

Cruise Summary

1. Cruise Information

- Cruise ID: KH-21-2
- Name of vessel: Hakuho Maru
- Title of cruise:

Study of horizontal and vertical distribution structure of Anguillid fishes in the upper Kuroshio region using environmental DNA (Ocean-DNA project) and study on the tectonic structure of the Philippine Sea Plate

- Chief Scientist [Affiliation]: Shingo Kimura [AORI]

- Cruise period:

Leg. 1: January 7, 2021 – January 9, 2021

Leg. 2: January 9, 2021 – January 20, 2021

- Ports of departure / call / arrival:

January 7, 2021, Port of Tokyo (leave port)

January 9, 2021, Port of Shingu (arrival in and leave port)

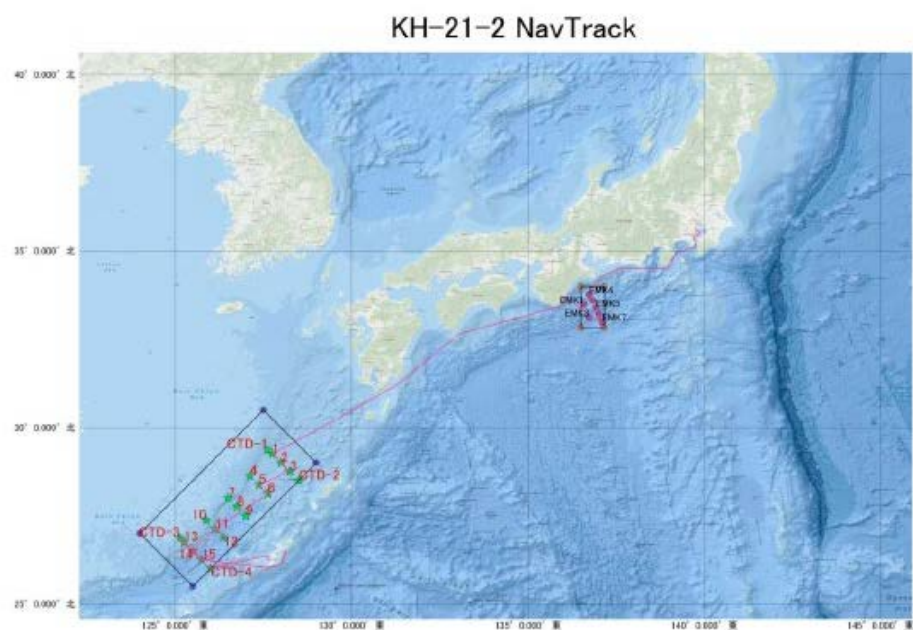
January 20, 2021, Port of Naha (arrival in port)

- Research area:

Nankai Trough waters and Nansei Islands

- Research map

KH-21-2 航跡図



○ Title of proposal

● Representative of Science Party [Affiliation]

Leg. 1:

Tadanori Goto [University of Hyogo], Takafumi Kasaya [JAMSTEC], Hiroshi Ichihara [Nagoya University], Haruno Koike [Nagoya University]

Leg. 1, 2:

Shingo Kimura [AORI], Seishi Hagihara [AORI], Jun Inoue [AORI], Ryoshiro Wakiya [AORI], Yurina Hane [AORI], Marcks Sydney Catherine [AORI], Waters Neil Aaron [AORI], Zhu Qianyi [AORI], Junpei Hinata [AORI], Takumi Yoshida [AORI], Miller Michael James [The University of Tokyo], Tatsuya Kawakami [Hokkaido University], Qifan Zhang [Hokkaido University], Satoshi Kameyama [National Institute for Environmental Studies], Hiroshi Senou [Kanagawa Prefectural Museum of Natural History], Hideo Ishigaki [AORI], Ryoji Toda [AORI]

2. Overview of Research Activities

Leg. 1: Recovery of OBEMs

The objective of this project is to clarify the three-dimensional resistivity structure beneath the seafloor and to visualize the distribution of pore water in the subducting oceanic plate. In this voyage, four ocean bottom electromagnetometers (OBEMs), which were installed in December 2020 during the KR20-13S voyage of the "Kairei", were recovered from the seafloor.

Leg. 2: Environmental DNA sample collection by CTD and fish larvae collection by IKMT

We conducted CTD observations, water samplings, and IKMT net trawling in the Nansei Islands, mainly in the upper reaches of the Kuroshio Current, in order to clarify the swimming depths of Japanese eels and understanding the fauna of fish larvae in the area by using environmental DNA techniques. This research cruise is part of the Ocean DNA Project being conducted by the Atmosphere and Ocean Research Institute of the University of Tokyo.

The target species are not only Japanese eels but also other Anguillid species including giant mottled eels. In addition, fishes that appear in the study area only as juveniles will be included in the study to establish a new analytical method and to test its effectiveness. IKMT nets were set at two depths during the day and night to collect fish larvae, avoiding the vertical migration of at sunrise and sunset, and CTD sampling was carried out at six depths for environmental DNA. The fish larvae were quickly sorted on board, and those in good condition (little damaged) were comprehensively selected, photographed, briefly identified by external morphology, and preserved in 5% formalin. In total, the net was towed 33 times (9 tows at 50 m, 16 tows at 100 m, 8 tows at 200 m) during the cruise. As a result, 144 leptocephali belonging to Elopomorpha and 651 specimens from 60 families were photographed and identified, and all other specimens (not photographed or identified) were frozen. The specimens collected will be used as

fish specimens with images for further species identification and to better understand the morphological characteristics of the early growth stages. Along with these IKMT net sampling, a total of 113 water samples were collected from 19 sampling points and the eDNA samples were filtered on board using Sterivex filter units and then frozen and stored. These eDNA samples will be used in the future for comparison with the actual fish fauna collected.