

The Fluctuation Characteristics of the Water Mass and the Current Structure of the Southeastern Region of The East Sea

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Introduction

Due to the instability of the EKWC, the oceanic conditions in the East Sea are affected by the fluctuations of the moving paths of the TWC, polar fronts, and warm eddies. In particular, warm eddies play an important role in spreading the surface water of the East Sea from its southern coastal region to its interior region (Isoda, 1994). However, the fluctuation characteristics of the meandering TWC and the warm eddies in the East Sea are not yet known due to the instability of the TWC. Hideaki(1999) showed that the moving paths and features of the TWC in the coastal regions of Japan were not constant.

In the present paper, the characteristics of water masses and current structures around the Noto Peninsula located in the southeastern coastal region of the East Sea were studied by using the observation results of a CREAMS (Circulations Research of the East Asian Marginal Seas) cruise and the data reports of oceanographic observations (Japan Meteorological Agency) from June of 1995 and June of 1996.

Data and Methods

Results of the CREAMS cruise

To investigate the oceanic conditions, the origins, and the levels of stability of the water masses around the Wakasa Bay, which is located in the southeastern part of the East Sea, the researchers drew up vertical profiles of temperature, salinity, density, dissolved oxygen and T-S diagrams based on the data measured on June in 1995 and June in 1996.

Results of the JMA data

The horizontal distributions of temperature and salinity measured at a depth of 100 m in June of 1995 and June of 1996 were drawn to investigate the

characteristics of water masses and current structures in the southeastern area of the East Sea. T-S diagrams from four serial oceanographic stations were prepared in accordance with the observation periods and stations. Geostrophic currents, without tidal currents, were calculated to discover the characteristics of the current fields. Horizontal distributions of the dynamic depth anomaly in the regions around the Noto Peninsula were prepared in order to observe the surface topography.

Results and Conclusions

Water mass showing characteristic of Tsushima Warm Current (TWC) existed over the continental shelf, the depth of which is shallower than 200 m and it had the following measurements: width, 190 km; thickness, 200 m. Minimum level of dissolved oxygen occurred at the layers of maximum salinity. In the current structure, a noteworthy phenomenon is that the positions of the high-salinity water (more than 34.6 psu) match well with the distributions of the southwestward flow. In June of 1995 and June of 1996, a southwestward flow were separated into two parts along line C and line G.

The isothermal lines and the isohaline, which exist horizontally along the coastal area of the Japan, change abruptly at the frontal area of the Noto Peninsula, then turn toward the center of the East Sea. The dynamic depth anomalies centering around the region far northwest of the Noto Peninsula were relatively high, compared with those of other regions. The isopycnic surface (σ_t , 25.8) existed near the surface in the central part of the East Sea, but, at the depth of 100 m, the isopycnic surface was found in the coastal waters.

References

- Hideaki, H. 1999. The Current structure of the Tsushima Warm Current along the Japanese Coast. *J. Oceanogr. Soc. Japan*, 55(2), 217~235.
- Y.Isoda. 1994. Warm Eddy Movements in the Eastern Japan Sea, *J. Oceanogr. Soc. Japan*, 50, 1~15.
- Japan Meteorological Agency. 1997 and 1998. Data report of oceanographic observation, No. 86, 87.