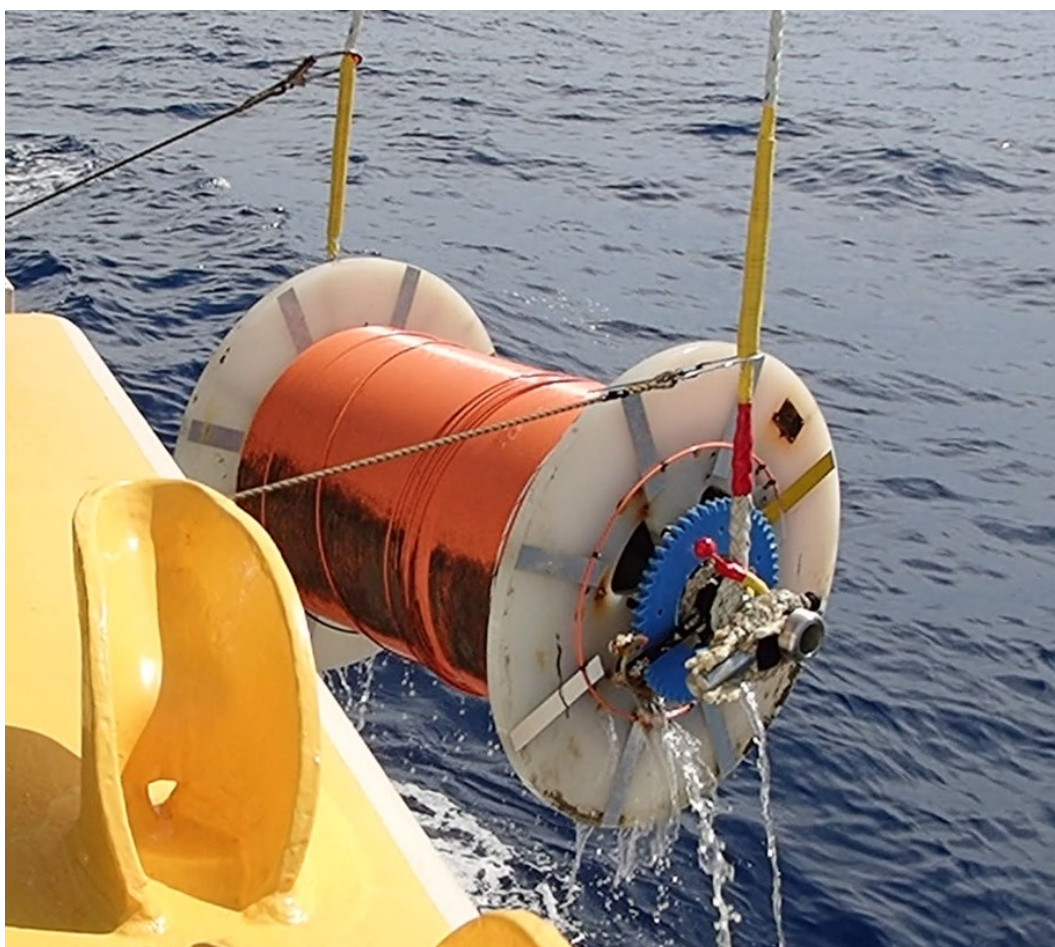




R/V *Shinsei-maru* Cruise Report  
KS-26-J04C

DONET maintenance

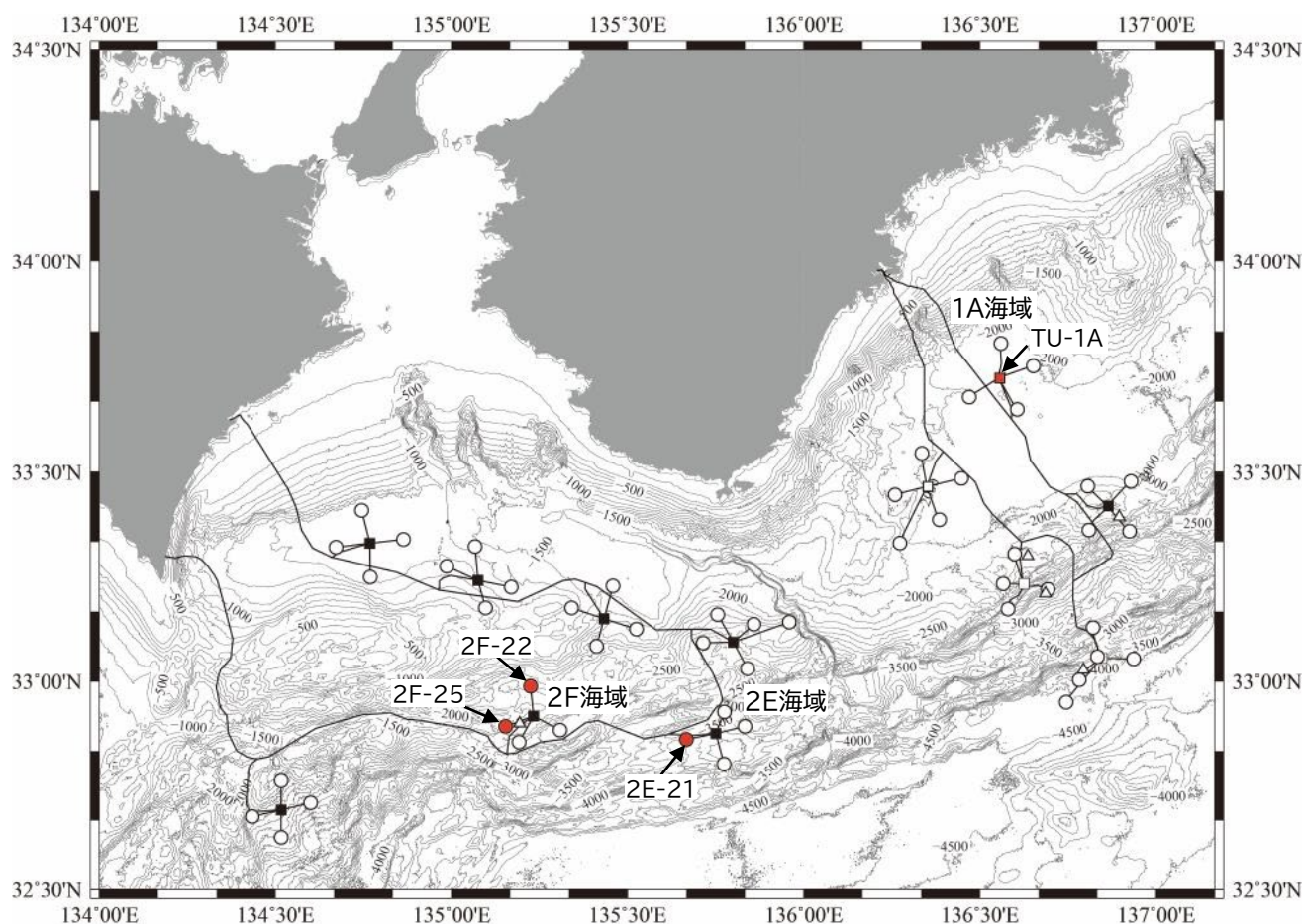


Kumano-nada and Off Kii-channel  
May 6 - 14, 2026

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

## 1. Cruise Information

- Cruise ID KS-26-J04C
- Name of vessel R/V *Shinsei-maru*
- Title of cruise DONET maintenance
- Chief Scientist [Affiliation] Takashi YOKOBIKI [JAMSTEC]
- Cruise period May 6- May 14, 2026
- Ports of departure / arrival JAMSTEC Yokosuka - Kobe port



○DONET observatory □DONET Node △Long term borehole Monitoring System

Figure1-1. Research area

Table 1-1. Research locations

| Observatory No. | Latitude    | Longitude    | Depth [m] |
|-----------------|-------------|--------------|-----------|
| TU-1A           | 33-43.344°N | 136-33.209°E | 2,009     |
| 2E-21           | 32-51.616°N | 135-40.020°E | 3,534     |
| 2F-22           | 32-59.277°N | 135-13.500°E | 2,104     |
| 2F-25           | 32-53.511°N | 135-09.225°E | 2,278     |

## 2. Research Proposal and Science Party

- Title of proposal
- Representative of Science Party
- Science Party (List)

|                   |           |
|-------------------|-----------|
| DONET Maintenance |           |
| Takushi IINUMA    | [JAMSTEC] |
| Takashi YOKOBIKI  | [JAMSTEC] |
| Yojiro YAMAMOTO   | [JAMSTEC] |
| Takeshi KATAYAMA  | [JAMSTEC] |
| Kyohiko MITSUZAWA | [JAMSTEC] |
| Ryo OYAMA         | [NME]     |
| Fumito SAKURAGI   | [NME]     |
| Kazuki TANIGUCHI  | [NME]     |

JAMSTEC: Japan Agency for Marine-Earth Science and Technology, NME: Nippon Marine Enterprises

## 3. Cruise outline

DONET (Dense Oceanfloor Network system for Earthquakes and Tsunamis) was developed and constructed by JAMSTEC starting in 2006 as a project of MEXT (Ministry of Education, Culture, Sports, Science and Technology). Operations began as segments were completed, and the system became fully operational in March 2016. In April 2016, its operation was transferred to NIED (National Research Institute for Earth Science and Disaster Resilience). Since then, JAMSTEC has maintained the seafloor components under a contract based on a comprehensive collaboration agreement with NIED. In this research cruise, we used the ROV Hyper-Dolphin, operated by the R/V Shinsei-Maru, to relocate extension cables for future repairs around the Termination Units (TU) in areas 1A. We also conducted fault investigations at Observation System 2F-25 and retrieved an extension cable bobbin at 2F-22 and Observation Systems at 2E-21.

## 4. Dive Summary

### 4.1 DIVE#2291 on May 7, 2026: Relocate extension cable around the TU-1A.

Relocation of the extension cable for future repairs around TU-1A was carried out during this dive. The ROV Hyper Dolphin started its descent at 09:08 and reached TU-1A at 10:14 at a depth of 2,004 m. Visibility was low due to suspended matter on the seafloor, which resembled falling large snowflakes (Botan-yuki). The relocation work began at 10:38. The parking port and junction box of the Extension Cable No. 8 (white cable) were lifted using both manipulators, raised to an altitude of 50 m above the seafloor, moved approximately 100 m to the west, and redeployed at a depth of 1,992 m. Afterward, while visually inspecting the extension cable, the ROV moved eastward to the cable turnaround point. The ROV left the seafloor at 12:04 and was recovered on deck at 13:19.



Photo 4.1-1 Termination Unit (TU-1A).



Photo 4.1-2 Junction Box seen through large snowflakes.

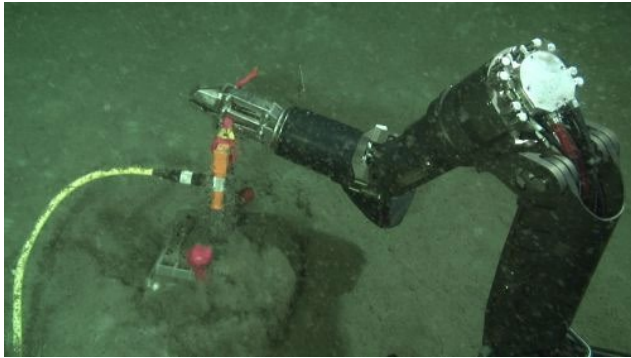


Photo 4.1-3 Pick-up parking port of No.8 cable.

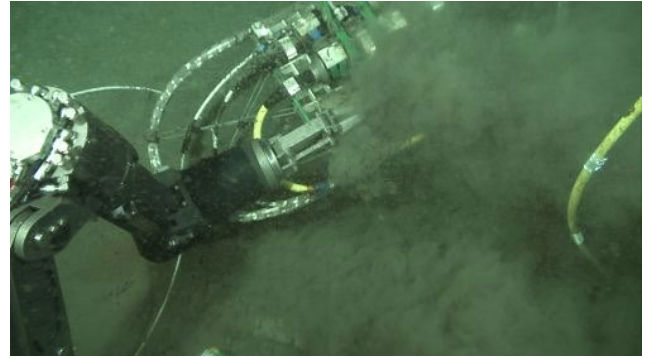


Photo 4.1-4 Pic-up junction box of No.8 cable.



Photo 4.1-5 Start moving for relocation.

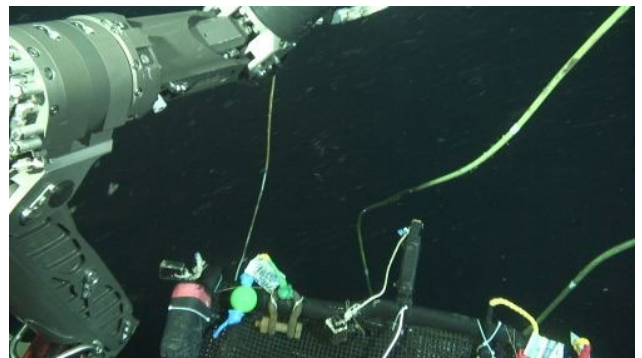


Photo 4.1-6 Moving above 50 m from the seafloor.

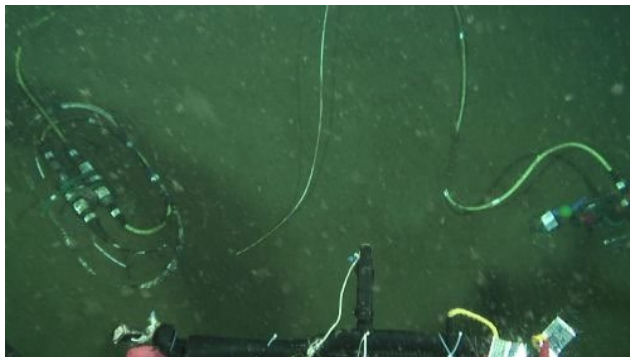


Photo 4.1-7 Re-deployed about 100 m west of original point.

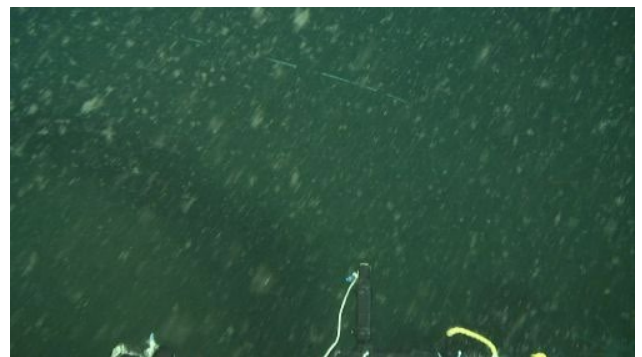


Photo 4.1-8 Check to the point where the extension cable turns back.

#### **4.2 DIVE#2292 on May 8, 2026: Investigation of communication failure at sensor system 2F-25.**

During this dive, a fault investigation of sensor system 2F-25 was conducted. The ROV Hyper Dolphin initiated its descent at 08:31 and reached the seafloor at 10:24. It took longer than usual to reach the seafloor due to the influence of the Kuroshio Current. At 11:55, the ROV landed in front of the Pressure Sensor Package of Sensor Unit 2F-25, and the extension cable connector was disconnected using the ROV's manipulator. The connector was then plugged into a loopback connector for diagnosis, and power was supplied from the Yokohama Backup Site to begin the investigation. The loopback test was completed at 13:32. Subsequently, starting at 13:42, the extension cable connector was connected to the ROV interface for Optical Time-Domain Reflectometry (OTDR) measurement, and the measurements were performed. The investigation successfully narrowed down the point of failure to near NODE-2F of the extension cable. The ROV left the seafloor at 14:10 and was recovered on deck at 15:42.

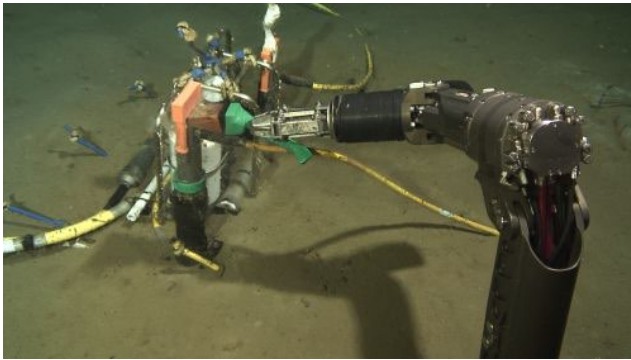


Photo 4.2-1 Disconnect the extension cable connector from the Pressure Sensor Package of the Sensor Unit.

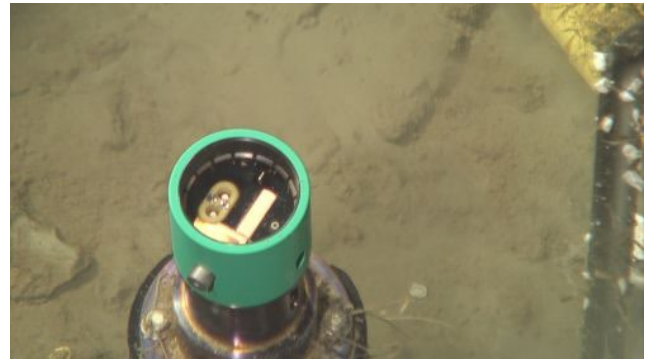


Photo 4.2-2 Inside the connector of the Sensor Unit for extension cable to the Node-2F.



Photo 4.2-3 Connect to the loopback connector for investigation from the Yokohama Backup Site.

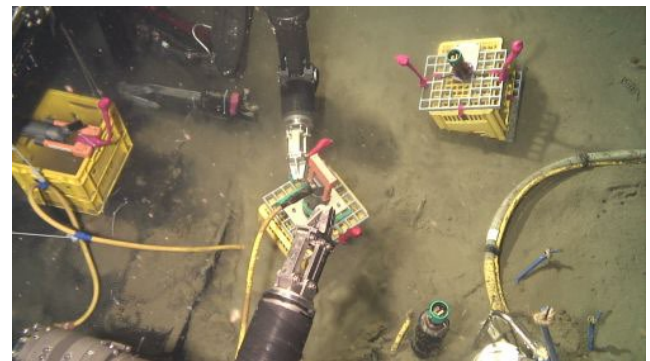


Photo 4.2-4 Connect to ROV-side connector for OTDR measurement.

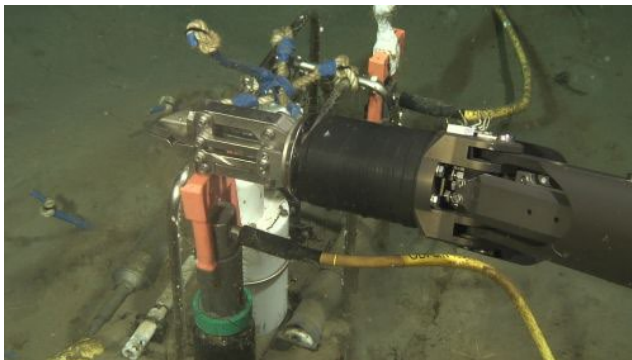


Photo 4.2-5 Reconnect the connector that was removed from the Pressure Sensor Package of the Sensor Unit.



Photo 4.2-4 Return to the original connections.

#### 4.3 Dive#2293 on May 10, 2026: Recovery of Sensor Unit at 2E-21 (1/2).

The recovery of Sensor Unit 2E-21 was carried out during this dive. The sensor unit consists of a pressure sensor package and a ground motion sensing system. The ROV Hyper Dolphin started its descent at 08:33 and reached 2E-21 at 10:39 at a depth of 3,530 m. After the ROV reached the seafloor, the power to the sensor unit was turned off from the Yokohama Backup Site. A mini-marker was deployed near the cable connecting the Ground Motion Sensing System (JB#29) and the Pressure Sensor Package (SPKG C292) at 10:53. At 12:45, the connector from the extension cable on the pressure sensor package was disconnected using the ROV's manipulator. The removed connector was installed onto the parking port and placed on the north side of the Extension Cable Bobbin No.30. At 13:56, the battery cable connector on the pressure sensor was disconnected using the ROV's manipulator, and then placed in the storage case on the battery unit. The remaining recovery operations were scheduled to be carried out during the

next dive. The ROV left the seafloor at 14:09 and was recovered on deck at 16:30.

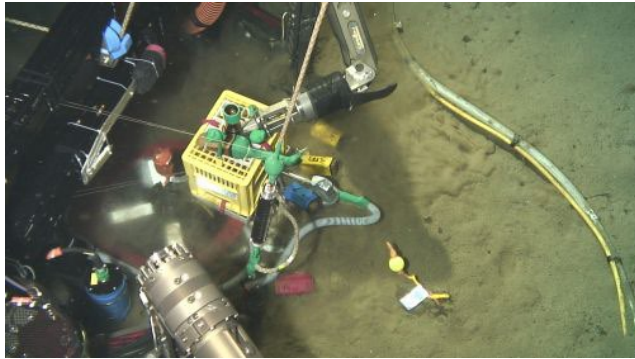


Photo 4.3-1 Yellow super-ball mini marker.

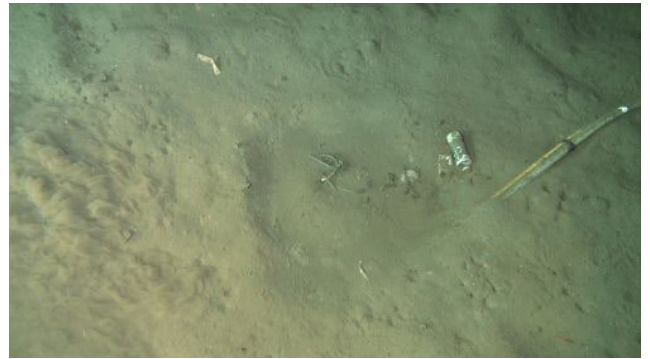


Photo 4.3-2 Burial point of the ground motion sensing system.



Photo 4.3-3 Connector removal.

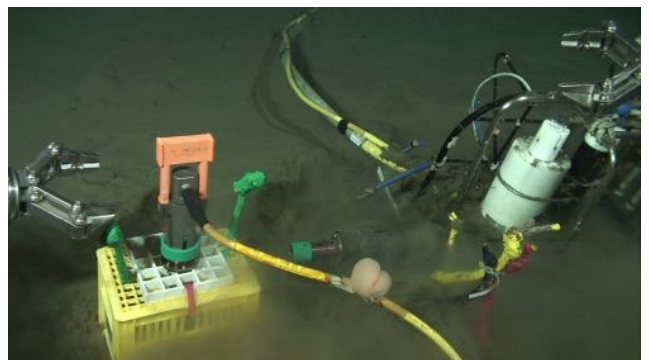


Photo 4.3-4 Connector set in parking port.

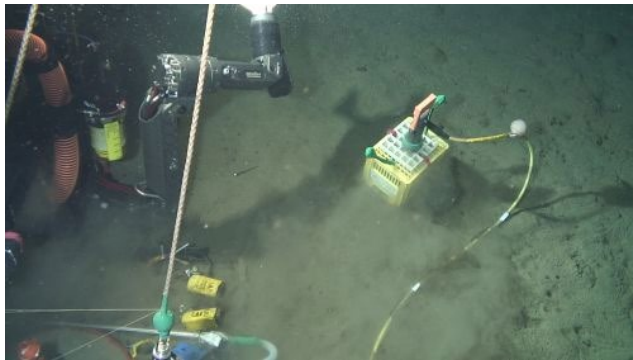


Photo 4.3-5 Placed parking port at north of the bobbin.



Photo 4.3-6 Extension Cable Bobbin No.30.



Photo 4.3-7 Confirming battery connector.

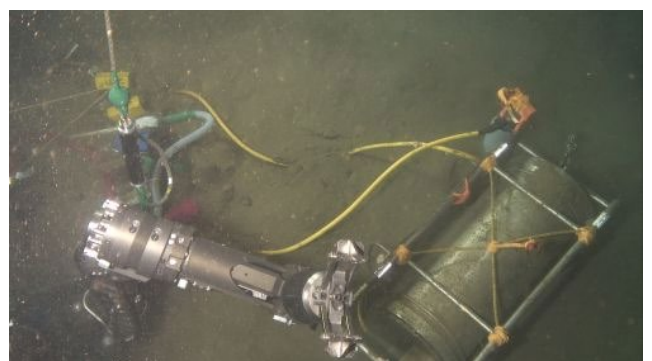


Photo 4.3-8 Store the removed battery connector.

#### 4.4 Dive#2294 on May 11, 2026: Recovery of Sensor Unit at 2E-21 (2/2).

During this dive, the recovery operation for Sensor Unit 2E-21 was carried out, continuing from the previous dive #2293. The ROV Hyper Dolphin started its descent at 08:28 and reached 2E-21 at 10:23 at a depth of 3,529 m. At 10:49, the pressure sensor package was moved in front of the ground motion sensing system by the ROV. Sand removal from the buried ground motion sensors was then initiated using the "Dorothy" sand suction and removal device. After the sand removal, it took some time to lift the ground motion sensing system out of the casing; however, it was successfully extracted at 12:49. Afterward, retrieval hooks were attached to both the pressure sensor package and the ground motion sensing system. The ROV left the seafloor at 14:11 and was recovered on deck at 16:30. The Pressure Sensor Package (SPKG C292) and the Ground Motion Sensing System (JB#29) were then hoisted onto the deck at approximately 16:45.

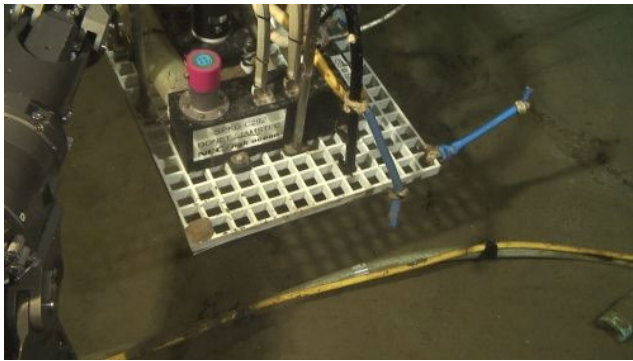


Photo 4.4-1 Movement of Pressure Sensor Package (SPKG C292).



Photo 4.4-2 Sand removal by the "Dorothy".



Photo 4.4-3 Lifting up the Ground Motion Sensing System (JB#29).



Photo 4.4-4 Casing cover.

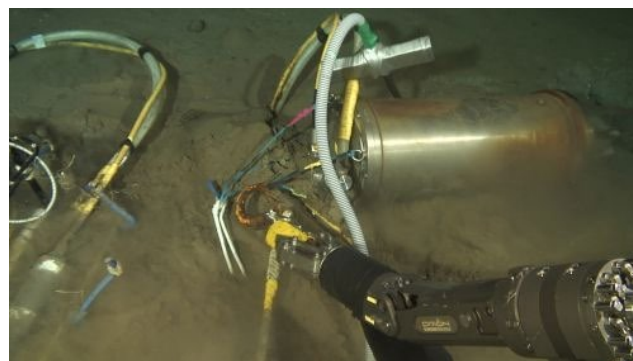


Photo 4.4-5 Attach the retrieval hook to the Ground Motion Sensing System (JB#29).

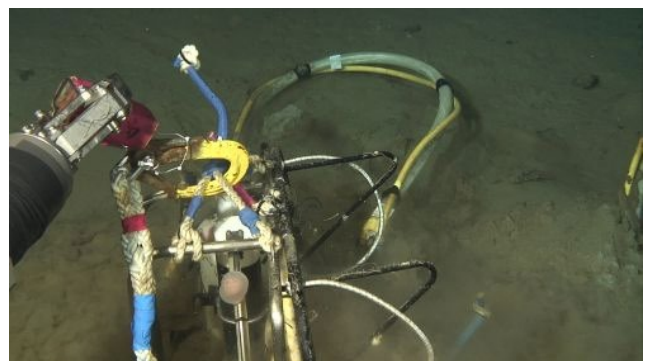


Photo 4.4-6 Attach the retrieval hook to the Pressure Sensor Package (SPKG C292).

#### 4.5 Dive#2295 on May 13, 2026: Recovery of Extension Cable Bobbin at 2F-22.

The objective of this dive was to recover the Extension Cable Bobbin No.42 that had been left on the seafloor due to an extension cable failure. The ROV Hyper Dolphin started its descent at 08:26 and reached 2F-22 at 10:12 at a depth of 2,100 m. At 10:28, the ROV landed in front of the sensor unit connector on the remaining Extension Cable Bobbin No. 42 (orange cable). The ROV grasped the connector of Extension Cable Bobbin No.42 with its manipulator and began moving toward Bobbin No. 42. During transit, it was confirmed that the new extension cable (red cable, Bobbin No. 60) currently in use was laid over the old cable. Therefore, the ROV landed at the intersection and adjusted its position so that the cable to be retrieved would pass beneath Extension Cable No. 60 (red cable). At 10:44, the ROV landed in front of Extension Cable Bobbin No. 42 and inspected the surrounding area. At 11:16, the extension cable was cut with a Mantis-type cutter for retrieval. Afterward, to prevent the cable from unwinding during recovery, an extension cable catcher was attached to the end of the extension cable and stored inside the bobbin. A rope-like sandbag was placed on the remaining extension cable to prevent it from being carried away by the bottom current. The retrieval rope was carefully attached to both sides of the bobbin shaft, and the ROV left the seafloor at 12:46. After liftoff, it was confirmed that the Extension Cable Bobbin No.42 was hanging below the ROV. The ROV was recovered on deck at 14:37, and the extension cable bobbin was hoisted onto the deck at approximately 14:50. This marked the first successful recovery of an extension cable bobbin from the deep seafloor.



Photo 4.5-1 Recovery target, the Extension Cable Bobbin No.42.

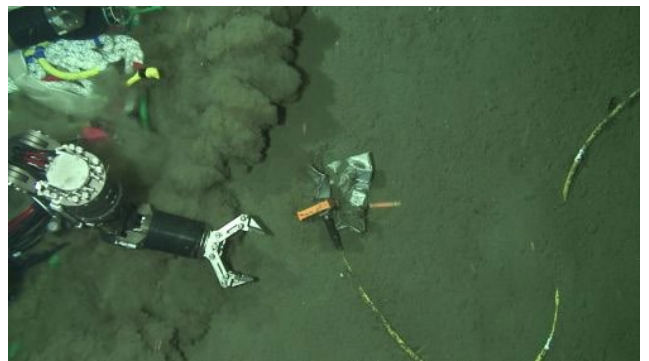


Photo 4.5-2 Connector of the extension cable bobbin.



Photo 4.5-3 Pass the connector beneath the new extension cable (red cable).



Photo 4.5-4 The connector was placed near the bobbin.

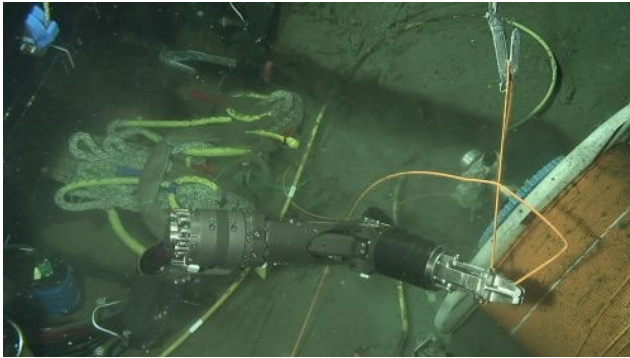


Photo 4.5-5 Cut the extension cable using a Mantis-type cutter.



Photo 4.5-6 The extension cable (orange cable) through into the cable catcher.

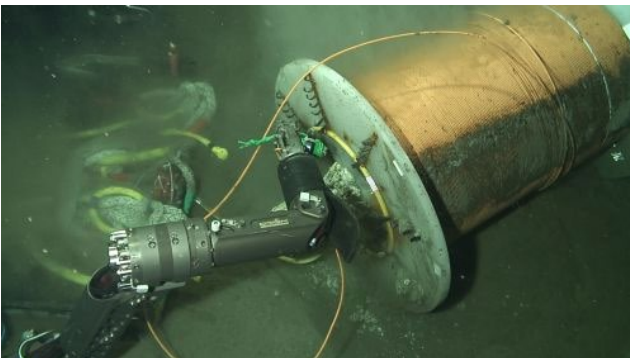


Photo 4.5-7 Put the extension cable catcher inside the bobbin.

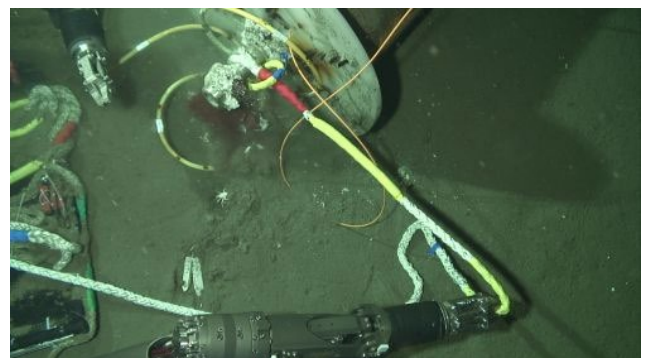


Photo 4.5-8 The retrieval rope was attached to the bobbin shaft.

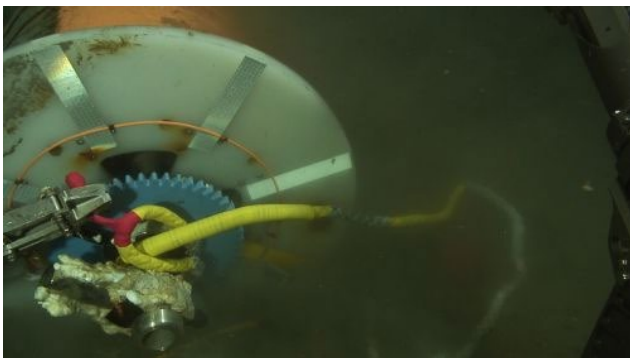


Photo 4.5-9 The retrieval rope was attached to the bobbin shaft on the opposite side.

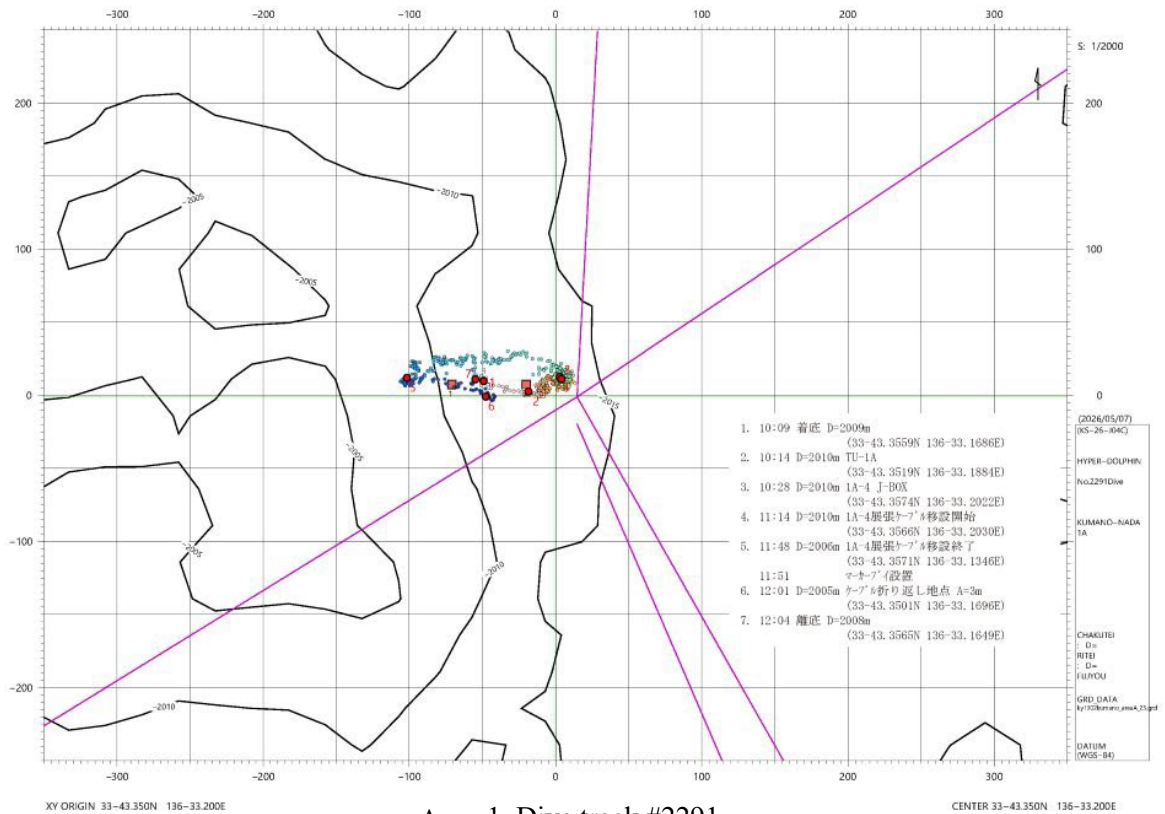


Photo 4.5-10 Connect a retrieval rope to the Extension Cable Bobbin No.42.

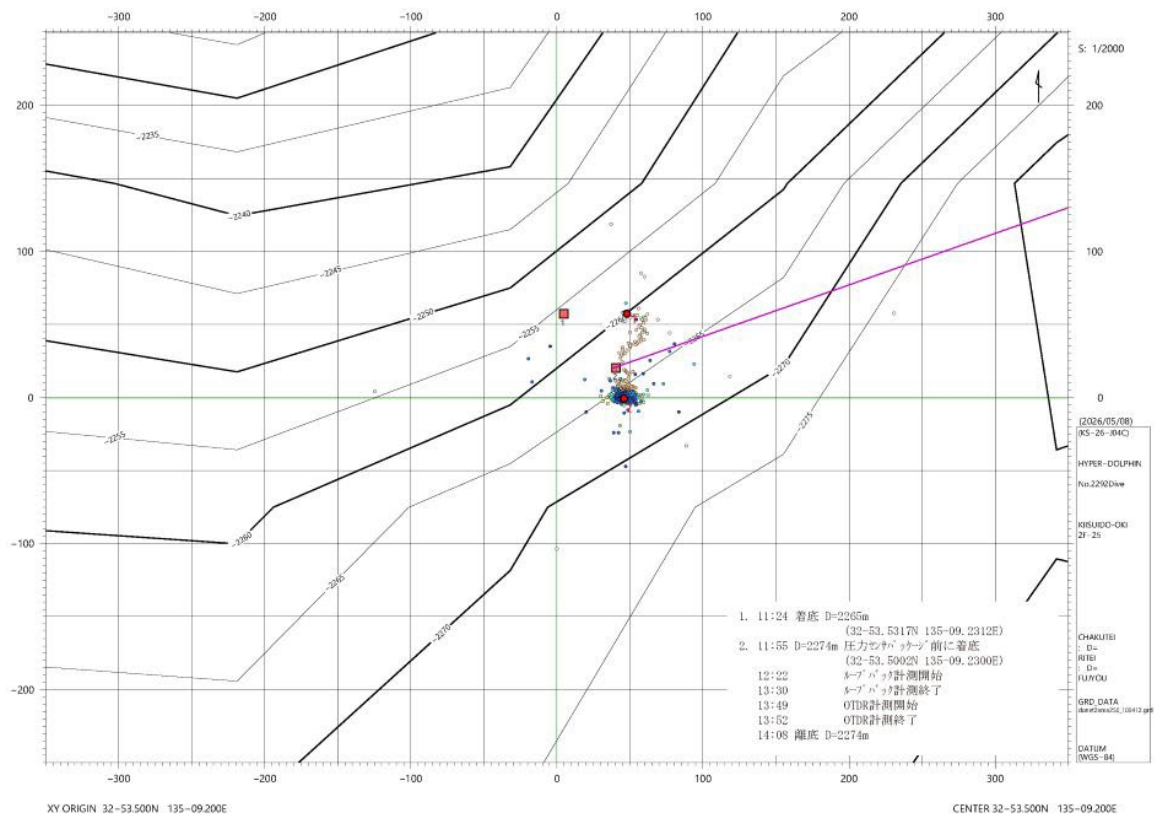
### Acknowledgements

We are grateful to Captain T. Shishikura and the crew of the R/V Shinsei-Marui for their professional support, which ensured the success of the cruise. We also thank the ROV Hyper-Dolphin operation team, including Chief Operator Mr. T. Kido, whose extensive experience led to the successful underwater maintenance of DONET. Finally, we would like to express our gratitude to the Research Vessels Operations Department, MarE3, JAMSTEC, for their coordination of the vessel operations, as well as to all other parties involved.

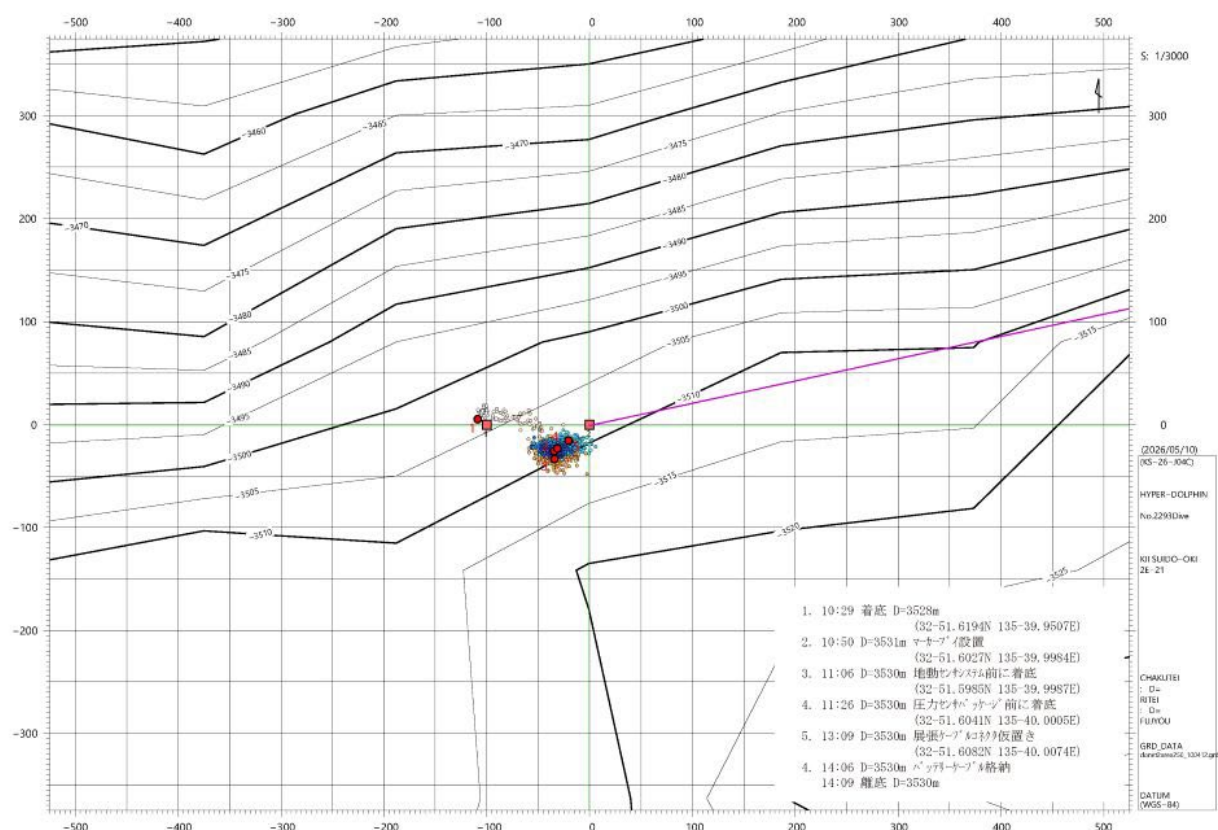
## Appendix: ROV *Hyper Dolphin* dive track



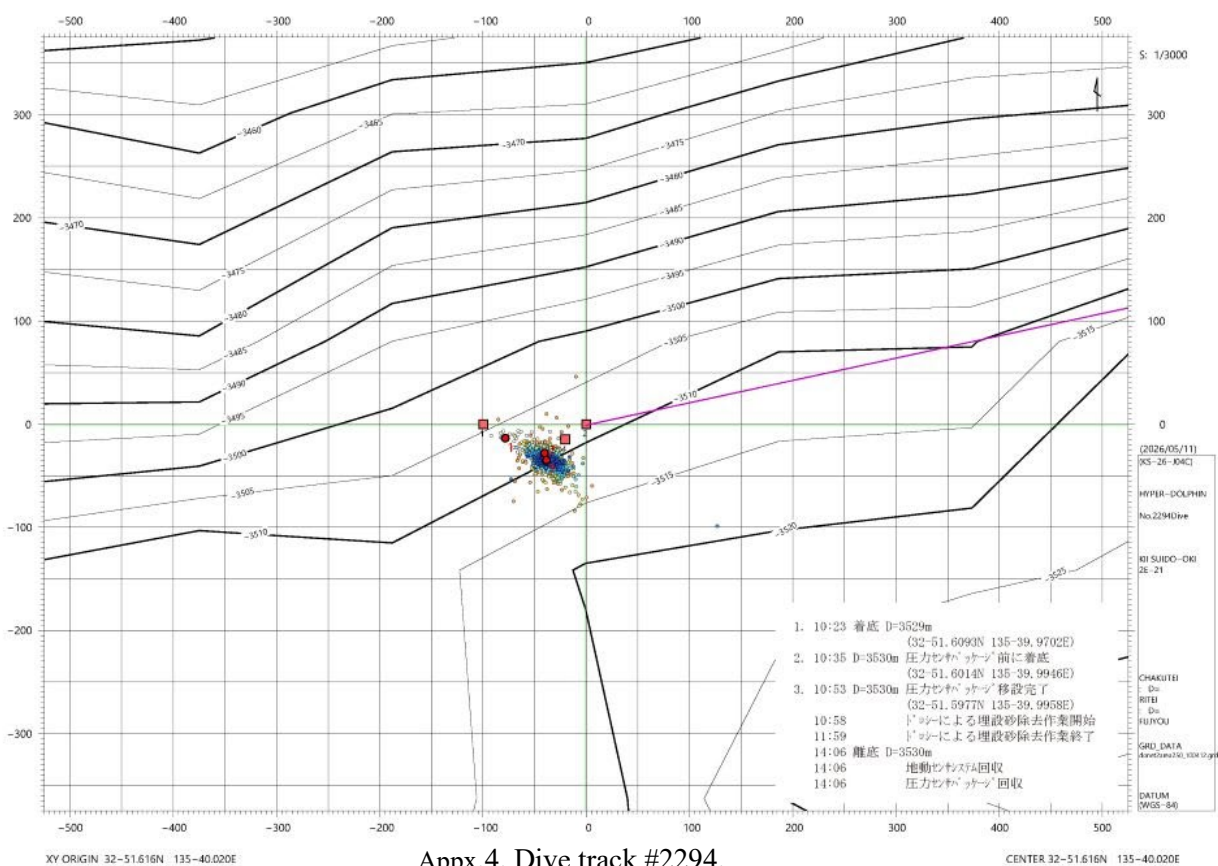
Appx.1. Dive track #2291.



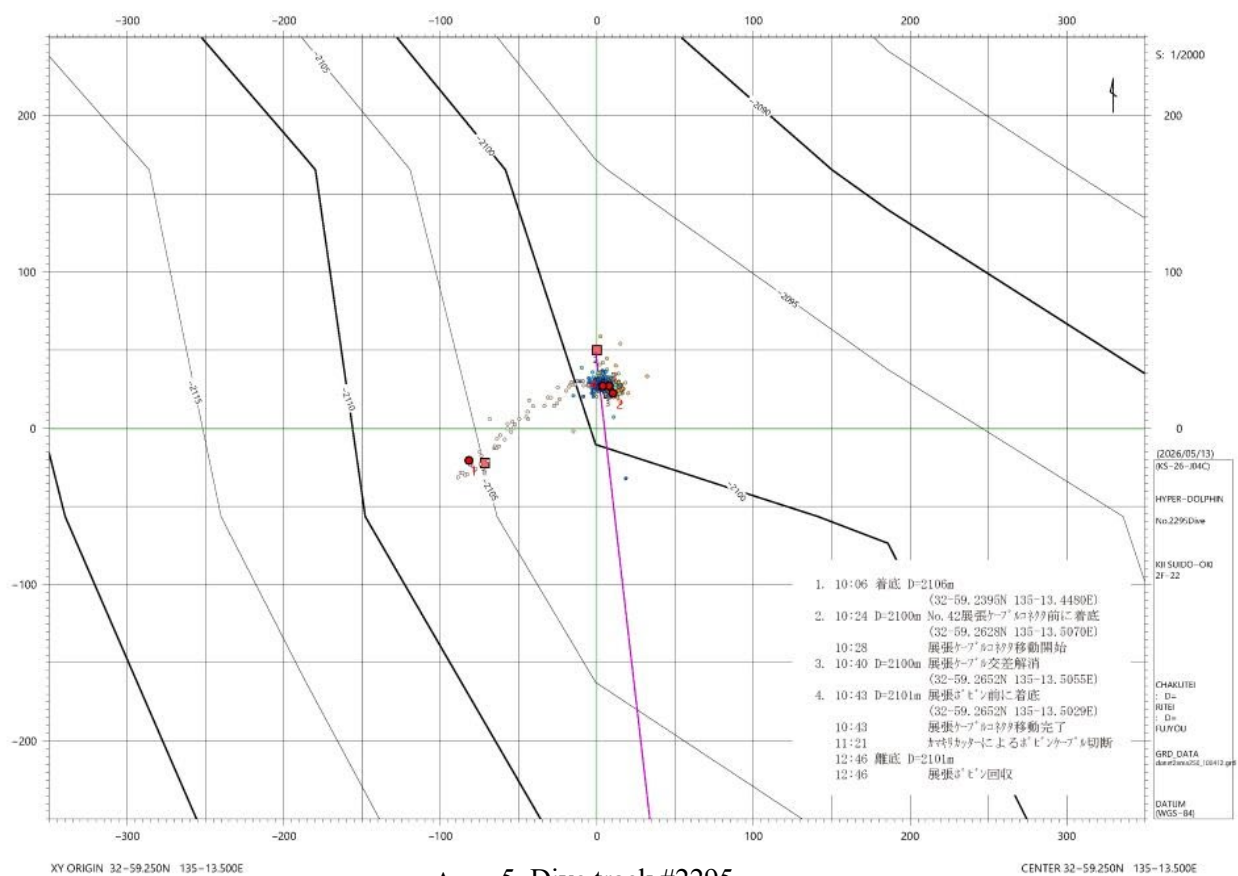
Appx.2. Dive track #2292.



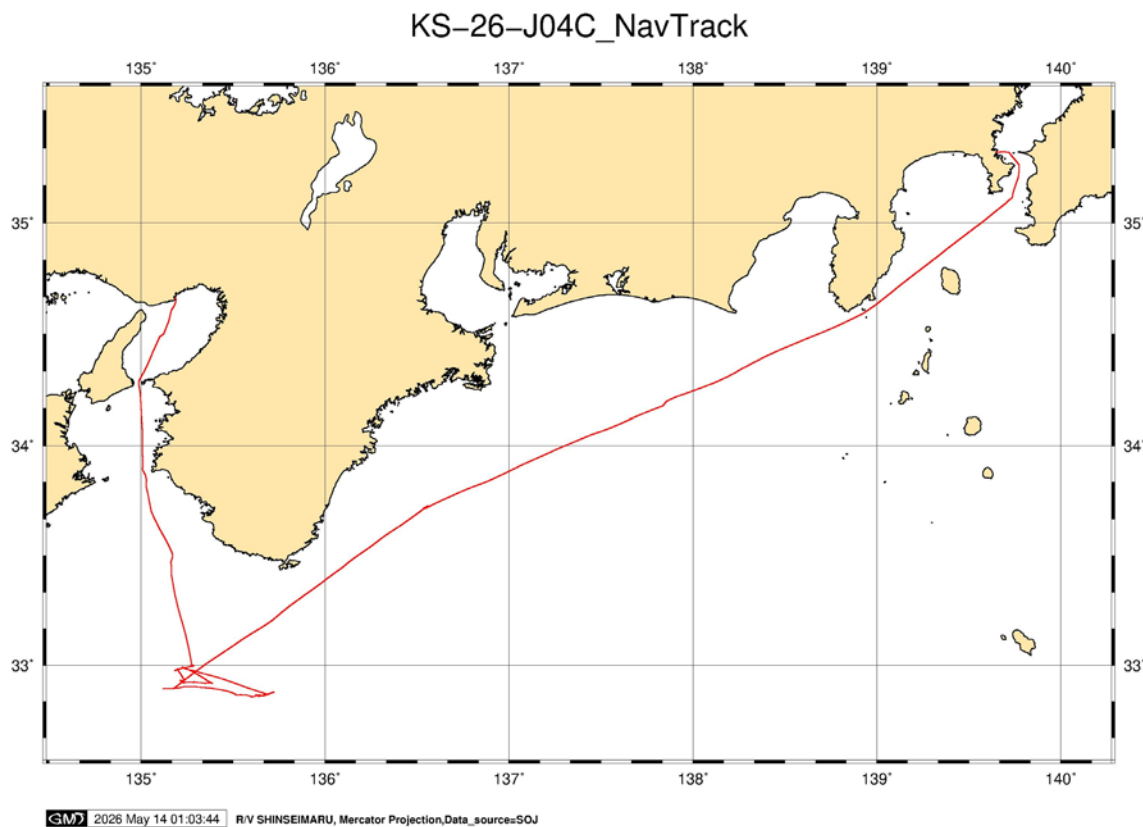
Appx.3. Dive track #2293.



Appx.4. Dive track #2294.



Appx.5. Dive track #2295.



### 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.

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