



R/V Kaimei Cruise Report
KM21-13C

Maintenance of the Dense Ocean-floor Network System
for Earthquakes and Tsunamis (DONET)

Kumano-nada and off Kii-suido

Dec. 01, 2021 – Dec. 09, 2021

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

Contents

1. Cruise Information
2. Research Proposal and Science Party
3. Research/Development Activities
4. Cruise Log
5. Notice on Using

1. Cruise Information

Cruise ID: KM21-13C

Name of vessel: KAIMEI

Title of project: Maintenance of the Dense Ocean-floor Network System for Earthquakes and Tsunamis (DONET)

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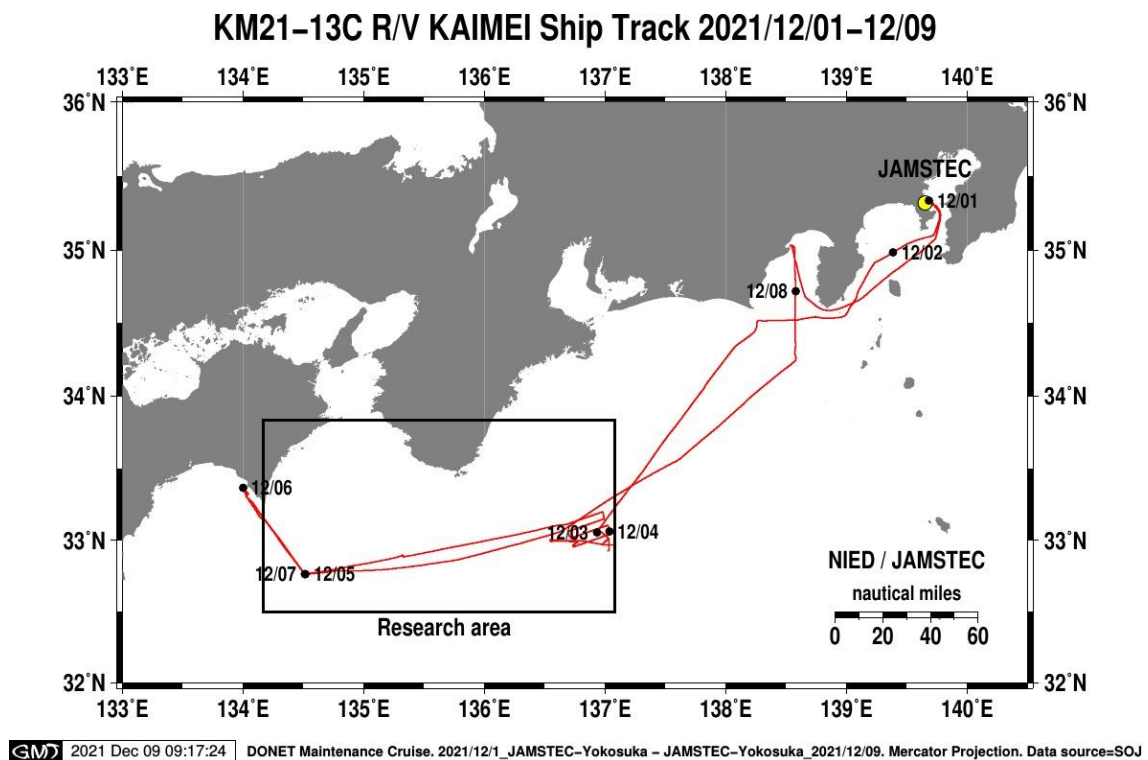
Chief Scientist [Affiliation] : Hiroyuki MATSUMOTO [JAMSTEC]

Cruise period: 2021/12/01 – 2021/12/09

Ports of departure / call / arrival: Yokosuka Port/Yokosuka Port

Research area: Kumano-nada and off Kii-suido

Research map



2. Research Proposal and Science Party

- Title of proposal: Maintenance of the Dense Ocean-floor Network System for Earthquakes and Tsunamis (DONET)
- Representative of Science Party [Affiliation] : Shuichi KODAIRA [JAMSTEC]
- Science Party (List) [Affiliation, assignment etc.]
 - Hiroyuki MATSUMOTO [JAMSTEC]
 - Shuhei NISHIDA [JAMSTEC]
 - Kyohiko MITSUZAWA [JAMSTEC]
 - Kohru KODERA [Nippon Marine Enterprises]
 - Masayuki TOIZUMI [Nippon Marine Enterprises]
 - Wataru TOKUNAGA [Nippon Marine Enterprises]
 - Haruki DOI [Nippon Marine Enterprises]

3. Research/Development Activities

3.1. Preparation for improvement of observatory condition

A seismic sensor is buried under the seafloor using the casing, i.e., 1-m depth hole deployed by the piston coring system during the DONET construction; however the sensor at KMC-11 could not be buried and is deployed at the seafloor, bringing that the seismic noise floor is relatively high compared to the other stations. Therefore, new observatory would be installed using the casing so that the sensor is buried under the seafloor.

Since the station KMC-10 is located on the slope, it is difficult to search the station using sonar. Inspections of bottom material using the suction system was conducted, deployment of ROV Homer, and visual observation around the station were conducted as a preparation for observatory construction, so that we save the time for a future deployment operation (Fig. 1).

At the KMC-10 station, we observed the cable laying situation around the station (Fig. 2), tested the installation of the casing (Fig. 3), and installed the ROV-Homer.

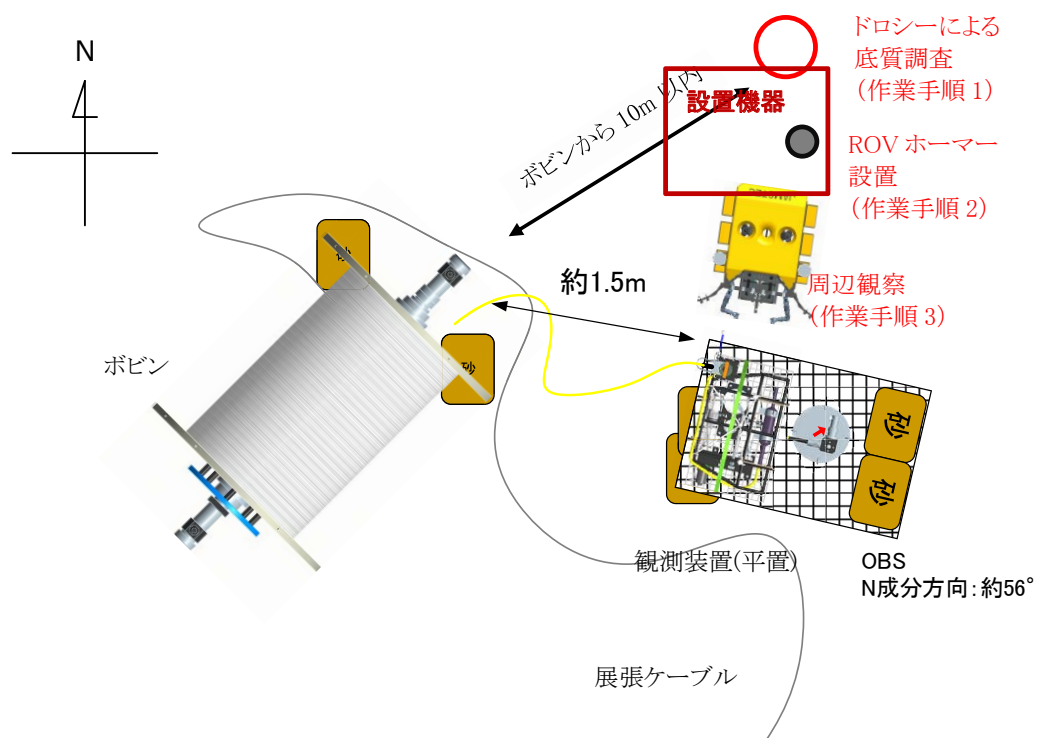


Fig. 1 Schematic figure of KMC



Fig. 2 Observatory equipment (left: cable drum, right: sensor system) of the KMC-10 station



Fig. 3 Casing installation test by the suction system

3.2. Improvement of data quality

The DONET seismic sensors are deployed under the seafloor except for one station at KMC-10. The seismic sensor at KMC-11 deployed during the KS-21-J02C cruise would be coupled with the seafloor by filling back sand between the sensor and the casing.

Due to the stormy weather, the MRC-11 station was not backfilled during this cruise, and alternatively a wide-area seafloor bathymetry survey was conducted using the "Kaimei" multi-narrow beam acoustic sounder system (Fig. 4).

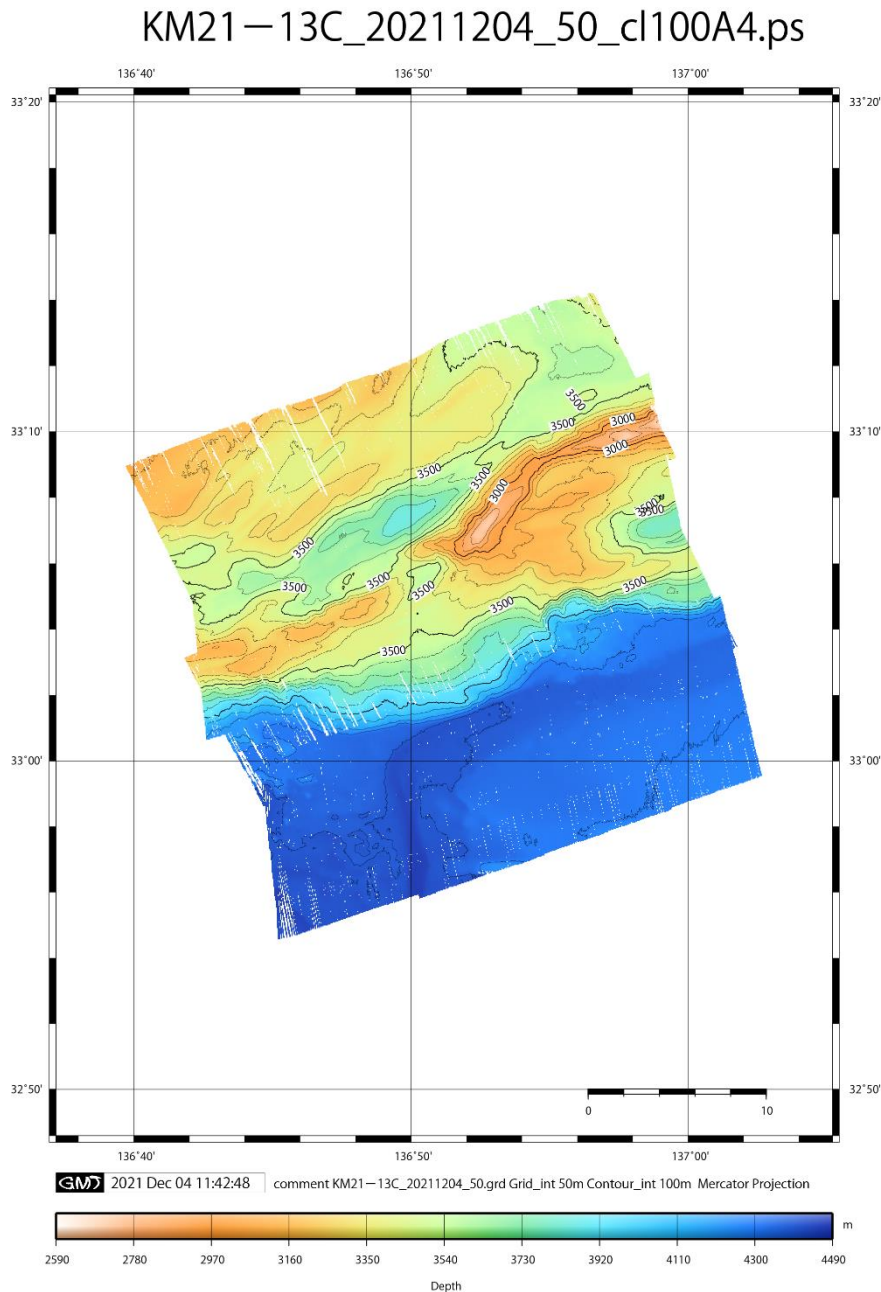


Fig. 4 Bathymetry obtained at the KM21-13C cruise

3.3. Replacement of the observation equipment

The observation equipment would be recovered at MRF-23, MRG-26, MRE-19 and MRG-29 stations where some observation data is unavailable. Depending on the sea conditions and the condition of the observation equipment, the observation equipment would be recovered at MRB-05 station.

The observation device consists of a ground motion sensor system and a pressure sensor package, which are connected by a 10 m underwater cable. Therefore, in the recovery work of the observation equipment, it is necessary to recover the ground motion sensor system and the pressure sensor package at the same time. In the recovery operation, a recovery rope pre-attached to the ground motion sensor system and a hook are attached to the frame of the pressure sensor package.

Using two dives, we recovered the observation equipment at the MRG-26 station (Fig. 5) where seismic data is in trouble (Figs. 6 – 9).

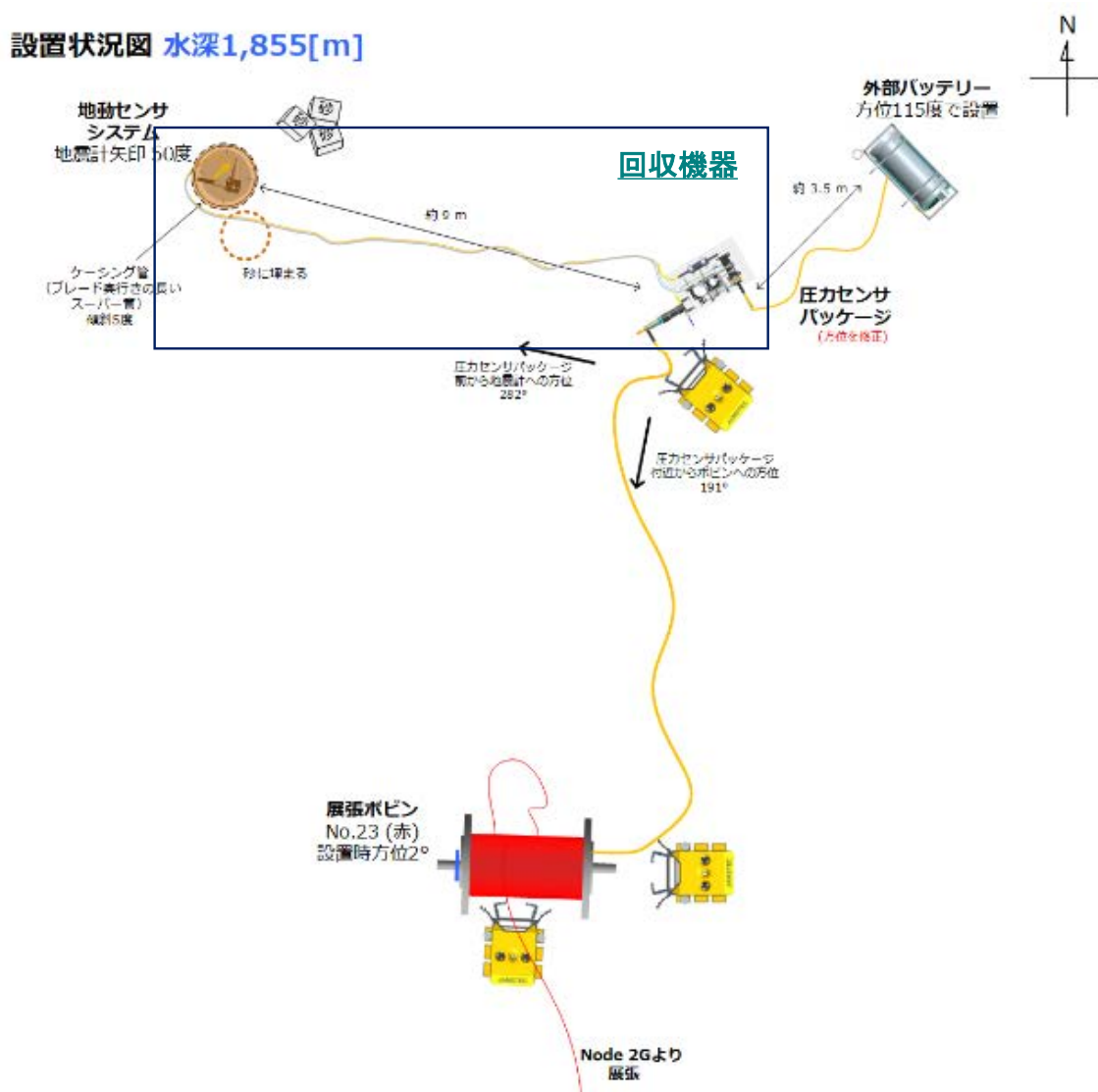


Fig. 5 Schematic figure of MRG-26 station

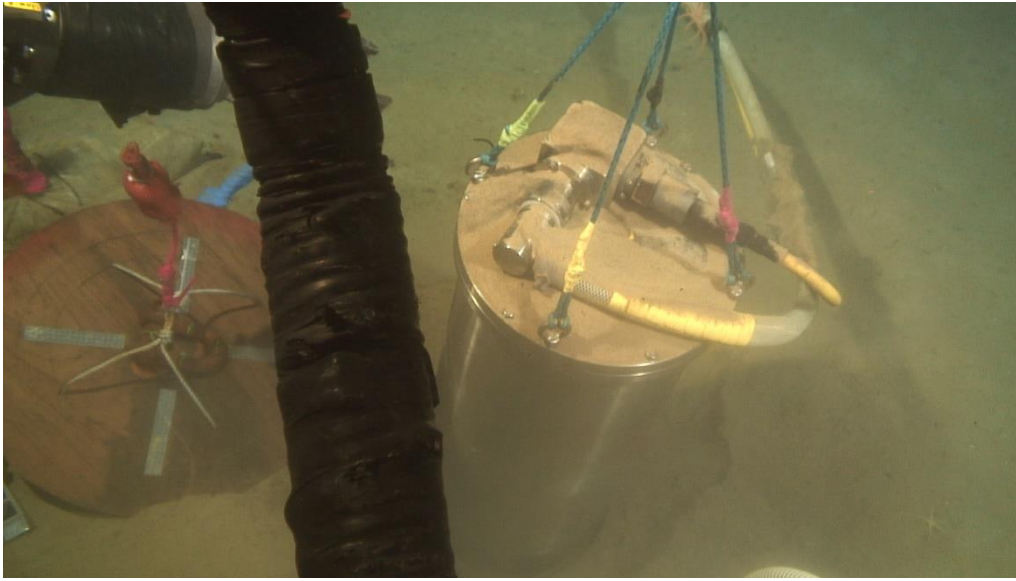


Fig. 6 Pulling up the seismic sensor

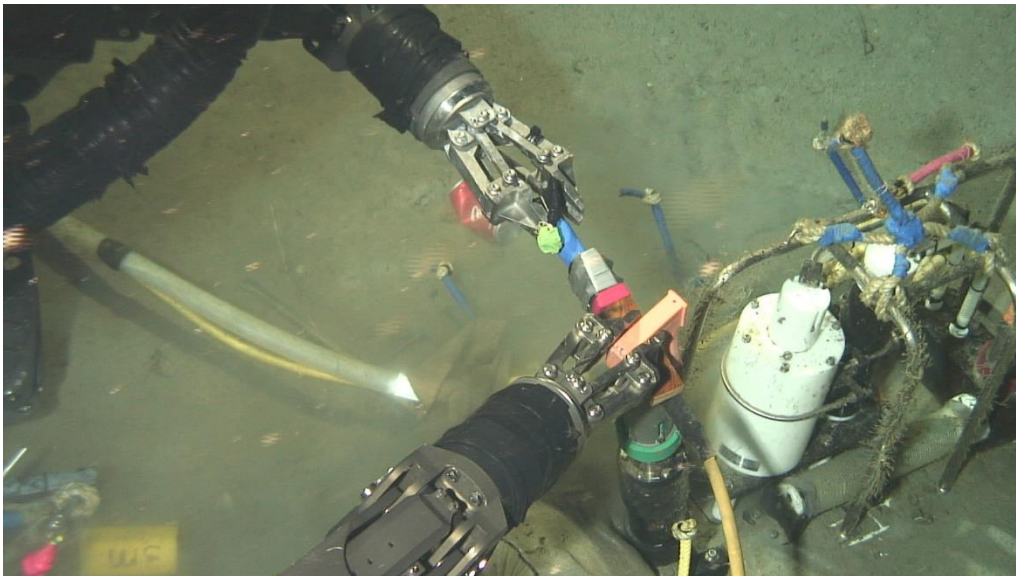


Fig. 7 Disconnect between the cable drum and the observatory

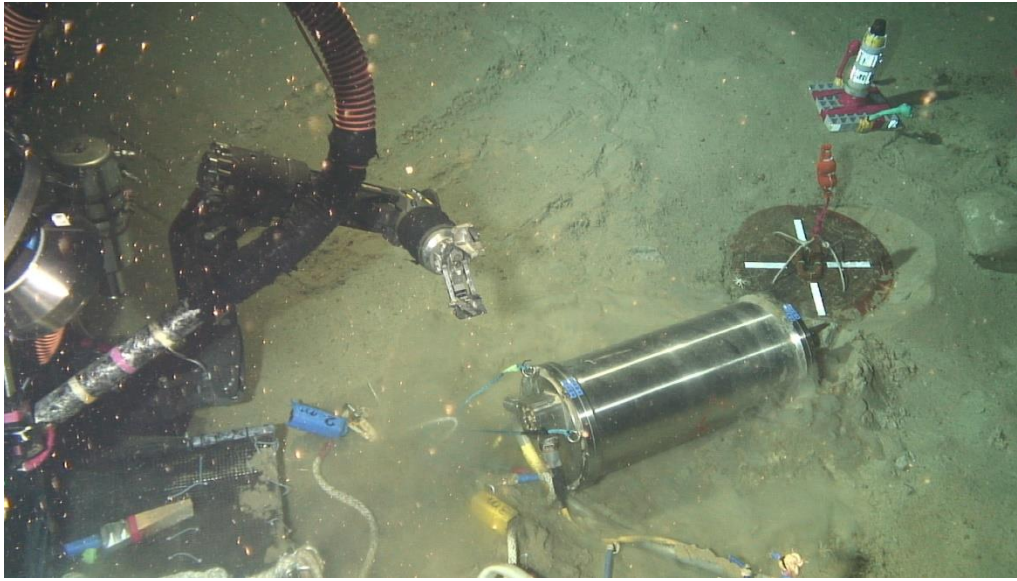


Fig.8 Recovery rope attached the pressure sensor package

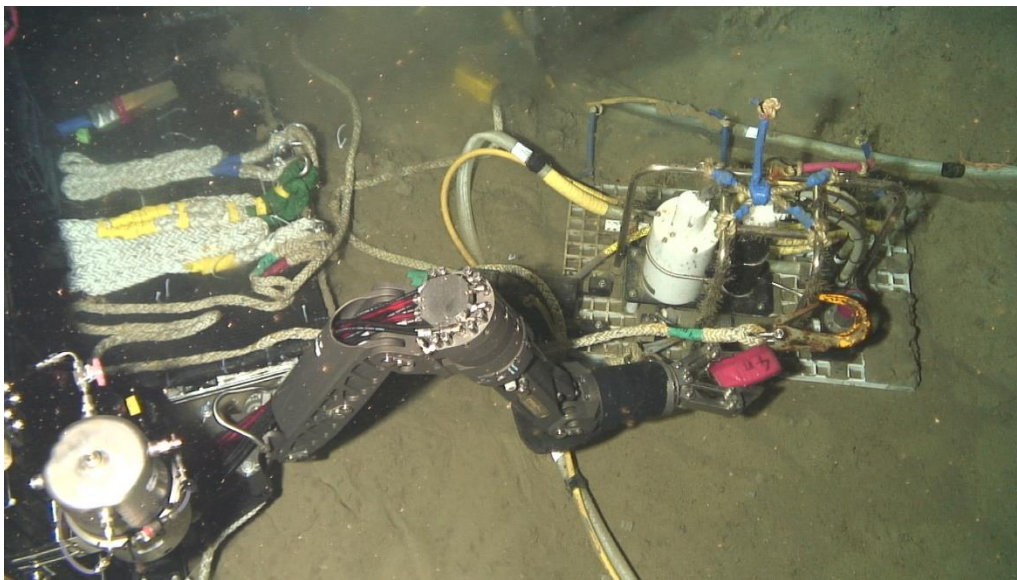


Fig. 9 Recovery rope attached the seismic sensor

4. Cruise Log

Cruise log is provided as follows.

Date	Ship log	Area	Activities
12/01	Departure from Yokosuka		
12/02	Shift to Kumano-nada		
12/03	HPD Dive #2137	KMC-10	Visual observation, Casing test
12/04	MBES	KMC area	Bathymetry survey
12/05	HPD Dive#2138	MRG-26	Replacement of observatory
12/06	Maintenance	West of off Muroto	Maintenance of 'Hyper-Dolphin'
12/07	HPD Dive #2139	MRG-26	Replacement of observatory
12/08	Shift to Yokosuka		Stop by Shimizu
12/09	Arrived at Yokosuka		

5. Notice on Using

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

This report is not necessarily corrected even if there is any inaccurate description (i.e. taxonomic classifications). This report is subject to be revised without notice. Some data on this report may be raw or unprocessed. If you are going to use or refer the data on this report, it is recommended to ask the Chief Scientist for latest status.

Users of information on this report are requested to submit Publication Report to JAMSTEC.

<http://www.godac.jamstec.go.jp/darwin/explain/1/e#report>

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