Cruise Summary

1. Cruise Information

(1) **Cruise ID:** KS-21-24

(2) **Vessel:** R/V SHINSEI MARU

(3) **Cruise Title**

Study on watermass mixing, material transport, and biological conditions with submesoscale processes off Sanriku

(4) **Chief Scientist**

Eisuke Tsutsumi (AORI)

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

S21-34 Eisuke Tsutsumi (AORI)

(6) **Research Titles**

S21-34 Study on water mass mixing, material transport, and biological environment associated with submesoscale processes off Sanriku

SGS21-03 Study on the distribution of marine mammals off Sanriku and its relationship to the physical and biological environmental factors

(7) **Cruise Period**

2021/10/19 - 2021/10/24

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

Ishinomaki - Hachinohe

(9) **Research Area**

Off Sanriku

2. Overview of the Observation

The Shinsei Maru KS-21-24 research cruise was conducted from October 19 to 24, 2021, off Sanriku to elucidate the formation mechanism of the submesoscale structure with a scale of 0.1 to 1 kilometer that prevails in the Sanriku offshore region, and the effects of the submesoscale flow on the mass transport, biological environment, and ecosystem. In addition, visual observations were conducted to understand the relationship between the marine environment and the distribution of marine mammals that are thought to use the Sanriku area as a foraging ground. The main observations were (1) Observation of the flow field by three moorings with

acoustic Doppler current profilers (ADCPs) off the mouth of the Otsuchi Bay, (2) Tow-yo conductivity-temperature-depth with chlorophyll fluorescence/turbidity and dissolved oxygen (Underway-bioCTD) observation on the 60-mile-long east-west transect off the mouth of Otsuchi Bay (Otsuchi-line), (3) Turbulence microstructure profiler VMP-250 observation (7.5-mile intervals) and CTD/Lowered-ADCP observation and water sampling (15-mile intervals) on the Otsuchi-line, (4) Continuous measurement of bioCTD, nitrate concentration, and colored dissolved organic matter (CDOM) concentration along the ship's track, (5) Continuous measurement of current profile by shipboard ADCP and acoustic backscatter by shipboard echosounder, and (6) Sighting survey of marine mammals during daytime navigation. Although the original observation plan was changed due to bad sea conditions at the middle and end of the cruise, the three ADCP mooring systems were successfully deployed and recovered, and the current velocity data were obtained for about two days. In addition, the other observations were generally successful.