

Cruise Summary

1. Cruise Information

(1) **Cruise ID:** KM20-11

(2) **Vessel:** R/V KAIMEI

(3) **Cruise Title**

Understanding the actual condition of marine pollutants and their impact on marine ecosystems

(4) **Chief Scientist**

Yasuo Furushima (JAMSTEC)

(5) **Representative of the Science Party**

P20-02_1-2 Katsunori Fujikura (JAMSTEC)

(6) **Research Titles**

P20-02_1-2 Understanding the actual condition of marine pollutants and their impact on marine ecosystems

(7) **Cruise Period**

2020/12/12 - 2020/12/25

(8) **Ports of departure/call/arrival**

off Futami Port on Chichijima - Yokosuka

(9) **Research Area**

Izu-Ogaswara Islands Surrounding Waters

(10) **Cruise Track**

Marine biodiversity is one of the important indicators of global environmental change. Therefore, understanding this change in biodiversity and obtaining knowledge that contributes to the evaluation of the impact of human activity on ecosystems is an urgent issue that leads to the understanding of the global environmental change system.

In particular, for deep-sea ecosystems, there is little information on the effects of changes in the marine environment, so it is necessary to carry out comprehensive biological surveys using multiple methods and perform integrated analysis with environmental data.

Therefore, in order to obtain knowledge that contributes to understanding, evaluation, and conservation of the impact of human activities on deep-sea ecosystems, it is necessary to upgrade and optimize impact assessment methods for marine plastic waste surveys and seabed resource development.

In this observation cruise, the following survey was conducted to acquire the

baseline data necessary for developing tools for the sophistication and optimization of impact assessment methods.

- The KM-ROV was equipped with a 4KVPR stereo video camera and a 4KGoPro stereo camera, and the distribution of suspended particles and zooplankton communities in the vertical direction from the surface layer to the deep sea was investigated in the mesopelagic to deep sea bottom ecosystem.
- A VPR (as an alternative to a small shadowgraph camera) is attached to the CTD water sampling system to display not only vertical environmental data (depth, water temperature, salt content, dissolved oxygen concentration, turbidity), but also the distribution of suspended particles and zooplankton communities. The water samples were carried out to grasp the particle composition of organic substances, inorganic substances, microplastics, etc. from the Raman signal.
- In order to evaluate the suspension and redeposition of suspended particles near the sea bottom, an acoustic Doppler current meter (ADV) was installed on the seafloor to measure high-definition three-dimensional flow near the bottom. In addition, an Expendable Vertical Microstructure Profiler (VMP-X) was used to measure turbulence flow from the surface layer just above the seafloor.
- In order to understand the actual distribution of marine plastics and the effects of deep-sea ecosystems, we conducted seafloor observation by KM-ROV, core sampling, water sampling, biological collection, and installation and recovery of microparticle capture experimental equipment. In addition, the Neuston net was towed to collect microplastics on the sea surface.
- As an urgent survey of the Research Institute for Marine Geodynamics (IMG), recovery of Ocean bottom electromagnetometer (OBEM) and Vector tsunameter (VTM) was carried out at Nishinoshima surrounding waters. Two Mobile Earthquake Recorders in Marine Areas by Independent Divers (MERMAID) were also installed.