

X. BOTTOM WATER TEMPERATURE IN THE CENTRAL PACIFIC BASIN (GH81-4 AREA)

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This short report presents vertical temperature profiles of bottom water at closely spaced 10 sites in the Central Pacific Basin, around 3° N, 169° 20' W. The aim of the measurement is to provide basic data to investigate a relation between manganese nodule formation and a property of bottom water.

Measurement

Measurement of the bottom water temperature was carried out simultaneously with coring and heat flow measurement. The GH80-1 type thermograd-meter (MATSUBAYASHI, 1982) settled in a hollow weight of a piston-corer and thermistor probes attached to the core-barrel were used. The temperature data at one minute interval during the corer was being drawn up at velocities of 60 to 70 m/min. in the bottom water were stored on the IC memory of the apparatus remaining after the heat flow measurement. Vertical temperature profiles of bottom 1,000 m of water column were obtained.

As the GH80-1 type thermograd-meter was designed for the purpose of temperature difference measurements, the accuracy in the temperature difference determination is within 0.01°C while the accuracy of the absolute value is about 0.2°C.

Results

Figure X-1 shows all observed temperatures (*in situ*). No recognizable difference exists among the sites. A minimum *in situ* temperature appears at about 4,500 m, which is shallower than that of other regions in the Central Pacific (EDMOND *et al.*, 1971; MATSUBAYASHI and MIZUNO, 1982). The rate of increase in *in situ* temperature below the minimum is nearly equal to the adiabatic temperature gradient, about 1.2°C/1,000 m at 5,000 m deep (BRYDEN, 1973) (The salinity was assumed to be 34.7 per-mil (MANTYLA, 1975)).

The sea-floor of the study area is covered with stable bottom water, the Pacific Bottom Water, originating from the Antarctic Bottom Water.

References

- BRYDEN, H. L. (1973) New polynomials for thermal expansion, adiabatic temperature gradient and potential temperature of sea water. *Deep-Sea Res.*, vol. 20, p. 401-408.
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GH81-4 Central Pacific Basin

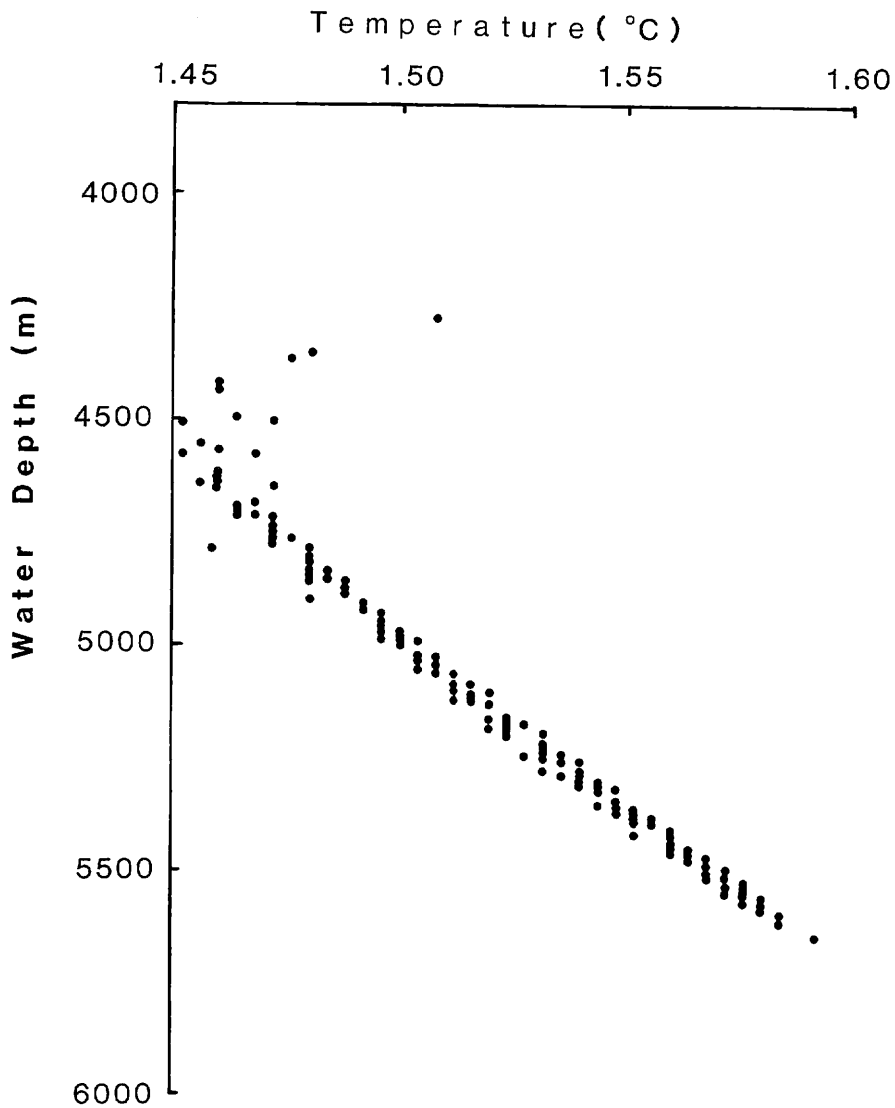


Fig. X-1 Bottom water temperature (*in situ*) profile. All observed temperatures are plotted.

Mar. Res., vol. 33, p. 341-354.

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