Cruise Summary

1. Cruise Information

● Cruise ID: KR18-04

● Name of vessel: RV Kairei

○ Title of project: Temperature Limit of the Deep Biosphere off Muroto (T-Limit)

● Title of cruise: Recovery of temperature data and shallow sediment at IODP Site C0023

● Chief Scientist [Affiliation]: Fumio Inagaki [JAMSTEC]

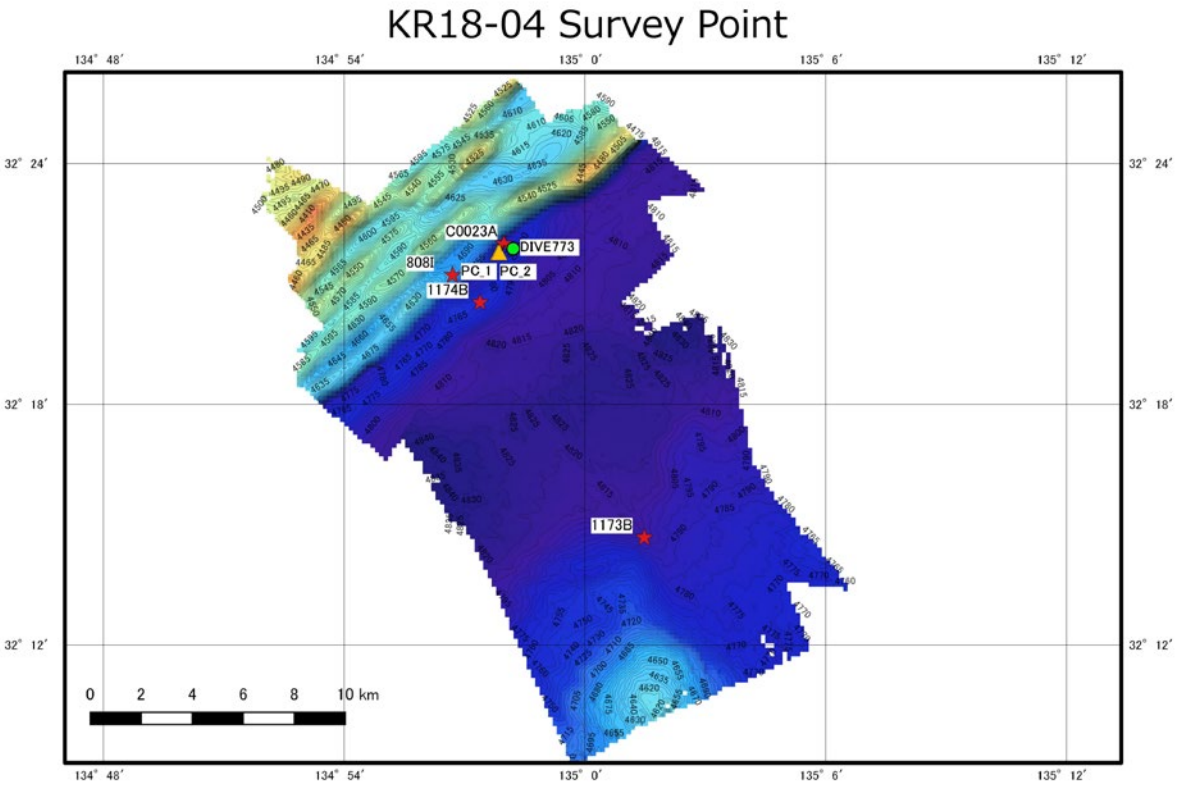
● Representative of Science Party [Affiliation] : Fumio Inagaki [JAMSTEC]

● Cruise period: From March 14 to March 21, 2018

●Ports of departure / call / arrival: Kochi / Shimizu

● Research area: Nankai Trough off Cape Muroto

○ Research map



Nankai Trough off Cape Muroto

Research area: 32°10.0’N, 32°30.0’N, 134°50.0’E, 135°10.0’E

・IODP Site C0023 Hole A：32°22.00'N, 134°57.98'E, Water depth: 4,775 m

・ODP Site 808 Hole I：32°21.22'N, 134°56.70'E, Water depth: 4,675 m

・ODP Site 1173 Hole B：32°14.68'N, 135°01.48'E, Water depth: 4,791 m

2. Overview of Research Activities

● Research objectives and background

During the KR18-04 T-Limit cruise, using the ROV *Kaiko*, we aim to retrieve borehole temperature data at IODP Site C0023 Hole A, which are recording the temperature for 1.5 years since IODP T-Limit Expedition 370 in 2016. In addition, using the RV *Kairei,* we will take two shallow sedimentary piston-cores with heat flow-data at nearby Site C0023. These additional data and samples retrieved from the T-Limit site will be valuable for the comprehensive understanding of the limits and habitability of the deep subseafloor life and biosphere in the Nankai subduction system off Cape Muroto.

● Operations and Results

- On March 15, we conducted the ROV *Kaiko* Dive 733. We confirmed the seabed at ~90 m from Site C0023, heading north to the wellhead that the sonar indicated. We approached to the CORK at Site C0023, and then landed on the ROV platform. First, we connected the communication and battery port of the *Kaiko* system to the temperature-data logger kit; however, no signals could be received from the logger. Then, we took "plan B" to recover all the temperature-data logger kit, detach it from the CORK, and then retrieved by locking with the *Kaiko*. During the operation, we took three 30 cm-long push core samples (one of three cores was empty) at 50 m southwest from Site C0023, and then take off the seabed. The temperature data were successfully retrieved from the data logger onboard. During the night, we performed side scan sonar.
- On March 16 and 17, no research operations were done because of the bad weather.
- On March 18, we obtained two heat flow-piston cores at 460 m south (210º) from Site C0023. Using 6 m-length core barrel, ~560 cm-long sediment cores were retrieved, which is almost 100% of the recovery. The heat flow-temperature data were also successfully obtained. The first piston core (HFPC-01) was processed onboard for microbiological and biogeochemical analyses, whereas the second piston core was used for the measurement of thermal conductivity and sedimentological analysis including the XCT image scan and core description at KCC. During the night, we performed again side scan sonar around this area.
- On March 19, we tried to deploy the heat flow-piston coring system; however, during the deployment, it was found to be difficult to control the positioning of the core by the mother vessel *Kairei* because of the bad weather and very strong sea current, which made the winch cable notably bending. Because of the safety reason, we recovered the coring system onboard without sediment coring. Then, it was decided by the captain and chief scientist that no operations could be done in the remaining dates during this cruise, and therefore started moving to the Shimizu port.

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