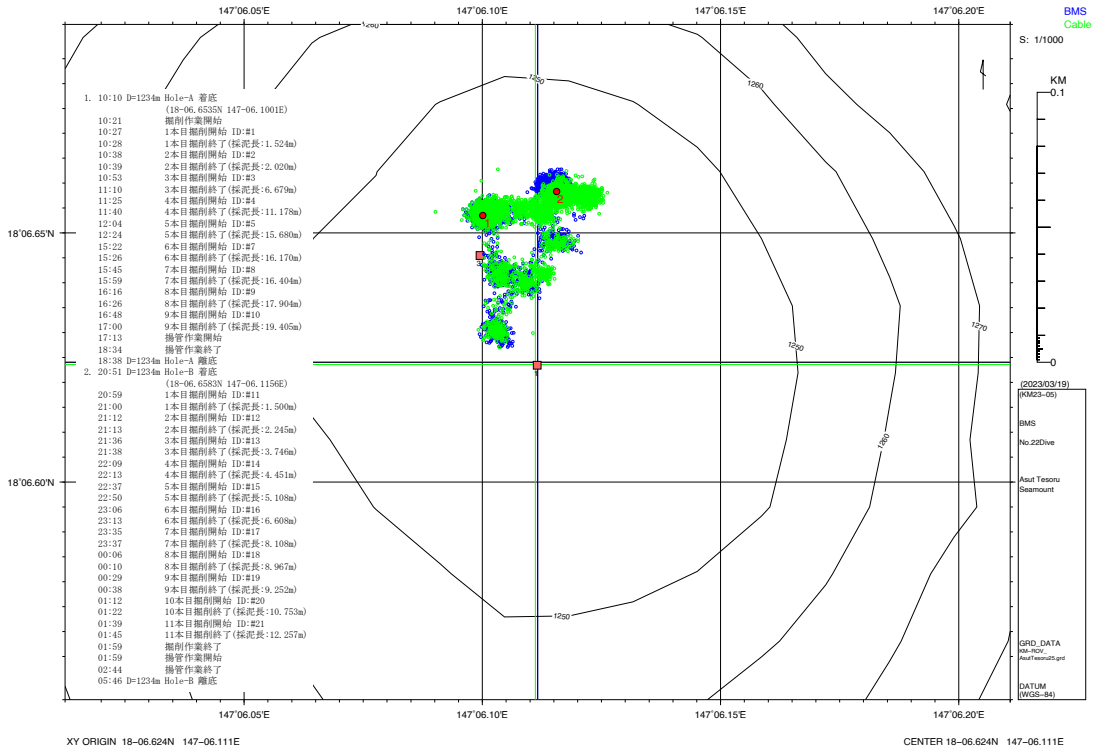
Event list:

March 19 10:10 18°06.6535N, 147°06.1001E Depth=1234 m Landing at Hole A

March 19 10:21 18°06.6535N, 147°06.1001E Depth=1234 m Start drilling & coring (Hole A)

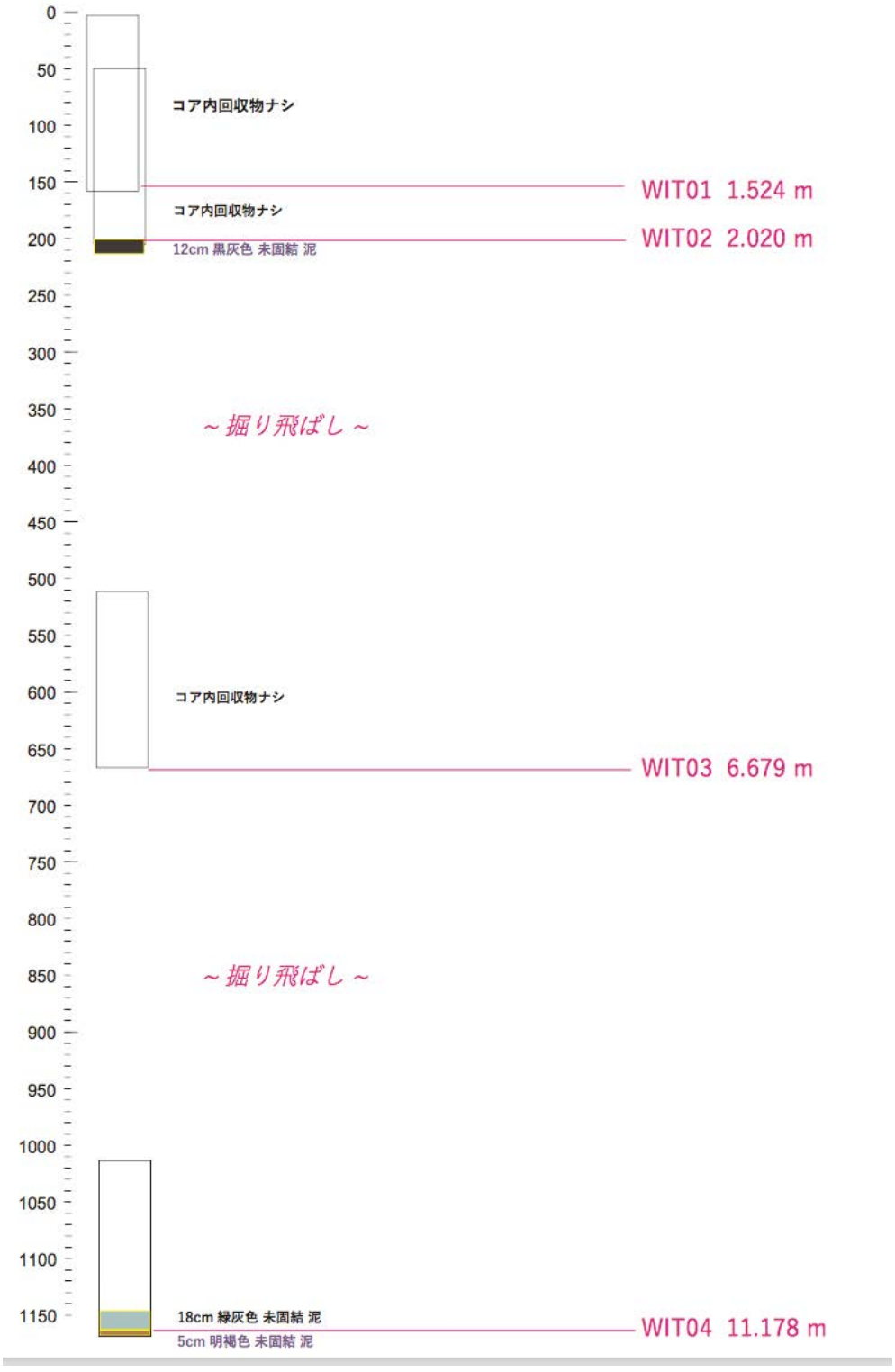
March 19 17:13	18˚06.6535N, 147˚06.1001E	Depth=1234 m	Finish drilling & coring (Hole A)
March 19 20:51	18˚06.6583N, 147˚06.1156E	Depth=1234 m	Landing at Hole B
March 19 20:59	18˚06.6583N, 147˚06.1156E	Depth=1234 m	Start drilling & coring (Hole B)
March 20 01:59	18˚06.6583N, 147˚06.1156E	Depth=1234 m	Finish drilling & coring (Hole B)
March 20 05:46	18˚06.6583N, 147˚06.1156E	Depth=1234 m	Leaving bottom

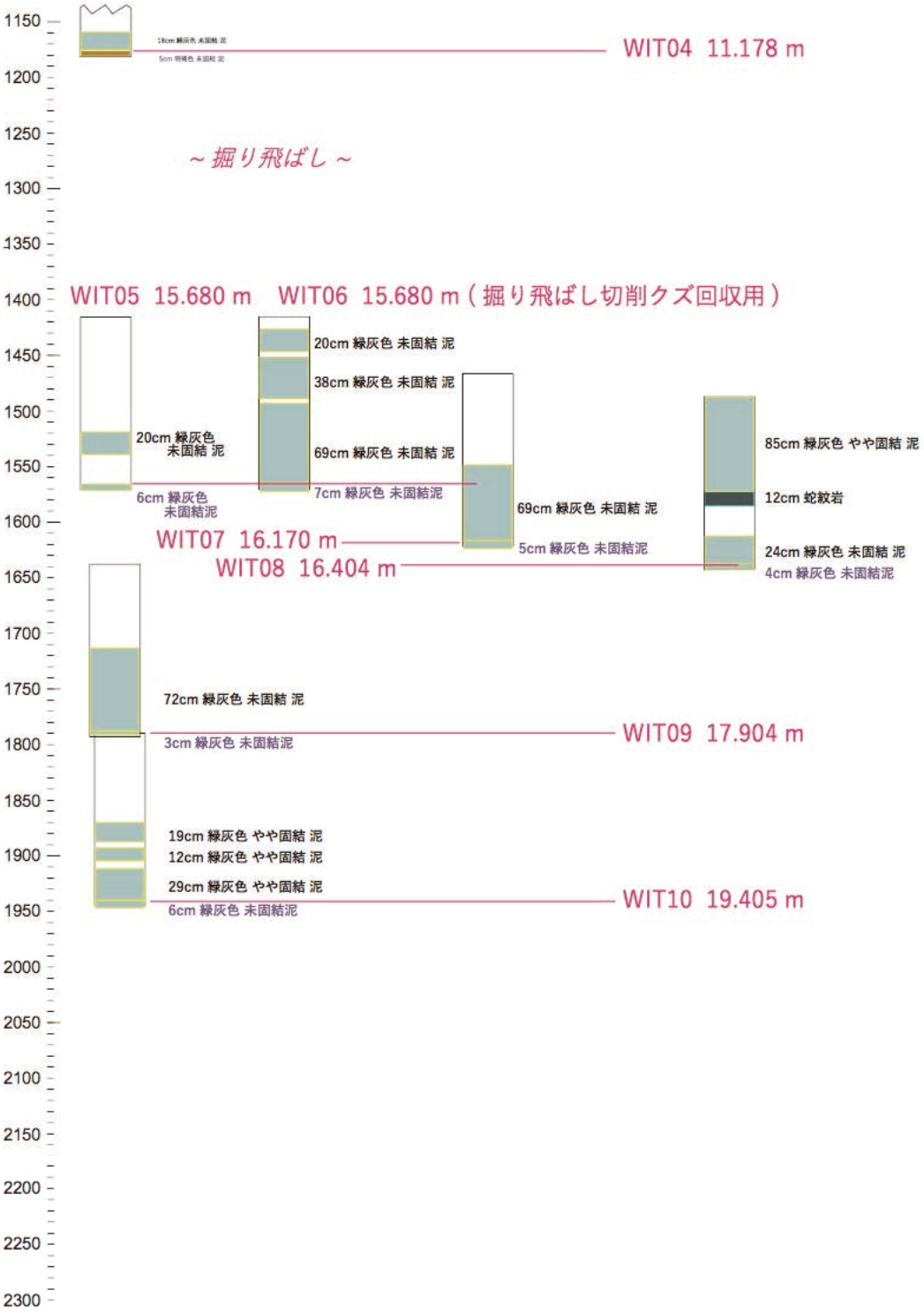
Dive Track:


147°06.05'E
147°06.10'E
147°06.15'E
147°06.20'E
18°06.65'N
18°06.60'N
BMS
Cable
S: 1/1000
KM
0.1
0
1. 10:10 D=1234m Hole-A 着底
(18-06.6535N 147-06.1001E)
10:21 掘削作業開始
10:27 1本目掘削開始 ID:#1
10:28 1本目掘削終了(採泥長:1.524m)
10:38 2本目掘削開始 ID:#2
10:39 2本目掘削終了(採泥長:2.020m)
10:53 3本目掘削開始 ID:#3
11:10 3本目掘削終了(採泥長:6.679m)
11:25 4本目掘削開始 ID:#4
11:40 4本目掘削終了(採泥長:11.178m)
12:04 5本目掘削開始 ID:#5
12:24 5本目掘削終了(採泥長:15.680m)
15:22 6本目掘削開始 ID:#7
15:26 6本目掘削終了(採泥長:16.170m)
15:45 7本目掘削開始 ID:#8
15:59 7本目掘削終了(採泥長:16.404m)
16:16 8本目掘削開始 ID:#9
16:26 8本目掘削終了(採泥長:17.904m)
16:48 9本目掘削開始 ID:#10
17:00 9本目掘削終了(採泥長:19.405m)
17:13 揚管作業開始
18:34 揚管作業終了
18:38 D=1234m Hole-A 離底
2. 20:51 D=1234m Hole-B 着底
(18-06.6583N 147-06.1156E)
20:59 1本目掘削開始 ID:#11
21:00 1本目掘削終了(採泥長:1.500m)
21:12 2本目掘削開始 ID:#12
21:13 2本目掘削終了(採泥長:2.245m)
21:36 3本目掘削開始 ID:#13
21:38 3本目掘削終了(採泥長:3.746m)
22:09 4本目掘削開始 ID:#14
22:13 4本目掘削終了(採泥長:4.451m)
22:37 5本目掘削開始 ID:#15
22:50 5本目掘削終了(採泥長:5.108m)
23:06 6本目掘削開始 ID:#16
23:13 6本目掘削終了(採泥長:6.608m)
23:35 7本目掘削開始 ID:#17
23:37 7本目掘削終了(採泥長:8.108m)
00:06 8本目掘削開始 ID:#18
00:10 8本目掘削終了(採泥長:8.967m)
00:29 9本目掘削開始 ID:#19
00:38 9本目掘削終了(採泥長:9.252m)
01:12 10本目掘削開始 ID:#20
01:22 10本目掘削終了(採泥長:10.753m)
01:39 11本目掘削開始 ID:#21
01:45 11本目掘削終了(採泥長:12.257m)
01:59 掘削作業終了
01:59 揚管作業開始
02:44 揚管作業終了
05:46 D=1234m Hole-B 離底
1260
1250
1270
1280
1290
(2023/03/19)
(KM23-05)
BMS
No.22Dive
Asut Tesoru
Seamount
GRD_DATA
KM-ROV_
AsutTesoru25.grd
DATUM
(WGS-84)
XY ORIGIN 18-06.624N 147-06.111E
CENTER 18-06.624N 147-06.111E

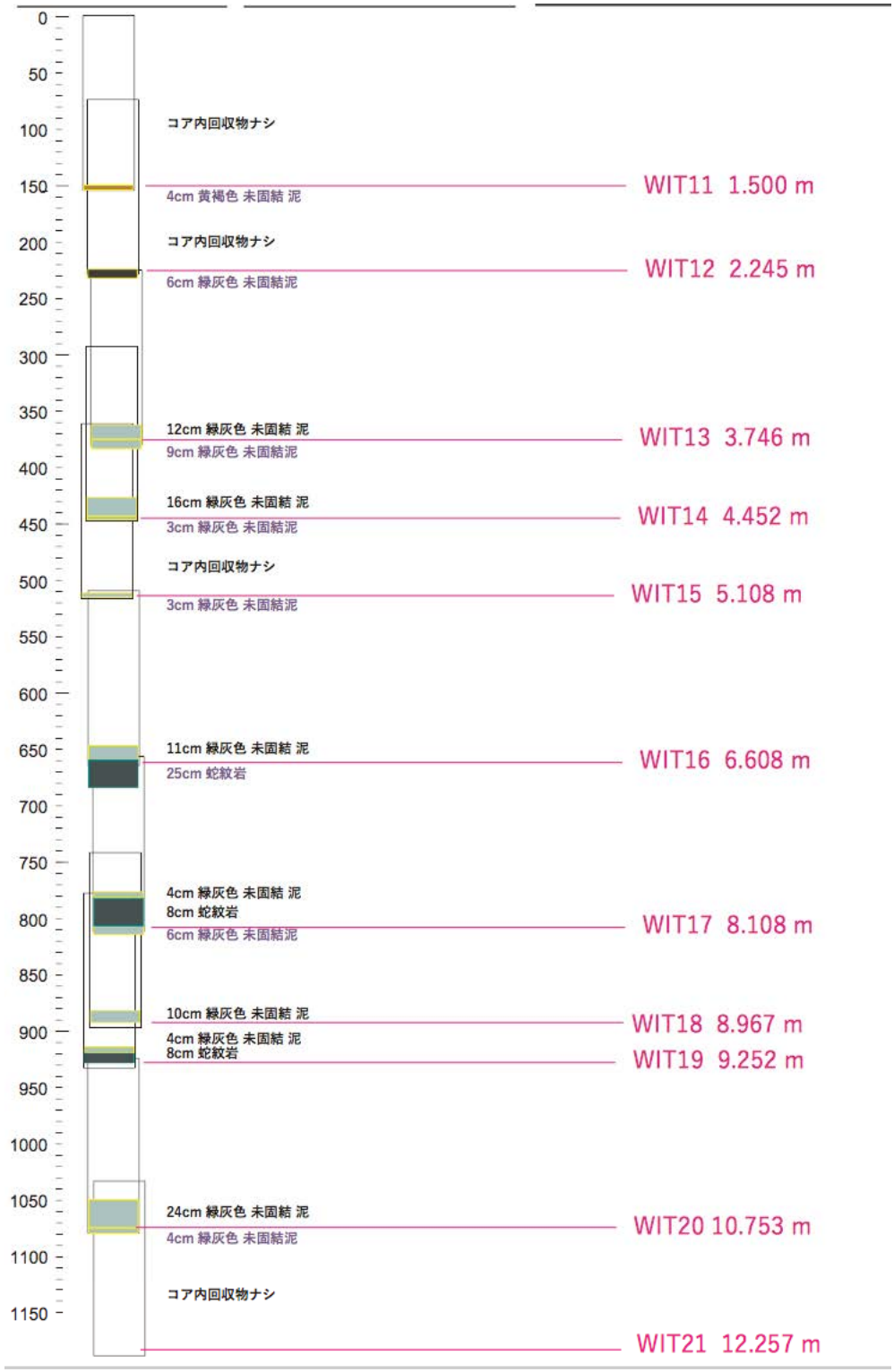
Core Recovery:

Hole A




1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100
2150
2200
2250
2300
WIT04 11.178 m
～掘り飛ばし～
WIT05 15.680 m
WIT06 15.680 m（掘り飛ばし切削クズ回収用）
20cm 緑灰色 未固結 泥
6cm 緑灰色 未固結泥
20cm 緑灰色 未固結 泥
38cm 緑灰色 未固結 泥
69cm 緑灰色 未固結 泥
7cm 緑灰色 未固結泥
69cm 緑灰色 未固結 泥
5cm 緑灰色 未固結泥
85cm 緑灰色 やや固結 泥
12cm 蛇紋岩
24cm 緑灰色 未固結 泥
4cm 緑灰色 未固結泥
WIT07 16.170 m
WIT08 16.404 m
72cm 緑灰色 未固結 泥
3cm 緑灰色 未固結泥
WIT09 17.904 m
19cm 緑灰色 やや固結 泥
12cm 緑灰色 やや固結 泥
29cm 緑灰色 やや固結 泥
6cm 緑灰色 未固結泥
WIT10 19.405 m

Hole B


0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
1150
コア内回収物ナシ
4cm 黄褐色 未固結 泥
WIT11 1.500 m
コア内回収物ナシ
6cm 緑灰色 未固結泥
WIT12 2.245 m
12cm 緑灰色 未固結 泥
9cm 緑灰色 未固結泥
WIT13 3.746 m
16cm 緑灰色 未固結 泥
3cm 緑灰色 未固結泥
WIT14 4.452 m
コア内回収物ナシ
3cm 緑灰色 未固結泥
WIT15 5.108 m
11cm 緑灰色 未固結 泥
25cm 蛇紋岩
WIT16 6.608 m
4cm 緑灰色 未固結 泥
8cm 蛇紋岩
6cm 緑灰色 未固結泥
WIT17 8.108 m
10cm 緑灰色 未固結 泥
WIT18 8.967 m
4cm 緑灰色 未固結 泥
8cm 蛇紋岩
WIT19 9.252 m
24cm 緑灰色 未固結 泥
4cm 緑灰色 未固結泥
WIT20 10.753 m
コア内回収物ナシ
WIT21 12.257 m

Dive Report: KM-ROV #220
Date: March 20, 2023
Site: Asùt Tesoru Seamount, Mariana Forearc
On bottom: 09:21, 18-06.6082N 147-06.1897E D=1258 m
Leave bottom: 15:40, 18-06.5934N 147-06.0766E D=1244 m
Observer: Chong CHEN (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #220 was to observe the drill hole of BMS#22, to conduct D-POTE measurements of the DART device and the IODP Hole U1496C CORK, and to collect reference seawater samples. Furthermore, we also aimed to sampling of animals from chemosynthesis-based ecosystems.

Dive summary:
We had first visual of the seafloor at 09:17, and proceeded to take the Niskin sample at 5 m above the seafloor (09:19) before arriving on the bottom at 09:21. Then, we sighted a few snake stars as well as a feather star on the seafloor and immediately stopped in front of them to collect using suction sampler (09:23-09:34). We then continued towards the DART device, arriving there at 09:50 and took measurements of the electric potential using D-POTE (10:00-10:04). Next, we moved to the location of BMS#22 to observe the drill hole, finding it at 10:30. No evidence of seepage was seen from the hole.

Then, we turned back towards south to observe the carbonate/brucite area around IODP Hole U1496B, arriving at 10:30. We attempted to sample an aspidodiadematid urchin near the hole but failed (10:37), and continued to sample three pieces of crusts into the sample box (small) (10:44-10:59). After that, we found a small patch of potential carbonate/brucite growth where small snails (likely *Provanna* or *Desbruyeresia*) were seen on the surface. We decided to take one 50 cm MBARI core on this patch (11:09) and then a suction sample of the surface (11:25-11:30), including a piece of crust into the sample box (small). Then we found a small mound that appeared to be a crusted carbonate chimney, and we sampled some using the scoop sampler into the sample box (small) (12:05). After that, we spent some time trying to find another active area indicated by white carbonate/brucite patch, but could not find one. At last, we ended up coming back to where we sampled around 11:10-11:30, and found another small patch next to the one we sampled before. We used the scoop sampler and sampled some crusts, animals, and mud into the sample box (large) (13:15-13:30).

We arrived at the CORK Lite at IODP Hole U1496C at 13:47 and practiced hovering over the CORK Lite to test if the water sampling protocol scheduled for the next ROV dive is doable

(13:48-13:55), and it was fine. Then, we proceeded to D-POTE measurements of the tip of the CORK Lite (14:02-14:05), the painted sides of the CORK Lite (14:08-14:16), and finally the rusty base of the re-entry cone (14:25-14:31). After that, we started to move towards the active white coloured patch with carbonate crust sighted near IODP Hole U1496A during *KM-ROV* Dive #219.

We quickly found the white coloured patch next to Hole U1496A, and proceeded to take two 50 cm MBARI cores (#2-#3) (14:54-15:16). Then, we used the suction sampler to collect some polychaetes near the white patch (15:20-15:29). Finally, we attempted to find some other interesting animals to sample and encountered a pelagic squid, but unfortunately the sampling attempt failed. Then, we left bottom at 15:40.

Payloads:

- Suction sampler with single chamber
- D-POTE with pistol-type electrode
- RNA fixation box (small)
- Sample box (large) x 1
- Sample box (small) x 1
- WHATS-III
- Markers x 2
- Niskin (5L) x 1
- MBARI-type pushcore (50 cm) x 3
- 'Kumade' scoop sampler

Event list:

09:19 Niskin sampler closed, D=1256m (18-06.6082N 147-06.1897E)

09:33 Suction sampling of feather star and snake stars, D=1260m (18-06.6107N 147-06.1881E)

09:40 Sighting of hard crust seafloor, D=1245m (18-06.6128N 147-06.1647E)

10:01 Beginning D-POTE measurements D=1240m (18-06.6170N 147-06.1320E)

10:04 Ending D-POTE measurements, D=1240m (18-06.6170N 147-06.1320E)

10:49 Sampling crusts into sample box (S), D=1240m (18-06.6251N 147-06.1076E)

11:17 MBARI 50 cm pushcore sampling (Yellow, #1) D=1240m (18-06.6251N 147-06.1076E)

11:25 Suction sampling of animals, D=1240m (18-06.6251N 147-06.1076E)

11:29 Sampling crusts into sample box, (S) D=1240m (18-06.6251N 147-06.1076E)

12:07 Sampling sediment into sample box, (S) D=1240m (18-06.6251N 147-06.1076E)

13:07 Sampling crust into sample box (L) with scoop, D=1240m (18-06.6251N 147-06.1076E)

13:30 Sampling crust into sample box (L), D=1240m (18-06.6251N 147-06.1076E)

14:03 Beginning D-POTE measurements at CORK Lite, D=1238m (18-06.6045N 147-06.1024E)

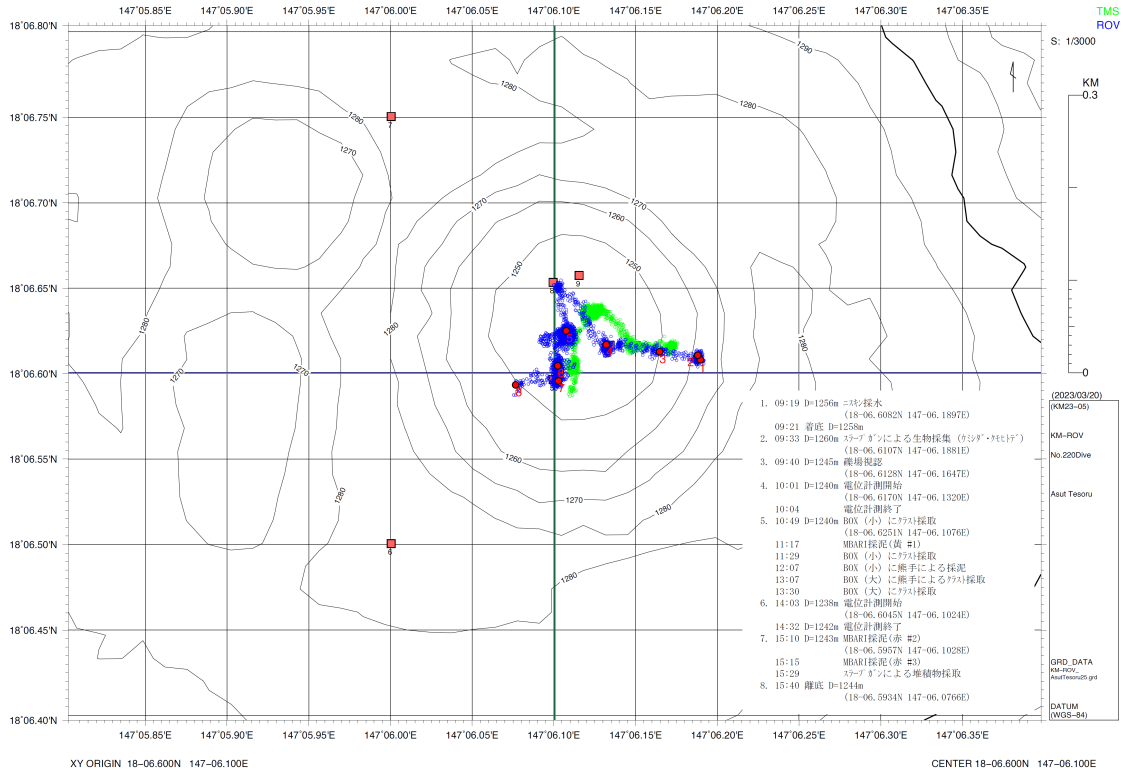
14:32 Ending D-POTE measurements at CORK Lite, D=1242m (18-06.6045N 147-06.1024E)

15:10 MBARI 50 cm pushcore sampling (Red, #2), D=1243m (18-06.5957N 147-06.1028E)

15:15 MBARI 50 cm pushcore sampling (Red, #3), D=1243m (18-06.5957N 147-06.1028E)

15:29 Suction sampling of animals, D=1243m (18-06.5957N 147-06.1028E)

Dive Track:


147°05.85'E
147°05.90'E
147°05.95'E
147°06.00'E
147°06.05'E
147°06.10'E
147°06.15'E
147°06.20'E
147°06.25'E
147°06.30'E
147°06.35'E
18°06.80'N
18°06.75'N
18°06.70'N
18°06.65'N
18°06.60'N
18°06.55'N
18°06.50'N
18°06.45'N
18°06.40'N
TMS
ROV
S: 1/3000
KM
0.3
0
1. 09:19 D=1256m ﾆｽﾝ採水
(18-06.6082N 147-06.1897E)
09:21 着底 D=1258m
2. 09:33 D=1260m ｽﾃｰﾌﾞ ｶﾞﾝによる生物採集 (ﾋﾐｼﾀﾞ・ﾅﾏｺﾄﾞﾃﾞ)
(18-06.6107N 147-06.1881E)
3. 09:40 D=1245m 礫場視認
(18-06.6128N 147-06.1647E)
4. 10:01 D=1240m 電位計測開始
(18-06.6170N 147-06.1320E)
10:04 電位計測終了
5. 10:49 D=1240m BOX (小) にﾌﾗｽﾄ採取
(18-06.6251N 147-06.1076E)
11:17 MBARI採泥(黄 #1)
11:29 BOX (小) にﾌﾗｽﾄ採取
12:07 BOX (小) に熊手による採泥
13:07 BOX (大) に熊手によるﾌﾗｽﾄ採取
13:30 BOX (大) にﾌﾗｽﾄ採取
6. 14:03 D=1238m 電位計測開始
(18-06.6045N 147-06.1024E)
14:32 D=1242m 電位計測終了
7. 15:10 D=1243m MBARI採泥(赤 #2)
(18-06.5957N 147-06.1028E)
15:15 MBARI採泥(赤 #3)
15:29 ｽﾃｰﾌﾞ ｶﾞﾝによる堆積物採取
8. 15:40 離底 D=1244m
(18-06.5934N 147-06.0766E)
(2023/03/20)
(KM23-05)
KM-ROV
No.220Dive
Asut Tesoru
GRD_DATA
KM-ROV_
AsutTesoru25.grd
DATUM
(WGS-84)
XY ORIGIN 18-06.600N 147-06.100E
CENTER 18-06.600N 147-06.100E

Dive Report: KM-ROV #221
Date: March 21, 2023
Site: Asut Tesoru Seamount, Mariana Forearc
On bottom: 08:50; 18˚06.5629N, 147˚06.1103E, D=1246 m
Leave bottom: 15:55; 18˚06.6165N 147˚06.1348E, D=1240 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #221 was to obtain the serpentinite fluid from the CORK-Lite established at IODP Exp#366 Hole 1496C and to collect the MBARI cores from the seafloor at around IODP Exp#366 Hole 1496B.

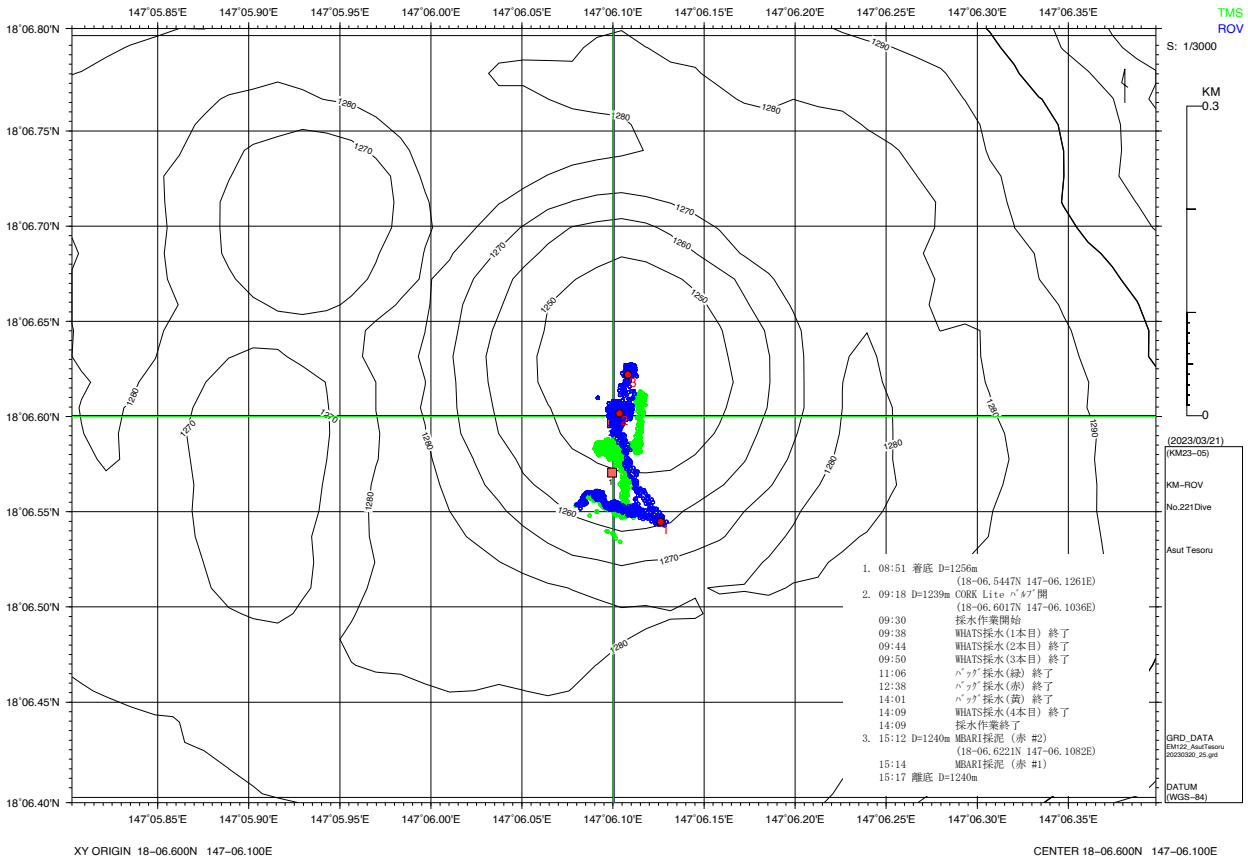
Dive summary:
We landed at 100 m southsoutheast of IODP Exp#366 Hole 1496C CORK Lite. We head to CORK Lite. In the way to CORK Lite, we found the brucite-carbonate crust near IODP Exp#366 Hole 1496A. It seemed to be natural seepage. Then, we arrived at CORK Lite. After the ball valve was opened, we started to collect the serpentinite fluid. A total 60 L of serpentinite fluid was collected. Then, we headed to IODP Exp#366 Hole 1496B. Two MBARI cores were obtained through the crust. Then, we left the bottom.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- D-POTE
- Bag sampler
- MBARI corer x 2

Event list:

08:51	18˚06.5447N, 147˚06.1261E	Depth=1256 m	Landing
09:18	18˚06.6017N, 147-06.1036E	Depth=1239 m	Arrived at CORK-Lite, opened a valve and started fluid sampling
14:09	18˚06.6017N, 147-06.1036E	Depth=1239 m	Finished water sampling (WHATS-III and bag)
15:12	18˚06.6221N, 147-06.1082E	Depth=1240 m	Arrived at IODP Exp#366 Hole 1496B and took sediments by two MBARI corers
15:17	18˚06.6221N, 147-06.1082E	Depth=1240 m	leaving bottom

Dive Track:


147°05.85'E
147°05.90'E
147°05.95'E
147°06.00'E
147°06.05'E
147°06.10'E
147°06.15'E
147°06.20'E
147°06.25'E
147°06.30'E
147°06.35'E
18°06.80'N
18°06.75'N
18°06.70'N
18°06.65'N
18°06.60'N
18°06.55'N
18°06.50'N
18°06.45'N
18°06.40'N
TMS
ROV
S: 1/3000
KM
0.3
0
1. 08:51 着底 D=1256m
(18-06.5447N 147-06.1261E)
2. 09:18 D=1239m CORK Lite ﾊﾞﾙﾌﾞ開
(18-06.6017N 147-06.1036E)
09:30 採水作業開始
09:38 WHATS採水(1本目) 終了
09:44 WHATS採水(2本目) 終了
09:50 WHATS採水(3本目) 終了
11:06 ﾊﾞｯｸﾞ採水(緑) 終了
12:38 ﾊﾞｯｸﾞ採水(赤) 終了
14:01 ﾊﾞｯｸﾞ採水(黄) 終了
14:09 WHATS採水(4本目) 終了
14:09 採水作業終了
3. 15:12 D=1240m MBARI採泥 (赤 #2)
(18-06.6221N 147-06.1082E)
15:14 MBARI採泥 (赤 #1)
15:17 離底 D=1240m
(2023/03/21)
(KM23-05)
KM-ROV
No.221Dive
Asut Tesoru
GRD_DATA
EM122_AsutTesoru
20230320_25.grd
DATUM
(WGS-84)
XY ORIGIN 18-06.600N 147-06.100E
CENTER 18-06.600N 147-06.100E

Dive Report: BMS #23
Date: March 22-23, 2023
Site: Asut Tesoru Seamount, Mariana Forearc
On bottom: March 22, 10:33; 18˚06.6139N, 147˚06.1154E, D=1233 m
Leave bottom: March 23, 01:42; 18˚06.6139N, 147˚06.1154E, D=1233 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *BMS #23* was to obtain the serpentinite mud and rock cores at summit of the Asut Tesoru Seamount.

Dive summary:
We landed at 10 m south of IODP 366 Hole 1496B (KM-ROV marker 128-1) and started to drill and core at Hole A down to approx. 29 mbsf. When the drill bit reached to 29 mbsf, BMS had a problem in drill pipe rotation probably due to the abnormally increased hole pressure by sticky serpentinite mud. Once all the drill pipes were recovered and washed the hole wall by mud fluid. Then, we re-started to drill Holl A. After several meters drilled down, the oil level of BMS suddenly decreased and many oil droplets leaked. Thus, we stopped to drill and left bottom.

Payloads:

KM23-05 Carousel Cup Load Out Rev 2023/3/22

Date:	2022/3/22	Carousel Load #	r0
Location:	Asut Tesoru		
Dive No:	23		

Lead Lenghts(m)	
IT	2.470
CBL	2.655
HWTL	1.655

SLOTS	CUPS 1	2	3	4	5	6
1	WIT3	WIT4	WIT5			
2	HWTL	HWT	HWT			
3	WIT6	WIT7	WIT8			
4	HQR	HQR	HQR	HQR	HQR	HQR
5	WIT9	WIT10	WIT11			
6	HQCB1	HQR	HQR	HQR	HQR	
7	WIT12	WIT13	WIT14			
8	HQR	HQR	HQR	HQR	HQR	HQR
9	WIT15	WIT16	WIT17			
10	HQCB2	HQR	HQR	HQR	HQR	
11	WIT18	WIT19	WIT20			
12	WIT21	WIT22	WIT23	WIT24	WIT25	WIT26
13	WIT27	WIT28	WIT29			
14	HQCB3	HQR	HQR	HQR	HQR	
15	WIT30	WIT31	WIT32			
16	HQR	HQR	HQR	HQR	HQR	HQR
17	WIT33	WIT34	WIT35			
18	WIT36	WIT37	WIT38	WIT39	WIT40	WIT41
19						
20	HQR	HQR	HQR	HQR	HQR	HQR
21						
22	HWT	HWT	HWT	HWT		
23						
24	HQR	HQR	HQR	HQR	HQR	HQR

	Number of Tools
42	HQR
3	HQCB
41	WIT
6	HWT
1	HWTL
	AL

	Depth in Meters
60.00	WIT
63.00	HQ

	Bit Type – Add # or SPC
6-1	Carbonade CT10
10-1	Carbonade CT10
14-1	Imp. Di-corp T7(#6～#8)FD

HQCB WIT	SLOT	CUP
WIT1	6	1
WIT2	10	1

Wkole around

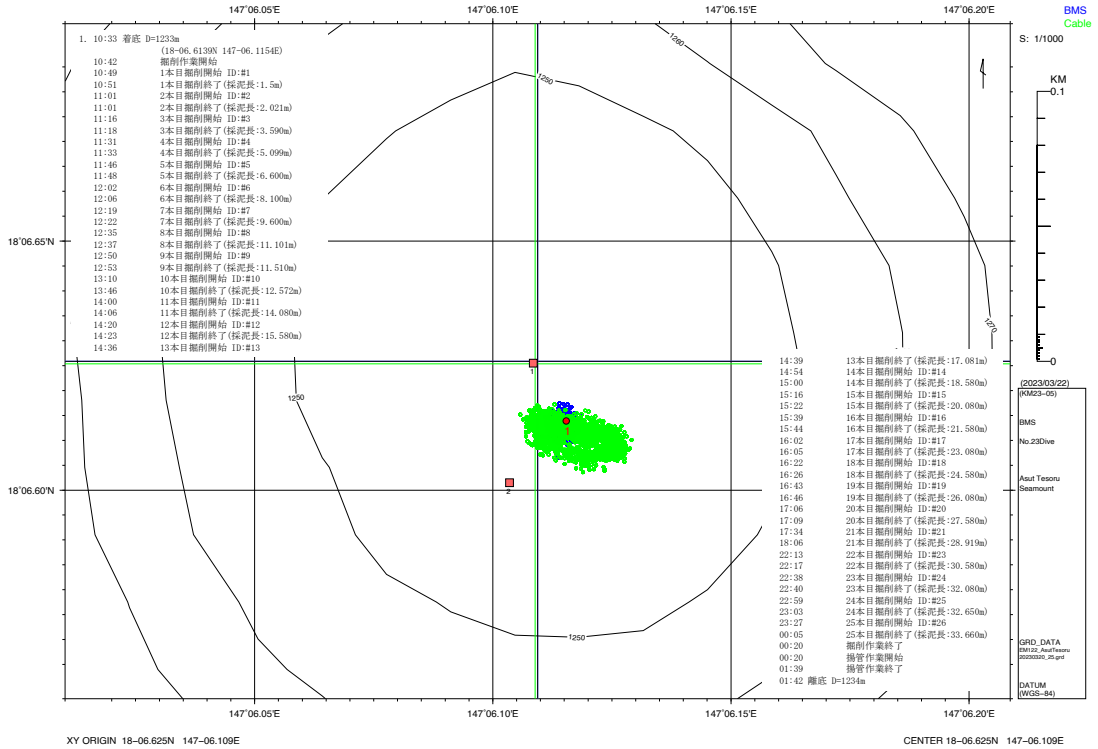
Wkole around

Event list:

March 22 10:33 18˚06.6139N, 147˚06.1154E Depth=1233 m Landing at Hole A

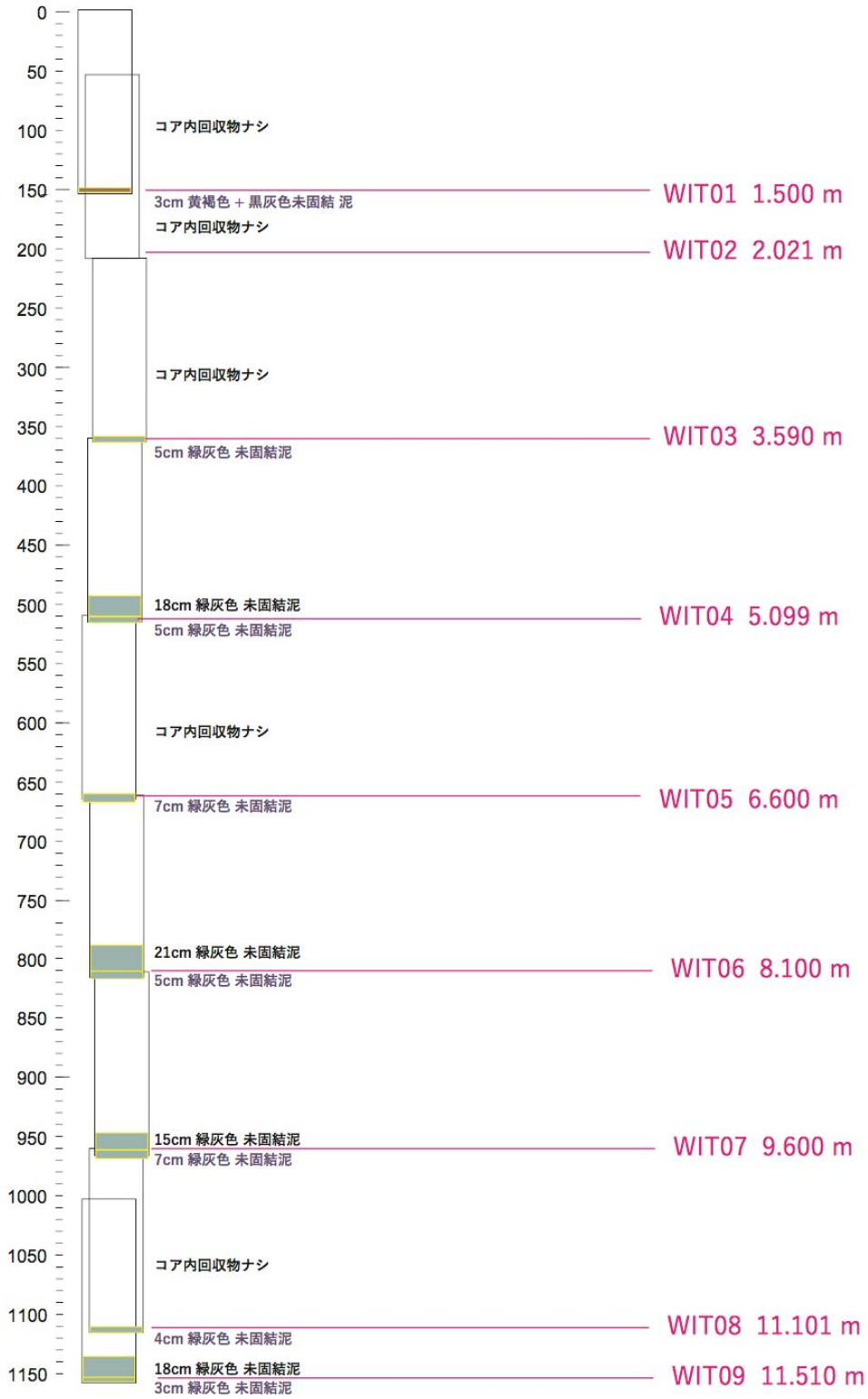
March 22 10:42	18˚06.6139N, 147˚06.1154E	Depth=1233 m	Start drilling & coring (Hole A)
March 22 18:06	18˚06.6139N, 147˚06.1154E	Depth=1233 m	Overloaded rotary torque
March 22 22:13	18˚06.6139N, 147˚06.1154E	Depth=1233 m	Re-start drilling & coring (Hole A)
March 23 00:20	18˚06.6139N, 147˚06.1154E	Depth=1233 m	Finish drilling & coring (Hole A)
March 23 01:42	18˚06.6139N, 147˚06.1154E	Depth=1233 m	Leaving bottom

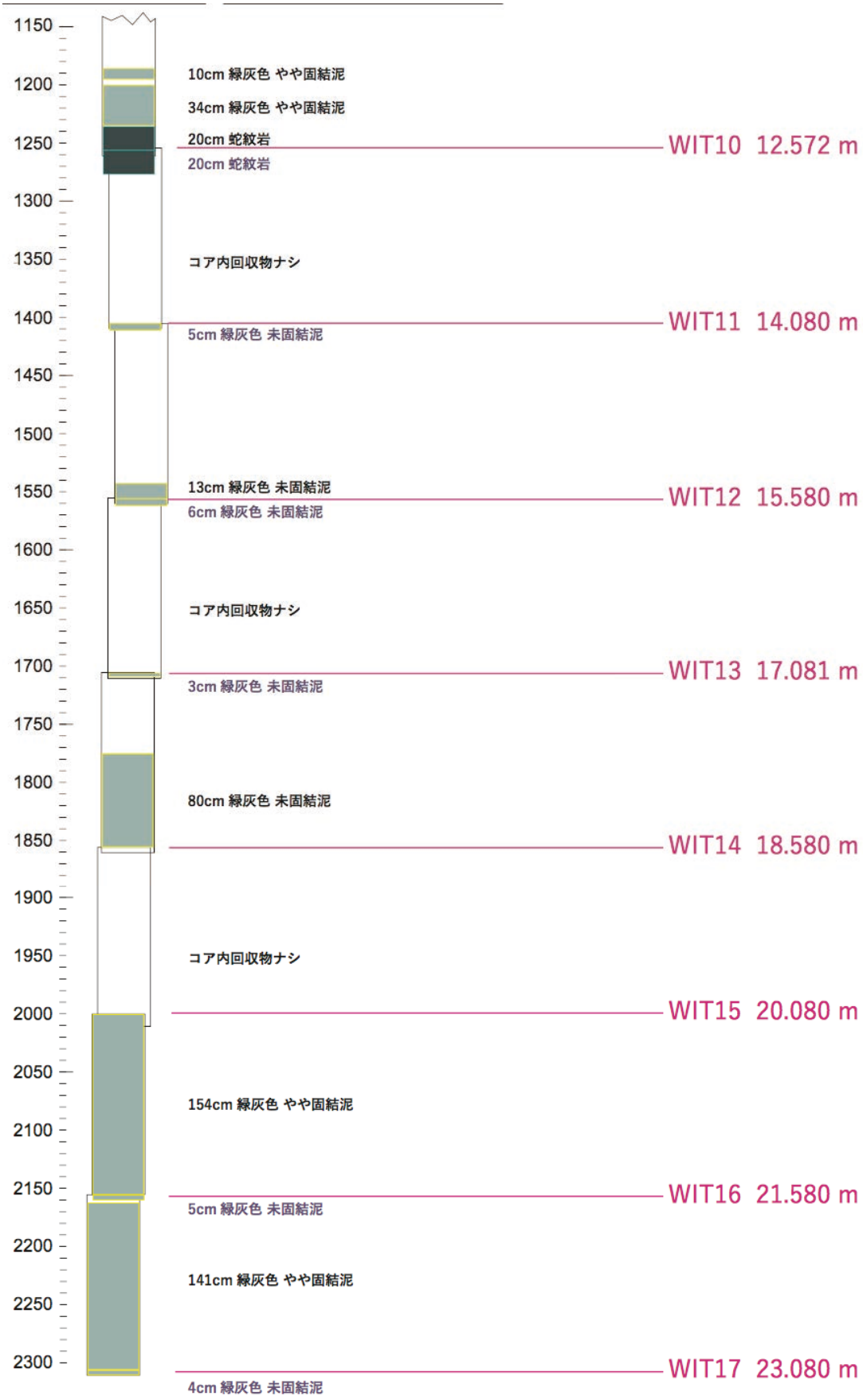
Dive Track:

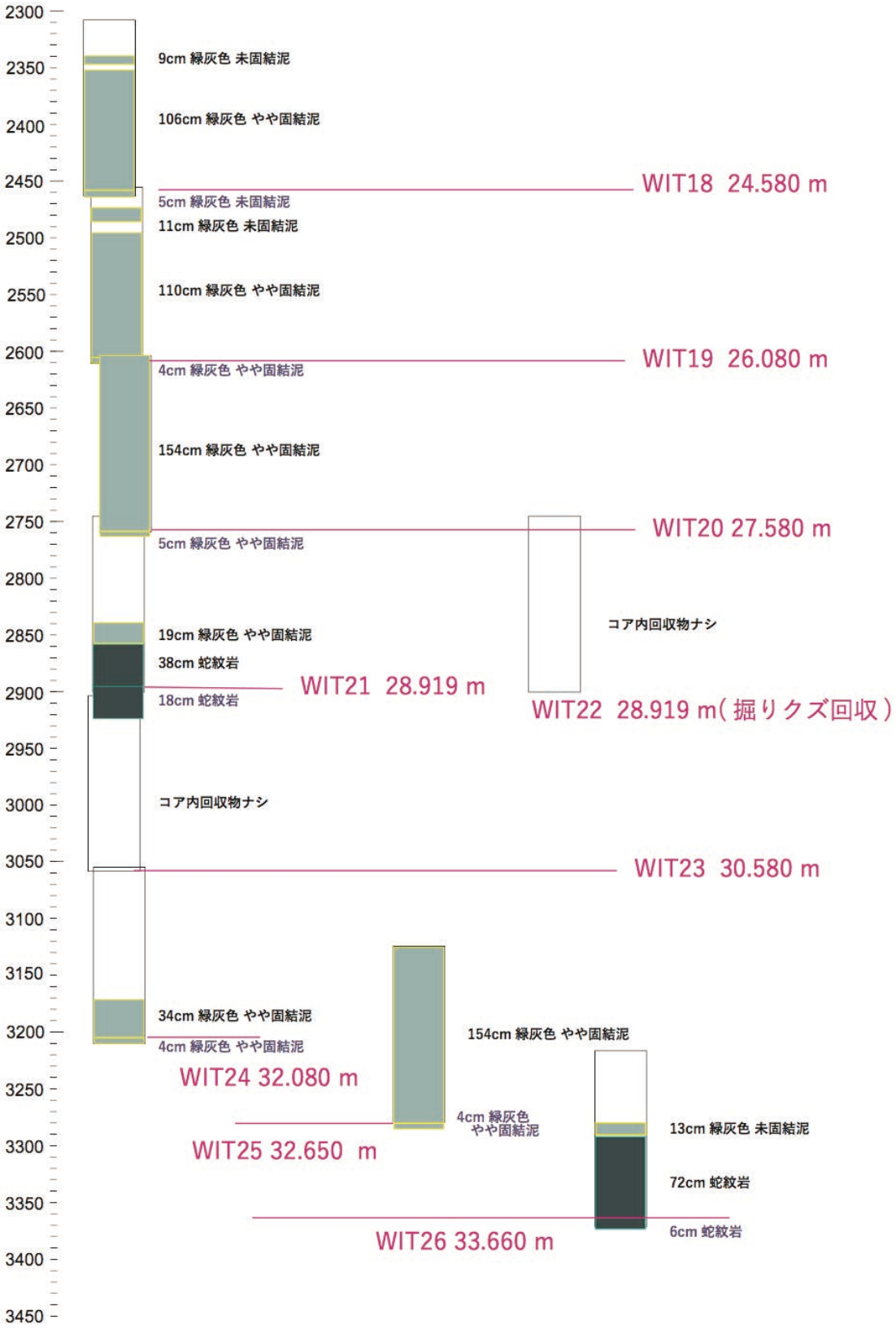

147°06.05'E
147°06.10'E
147°06.15'E
147°06.20'E
18°06.65'N
18°06.60'N
BMS
Cable
S: 1/1000
KM
0.1
0
1. 10:33 着底 D=1233m
(18-06.6139N 147-06.1154E)
10:42 掘削作業開始
10:49 1本目掘削開始 ID:#1
10:51 1本目掘削終了(採泥長:1.5m)
11:01 2本目掘削開始 ID:#2
11:01 2本目掘削終了(採泥長:2.021m)
11:16 3本目掘削開始 ID:#3
11:18 3本目掘削終了(採泥長:3.590m)
11:31 4本目掘削開始 ID:#4
11:33 4本目掘削終了(採泥長:5.099m)
11:46 5本目掘削開始 ID:#5
11:48 5本目掘削終了(採泥長:6.600m)
12:02 6本目掘削開始 ID:#6
12:06 6本目掘削終了(採泥長:8.100m)
12:19 7本目掘削開始 ID:#7
12:22 7本目掘削終了(採泥長:9.600m)
12:35 8本目掘削開始 ID:#8
12:37 8本目掘削終了(採泥長:11.101m)
12:50 9本目掘削開始 ID:#9
12:53 9本目掘削終了(採泥長:11.510m)
13:10 10本目掘削開始 ID:#10
13:46 10本目掘削終了(採泥長:12.572m)
14:00 11本目掘削開始 ID:#11
14:06 11本目掘削終了(採泥長:14.080m)
14:20 12本目掘削開始 ID:#12
14:23 12本目掘削終了(採泥長:15.580m)
14:36 13本目掘削開始 ID:#13
14:39 13本目掘削終了(採泥長:17.081m)
14:54 14本目掘削開始 ID:#14
15:00 14本目掘削終了(採泥長:18.580m)
15:16 15本目掘削開始 ID:#15
15:22 15本目掘削終了(採泥長:20.080m)
15:39 16本目掘削開始 ID:#16
15:44 16本目掘削終了(採泥長:21.580m)
16:02 17本目掘削開始 ID:#17
16:05 17本目掘削終了(採泥長:23.080m)
16:22 18本目掘削開始 ID:#18
16:26 18本目掘削終了(採泥長:24.580m)
16:43 19本目掘削開始 ID:#19
16:46 19本目掘削終了(採泥長:26.080m)
17:06 20本目掘削開始 ID:#20
17:09 20本目掘削終了(採泥長:27.580m)
17:34 21本目掘削開始 ID:#21
18:06 21本目掘削終了(採泥長:28.919m)
22:13 22本目掘削開始 ID:#23
22:17 22本目掘削終了(採泥長:30.580m)
22:38 23本目掘削開始 ID:#24
22:40 23本目掘削終了(採泥長:32.080m)
22:59 24本目掘削開始 ID:#25
23:03 24本目掘削終了(採泥長:32.650m)
23:27 25本目掘削開始 ID:#26
00:05 25本目掘削終了(採泥長:33.660m)
00:20 掘削作業終了
00:20 揚管作業開始
01:39 揚管作業終了
01:42 離底 D=1234m
1260
1250
1270
1290
(2023/03/22)
(KM23-05)
BMS
No.23Dive
Asut Tesoru
Seamount
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 18-06.625N 147-06.109E
CENTER 18-06.625N 147-06.109E

Core Recovery:

Hole A




1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1900
1950
2000
2050
2100
2150
2200
2250
2300
10cm 緑灰色 やや固結泥
34cm 緑灰色 やや固結泥
20cm 蛇紋岩
20cm 蛇紋岩
WIT10 12.572 m
コア内回収物ナシ
5cm 緑灰色 未固結泥
WIT11 14.080 m
13cm 緑灰色 未固結泥
6cm 緑灰色 未固結泥
WIT12 15.580 m
コア内回収物ナシ
3cm 緑灰色 未固結泥
WIT13 17.081 m
80cm 緑灰色 未固結泥
WIT14 18.580 m
コア内回収物ナシ
WIT15 20.080 m
154cm 緑灰色 やや固結泥
5cm 緑灰色 未固結泥
WIT16 21.580 m
141cm 緑灰色 やや固結泥
4cm 緑灰色 未固結泥
WIT17 23.080 m


2300
2350
2400
2450
2500
2550
2600
2650
2700
2750
2800
2850
2900
2950
3000
3050
3100
3150
3200
3250
3300
3350
3400
3450
9cm 緑灰色 未固結泥
106cm 緑灰色 やや固結泥
WIT18 24.580 m
5cm 緑灰色 未固結泥
11cm 緑灰色 未固結泥
110cm 緑灰色 やや固結泥
WIT19 26.080 m
4cm 緑灰色 やや固結泥
154cm 緑灰色 やや固結泥
WIT20 27.580 m
5cm 緑灰色 やや固結泥
コア内回収物ナシ
19cm 緑灰色 やや固結泥
38cm 蛇紋岩
WIT21 28.919 m
18cm 蛇紋岩
WIT22 28.919 m(掘りクズ回収)
コア内回収物ナシ
WIT23 30.580 m
34cm 緑灰色 やや固結泥
4cm 緑灰色 やや固結泥
WIT24 32.080 m
154cm 緑灰色 やや固結泥
4cm 緑灰色
やや固結泥
WIT25 32.650 m
13cm 緑灰色 未固結泥
72cm 蛇紋岩
6cm 蛇紋岩
WIT26 33.660 m

Dive Report: KM-ROV #222
Date: March 23, 2023
Site: Asùt Tesoru Seamount, Mariana Forearc
On bottom: 08:51; 18˚06.5494N, 147˚06.1025E, D=1252 m
Leave bottom: 15:00; 18˚06.6127N, 147˚06.1144E, D=1239 m
Observer: Shino Suzuki (JAXA)

Objectives:
The objective of *KM-ROV* Dive #222 was to obtain the pristine serpentinite fluid that flowed from the CORK Lite IODP#366-HoleU1496C. To collect pristine fluid sample, we employed a newly-developed TSURISAGE-water sampler which is capable of collecting fluid from the relatively deep point (about 7-8 m below the head of the CORK Lite) in the CORK Lite.

Dive summary:
First, we quickly tested a repaired suction sampler for ten minutes (8:52-9:02) on the way from the first landed site to the CORK Lite site and confirmed that it worked appropriately. Soon after we arrived at the CORK Lite site, we installed the sinker (sampling port) of TSURISAGE-water sampler (9:18 AM) to the CORK Lite and then moved up the ROV at 1238.0m. We paid out the tube of the TSURISAGE-water sampler. The tip of the tube was expected to reach around 7.5 m below the head of CORK Lite (length of the tube was about 9 m.). We collected the fluid with WHATS#1 (9:27-9:36), WHATS#2 (9:36-9:43) and WHATS#3 (9:43-9:51) and analyzed the waters with the cyclic voltammetry (named D-POTE) during the water collection. Then we collected first 20L of fluid (10:00-11:13), second 20L of fluid (11:32 - 12:46) and third 20L of fluid (12:58-14:13) with the bag samplers, and then collected fluid with WHATS#4 (14:13-14:25). We pulled up the tube of TSURISAGE-water sampler by a winch which can be operated by the manipulator of ROV, then TSURISAGE-water sampler was pulled out from the CORK Lite entirely. We closed the bulb of CORK Lite.
Then ROV moved up to the north a bit and we identified the drill hole of BMS#23 (which has a nice 100-year coral marker!) and then observed it. Then we left bottom.

Payloads:
- Suction sampler with single chamber
- WHATS-3
- Bag sampler
- D-POTE
- TSURISAGE-water sampler

Event list:

08:51 landing D=1252m (18-06.5494N 147-06.1025E)

09:27 D=1238m Start collecting water (18-06.6017N 147-06.1036E)

09:35 WHATS#1 sampling -- done

09:43 WHATS#2 sampling -- done

09:51 WHATS#3 sampling -- done

11:13 Bag water#1 (yellow) sampling -- done

12:46 Bag water#2 (red) sampling -- done

14:17 Bag water#3 (green) sampling -- done

14:25 WHATS#4 start

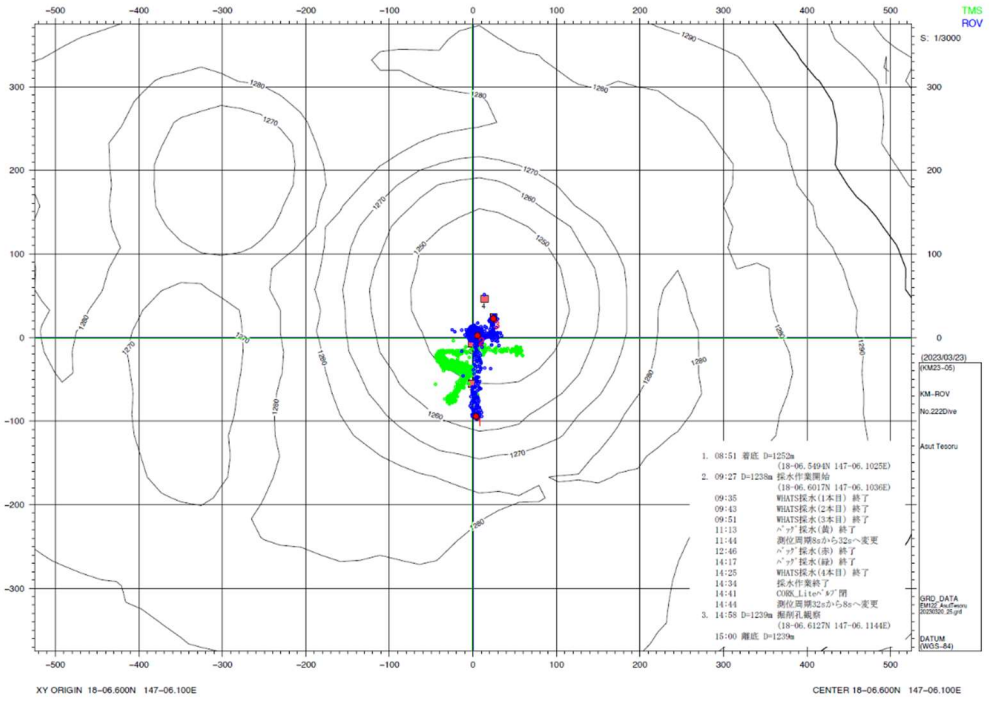
14:34 WHATS#4 done

14:41 Close the bulb of CORK Lite

14:58 D=1239m Observation of drill hole of BMS#23

15:00 leave the bottom (18-06.6127N 147-06.1144E) D=1239m

Dive Track:


TMS
ROV
S: 1/3000
1. 08:51 着底 D=1252m
(18-06.549N 147-06.1025E)
2. 09:27 D=1238m 採水作業開始
(18-06.601N 147-06.1036E)
09:35 WHATS採水(1本目) 終了
09:43 WHATS採水(2本目) 終了
09:51 WHATS採水(3本目) 終了
11:13 ﾍﾞｯﾀﾞ採水(黄) 終了
11:44 測位周期8sから32sへ変更
12:46 ﾍﾞｯﾀﾞ採水(赤) 終了
14:17 ﾍﾞｯﾀﾞ採水(緑) 終了
14:25 WHATS採水(4本目) 終了
14:34 採水作業終了
14:41 CORL_Liteﾍﾞｯﾀﾞ閉
14:44 測位周期32sから8sへ変更
3. 14:58 D=1239m 船舶礼観察
(18-06.612N 147-06.1144E)
15:00 離底 D=1239m
(2023/03/23)
(KM23-05)
KM-ROV
No.222Dive
Asut Tesoru
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 18-06.600N 147-06.100E
CENTER 18-06.600N 147-06.100E

Dive Report: KM-ROV #223
Date: March 25, 2023
Site: NW Eifuku Seamount, Mariana Arc
On bottom: 09:06; 21˚29.2531N, 144˚02.4395E, D=1659 m
Leave bottom: 12:10; 21˚29.2341N, 144˚02.4990E, D=1614 m
Observer: Ken Takai (JAMSTEC)

Objectives:
The objective of *KM-ROV* Dive #223 was to collect liquid CO2 droplets and to measure the composition by in situ Raman spectroscopy and to obtain the pure liquid CO2 fraction.

Dive summary:
We landed on the larva and volcanic clast seafloor about 100 m west from the Champagne site. Near the cheap sparkling wine site, we collected several animal individuals. Then, we moved to liquid CO2 droplet site. We started to collect liquid/supercritical CO2 droplet. We successfully gathered 2 L of liquid/supercritical CO2 fluid in the glass bottle. Then, we sampled 2 bottles of fluid at the seafloor (1619 m; 16MPa). During the recovery of ROV, we stopped ROV at water depths of 600, 550, 500 m and in situ Raman spectrometry was repeated. At 500 m, two bottles of liquid CO2 were collected. Furthermore, we stopped ROV at a water depth of 450 m and in situ Raman spectrometry was repeated. However, at 430 m, liquid CO2 make a phase separation into liquid and gas phases. We stopped ROV at a water depth of 415 m and in situ Raman spectrometry was repeated. Again, we stopped ROV at a water depth of 400 m and in situ Raman spectrometry was repeated. Again, we stopped ROV at a water depth of 350 m and in situ Raman spectrometry was repeated. Again, we stopped ROV at a water depth of 300 m and in situ Raman spectrometry was repeated.

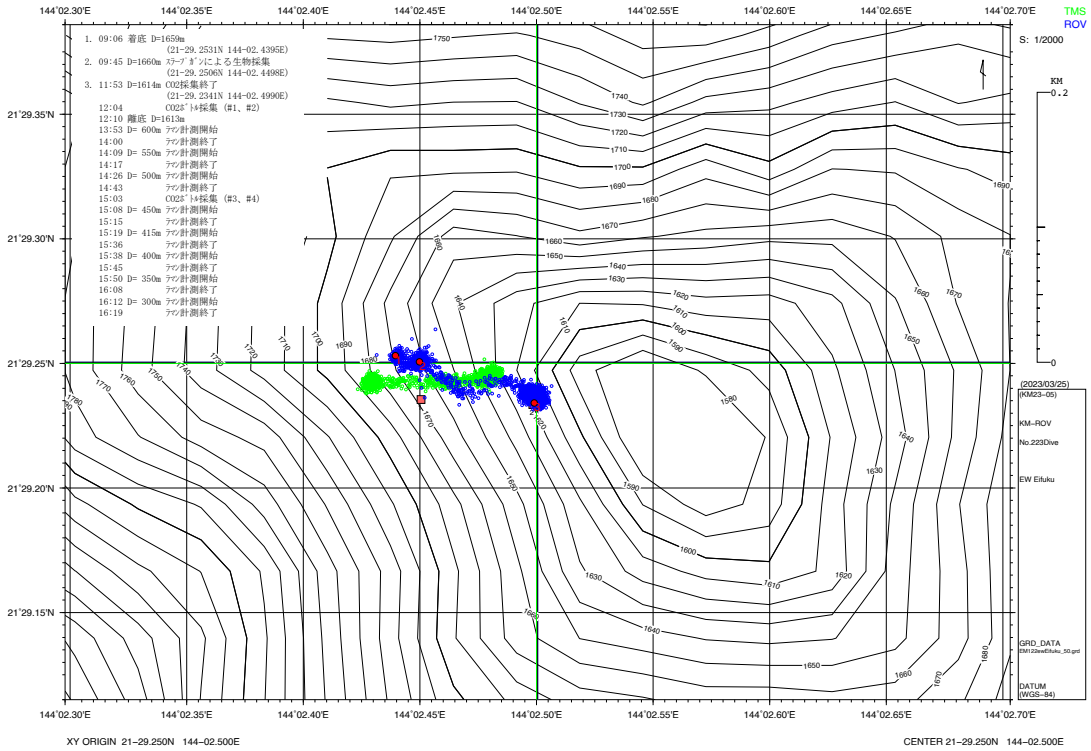
Payloads:
- Suction sampler with single chamber
- *In situ* Raman spectrometer
- Liquid CO2 sampler

Event list:

09:06	21˚29.2531N, 144˚02.4395E	Depth=1659 m	Landing
09:45	21˚29.2506N, 144˚02.4498E	Depth=1660 m	Sampling animals
11:53	21˚29.2341N, 144˚02.4990E	Depth=1614 m	Gathering liquid/supercritical CO2 and sampling 2 bottles
12:10	21˚29.2341N, 144˚02.4990E	Depth=1613 m	leaving bottom
14:00		Depth=600 m	In situ Raman spectrometry

14:17	Depth=550 m	In situ Raman spectrometry
15:03	Depth=500 m	In situ Raman spectrometry and sampling 2 bottles
15:15	Depth=450 m	In situ Raman spectrometry
15:36	Depth=415 m	In situ Raman spectrometry
15:45	Depth=400 m	In situ Raman spectrometry
15:50	Depth=350 m	In situ Raman spectrometry
16:19	Depth=300 m	In situ Raman spectrometry

Dive Track:


144°02.30'E
144°02.35'E
144°02.40'E
144°02.45'E
144°02.50'E
144°02.55'E
144°02.60'E
144°02.65'E
144°02.70'E
TMS
ROV
S: 1/2000
KM
0.2
0
21°29.35'N
21°29.30'N
21°29.25'N
21°29.20'N
21°29.15'N
1. 09:06 着底 D=1659m
(21-29.2531N 144-02.4395E)
2. 09:45 D=1660m ｽﾗｰﾌﾟｶﾞﾝによる生物採集
(21-29.2506N 144-02.4498E)
3. 11:53 D=1614m CO2採集終了
(21-29.2341N 144-02.4990E)
12:04 CO2ﾎﾞﾄﾙ採集 (#1、#2)
12:10 離底 D=1613m
13:53 D= 600m ﾃﾝ計測開始
14:00 ﾃﾝ計測終了
14:09 D= 550m ﾃﾝ計測開始
14:17 ﾃﾝ計測終了
14:26 D= 500m ﾃﾝ計測開始
14:43 ﾃﾝ計測終了
15:03 CO2ﾎﾞﾄﾙ採集 (#3、#4)
15:08 D= 450m ﾃﾝ計測開始
15:15 ﾃﾝ計測終了
15:19 D= 415m ﾃﾝ計測開始
15:36 ﾃﾝ計測終了
15:38 D= 400m ﾃﾝ計測開始
15:45 ﾃﾝ計測終了
15:50 D= 350m ﾃﾝ計測開始
16:08 ﾃﾝ計測終了
16:12 D= 300m ﾃﾝ計測開始
16:19 ﾃﾝ計測終了
(2023/03/25)
(KM23-05)
KM-ROV
No.223Dive
EW Eifuku
GRD_DATA
DATUM
(WGS-84)
XY ORIGIN 21-29.250N 144-02.500E
CENTER 21-29.250N 144-02.500E

V. Notice on Using

This cruise report is a preliminary documentation as of the end of cruise.
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