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THE OCEANOGRAPHIC CONDITION IN THE SECTION FROM THE SOUTH OF HONSHU TO POHNPEI IN 1994

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Introduction

In the research project of Kagoshima University Research Center for the South Pacific, the oceanographic observations were carried out between the south of Honshu to Pohnpei by the *Keiten Maru* (G. T. 860 tons), fishing training ship of Kagoshima University from 29th October to 9th November in 1994.

The oceanographic observations were made by CTD system, the Conductivity, Temperature, and Depth Recorder system (Neil Brown Instrument Model Mark III and Terminal Deck Unit 1150), and XBT, Expendable Bathy-thermographs (Murayama Denki Ltd. Type Z-60-16 III). The maximum depth of CTD lowering was 1000m, and that of XBT 900m. The CTD and XBT observations were made at 10, and 12 stations, respectively. Fig. 1 shows the locations of CTD and XBT observations. For avoiding typhoon and stormy weather, the observation line was not straight. The distance between two stations was 90 miles approximately. The temperature and pressure values measured by CTD were calibrated before and after the cruise by SPRT and standard weight according to SEA Corporation. In order to calibrate the conductivity measured by CTD, a total of 26 sea water samples was obtained from four stations (St. 1, 3, 17, and 20) by Rosset Multi Sampler. A correction of Conductivity was made so that the salinity of water samples determined by AUTOSAL coincides as much as possible with the salinity estimated from CTD values at the depth where the sea water samples were obtained. The standard deviation of difference between corrected CTD salinity and AUTOSAL salinity is 0.0079 PSU for 16 pairs.

Results and Discussion

Vertical section of temperature

Fig. 2 shows the distribution of water temperature in the vertical section along the observation line from St. 1 ($34^{\circ}-41.14'N$, $139^{\circ}-41.52'E$) to St. 22 ($08^{\circ}-29.00'N$, $157^{\circ}-32.97'E$). The surface mixed layer, of which values are higher than $26^{\circ}C$, was found from St. 7 to St. 22, having a thickness of 47~108m, while sea surface temperature is lower than $25^{\circ}C$ at St. 9. The strong southward down-slope of isotherms in the whole layer between St. 1 to St. 3 is associated with the Kuroshio. The southward up-slope of isotherms in the almost whole layer between St. 3 to St. 6 is associated with the Kuroshio Countercurrent. A sharp thermocline with a core temperature of $20^{\circ}C$ from St. 18 to St. 22 is associated with the North Equatorial Current. In 1990, this current began from near $13^{\circ}N$ (HIGASHI *et al.*, 1991), but in 1994, it is seen at $14^{\circ}N$. The isotherm spreading of $18^{\circ}C$ and $19^{\circ}C$ from St. 13 towards the north is the Subtropical Mode Water.

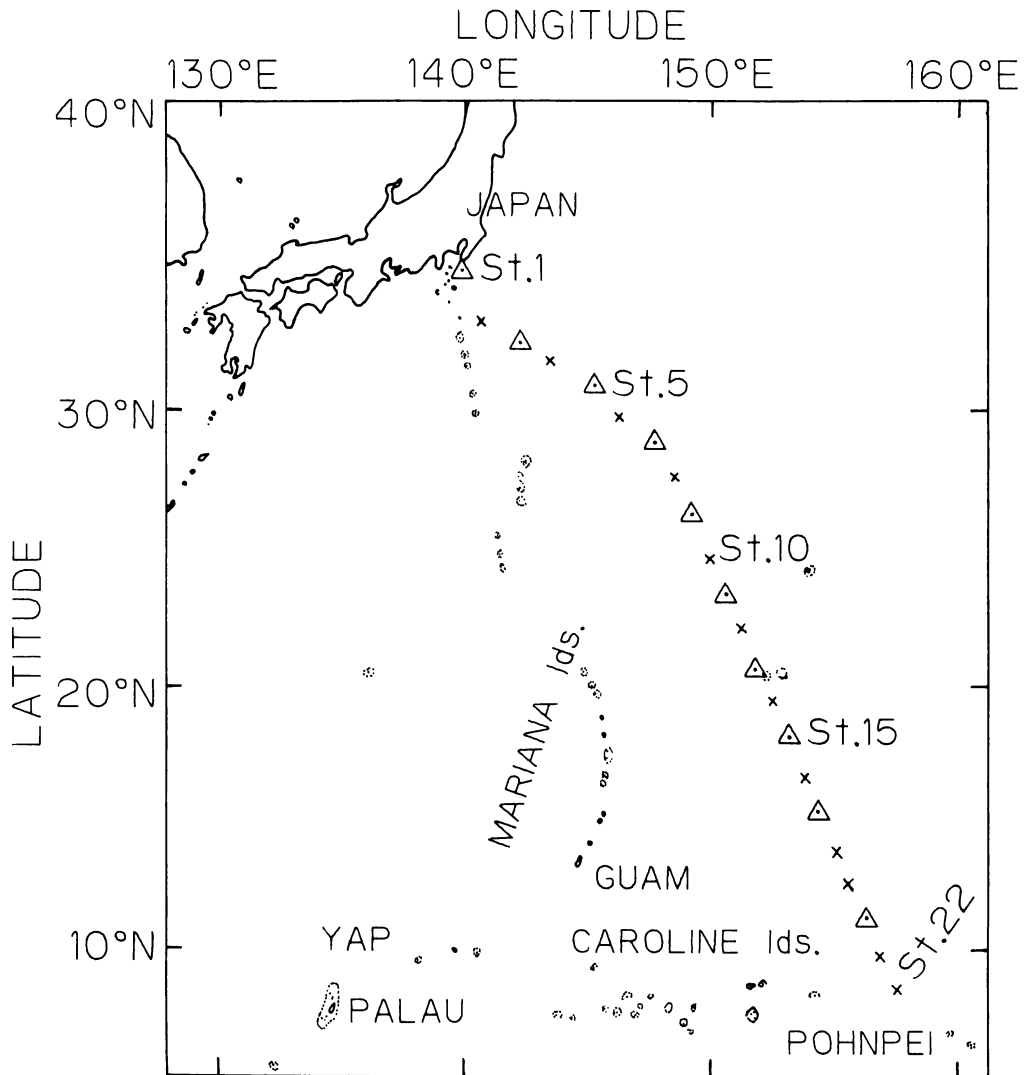


Fig. 1 The locations of oceanographic observations (triangles show the CTD stations and crosses show the XBT stations)

Vertical section of salinity

Fig. 3 shows the distribution of salinity in the vertical section along the observation line. The surface low-salinity water observed in 1989 and 1990 in the entire section (YUWAKI *et al.*, 1990, HIGASHI *et al.*, 1991) is not found in 1994. But surface low-salinity water less than 34.5 PSU, associated with the North Equatorial Countercurrent, was found in the south of St. 17. It has the thickness of 70m, with its lowest value being 34.081 PSU at the sea surface of St. 20.

The subsurface saline water higher than 34.9 PSU is found in the layer of 30~230m deep between St. 7 to St. 9, and St.11 to St. 20. The maximum value of subsurface saline water is 35.218 PSU in 138m depth at St. 13. Below the subsurface saline water, the North Pacific

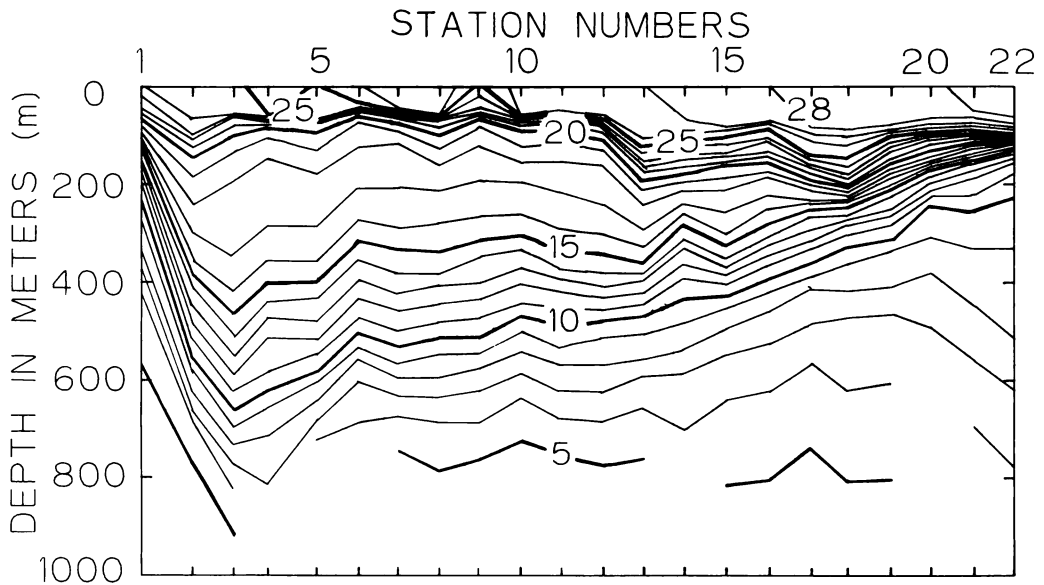


Fig. 2 Distribution of water temperature (°C) in the vertical section

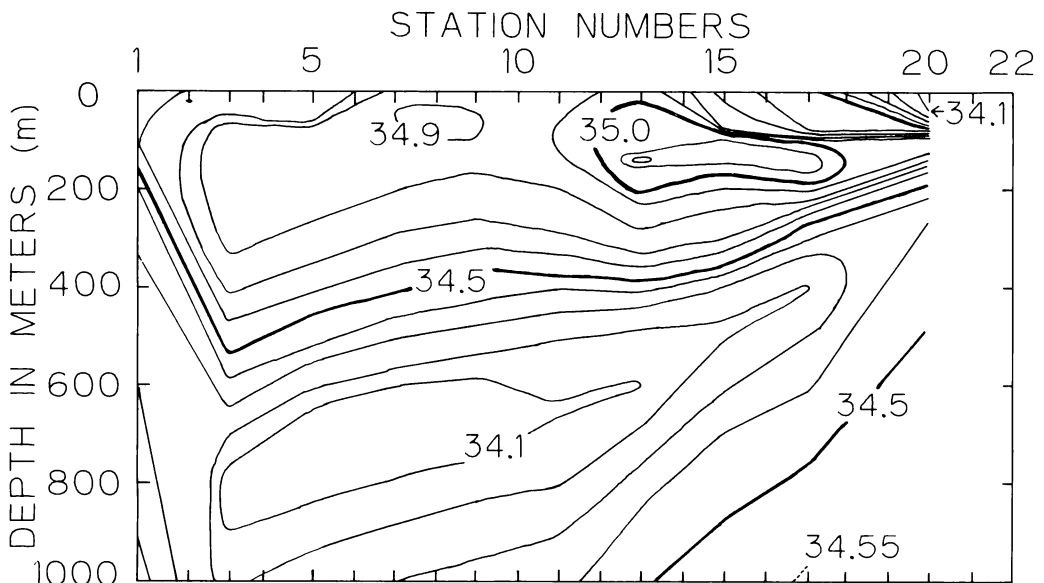


Fig. 3 Distribution of salinity (PSU) in the vertical section

Intermediate Water, characterized by low-saline water less than 34.2 PSU, appears tongue-like in the layer of 500~1000m deep. The North Pacific Intermediate Water extends from St. 2 to St. 17, and it becomes shallower towards the south.

References

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