

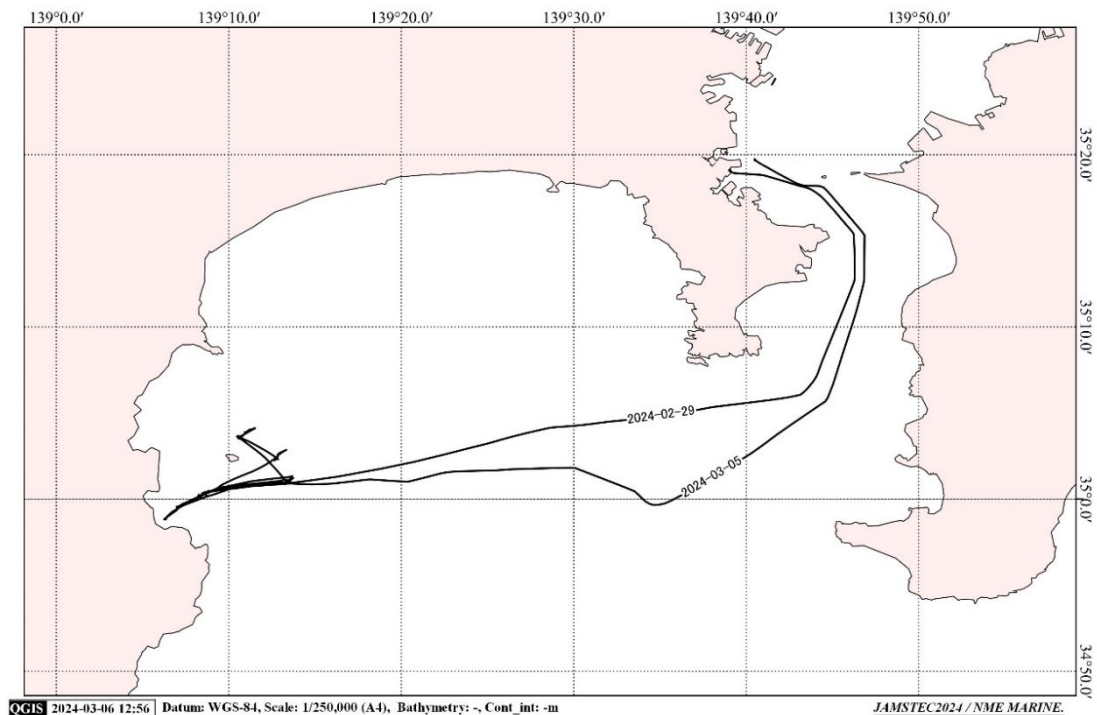
Cruise Summary

1. Cruise Information

- (1) **Cruise ID:** KS-24-J02C
- (2) **Vessel:** R/V SHINSEI MARU
- (3) **Cruise Title**
Verification tests on physical property estimation technology and Doppler verification technology using lasers
- (4) **Chief Scientist**
Shojiro Ishibashi (JAMSTEC)
- (5) **Representative of the Science Party**
C23-08 Shojiro Ishibashi (JAMSTEC)
- (6) **Research Titles**
C23-08C Verification tests on physical property estimation technology and Doppler verification technology using lasers
- (7) **Cruise Period**
2024/02/29 - 2024/03/07
- (8) **Ports of departure/call/arrival**
Yokosuka - Yokosuka
- (9) **Research Area**
East of Hatsuhima, Sagami Bay, JAPAN

(10) Cruise Track

KS-24-J02C, R/V SHINSEIMARU, Cruise Track, OFF HATSUSHIMA



2. Overview of the Observation

We aim to realize complex underwater seafloor sensing by understanding the underwater propagation characteristics of reflected laser. In order to establish submarine exploration technology that actively incorporates underwater optics, we focused on the characteristics of reflected laser (scattered laser) in the deep sea, and studied the following methods: (1) Obtaining time information from reflected laser, (2) Determining reflectance from reflected laser. Also, we worked on detection and (3) extraction of Doppler components from reflected laser.

In this sea trial, the "Green Laser Demonstrator", which incorporates a laser source in the green wavelength range, and the "UV Laser Demonstrator", which incorporates a laser source in the UV wavelength range, are mounted on the rear of the ROV "Kaiko", and "Estimation of physical properties by seafloor laser reflection" was carried out. A test was conducted. At the same time, a ``Doppler Demonstrator" incorporating a green wavelength laser source was installed on all ROV ``Kaiko" aircraft, and a ``basic performance test of the Doppler Demonstrator" was conducted.

As a result, seafloor reflections by the "Green Laser Demonstrator" and "UV Laser

Demonstrator" as well as reflections from a seabed and seabed mockups were measured, and data useful for estimating physical properties was obtained. At this time, a visualization horizontal resolution of more than 8,000 pixels was confirmed in the "Green Laser Demonstrator", achieving one of the final goals of this research. At the same time, a "Doppler Demonstrator" was used to measure reflections of suspended objects in the deep sea from the direction of Kaiko's travel, and a Doppler shift associated with relative velocity was detected. Detailed analysis of the test results will take place after disembarkation.