

A LONG OCEANOGRAPHIC SECTION FROM THE SOUTH OF KYUSYU TO THE EQUATOR, 145°E IN NOVEMBER 1989

Yasutaka YUWAKI, Masataka HIGASHI,
Sunao MASUMITSU and Toru NISHI

INTRODUCTION

The new research project, which started in 1989, conducted by the Kagoshima University Research Center for the South Pacific is a comprehensive study entitled "Man and the Environment in Papua New Guinea." The Keiten Maru (860 tons), training and research ship of the Faculty of Fisheries, Kagoshima University joined in the research project. The Keiten Maru with scientific party on board departed Kagoshima on 10 November 1989 and headed southeast to the equator, making oceanographic observations along the way.

The observations on the section from near the south of the Kyusyu to the equator started Station 1 at lat. 30°-00'N, long. 130°-50'E, on 10 November, 1989 and terminated Station 30 at the equator, long. 145°-00'E, north of Papua New Guinea on 18 November. The XBT was launched every degree of latitude, and the CTD was lowered at 9 stations on the track, as shown in Fig. 1.

After the oceanographic observations, the Keiten Maru called at Lae and Port Moresby, Papua New Guinea, and returned to Kagoshima on 20 December, 1989.

The objective of the observation was to examine the effect of the Kuroshio, the Subtropical Countercurrent (SCC), the North Equatorial Current (NEC) and the North Equatorial Countercurrent (NECC) in November 1989 on oceanic conditions.

Results and Discussion

Temperature section

The vertical section of water temperature between Stn. 1 at lat. 30°-00'N, long. 130°-50'E and Stn. 30 at the Equator, long. 145°E is shown in Fig. 2. The surface mixed layer was as thick as about 75 m over the whole section. A weak surface thermal front was located at about lat. 12°N, 18°N, 22°N and 28°N. A sharp thermocline centered at 20°C was found at a depth of 100–300 m from the Equator to lat. 15°N. The thermocline sloped up from the Equator to lat. 07°-30'N, and it sloped down from the ridge of thermocline to lat. 15°N. The ridge of the thermocline is thought to indicate the boundary between the NEC and the NECC. From about lat. 15°N to the north, the thermocline separated into two parts; one was the surface thermocline centered at 22°C, and the other was the main thermocline centered at 10°C to 12°C. Between the two thermoclines, the Subtropical Mode Water was found at a depth of 200–300 m. The largest slope of the main thermocline at lat. 30°N is thought to correspond to the Kuroshio current.

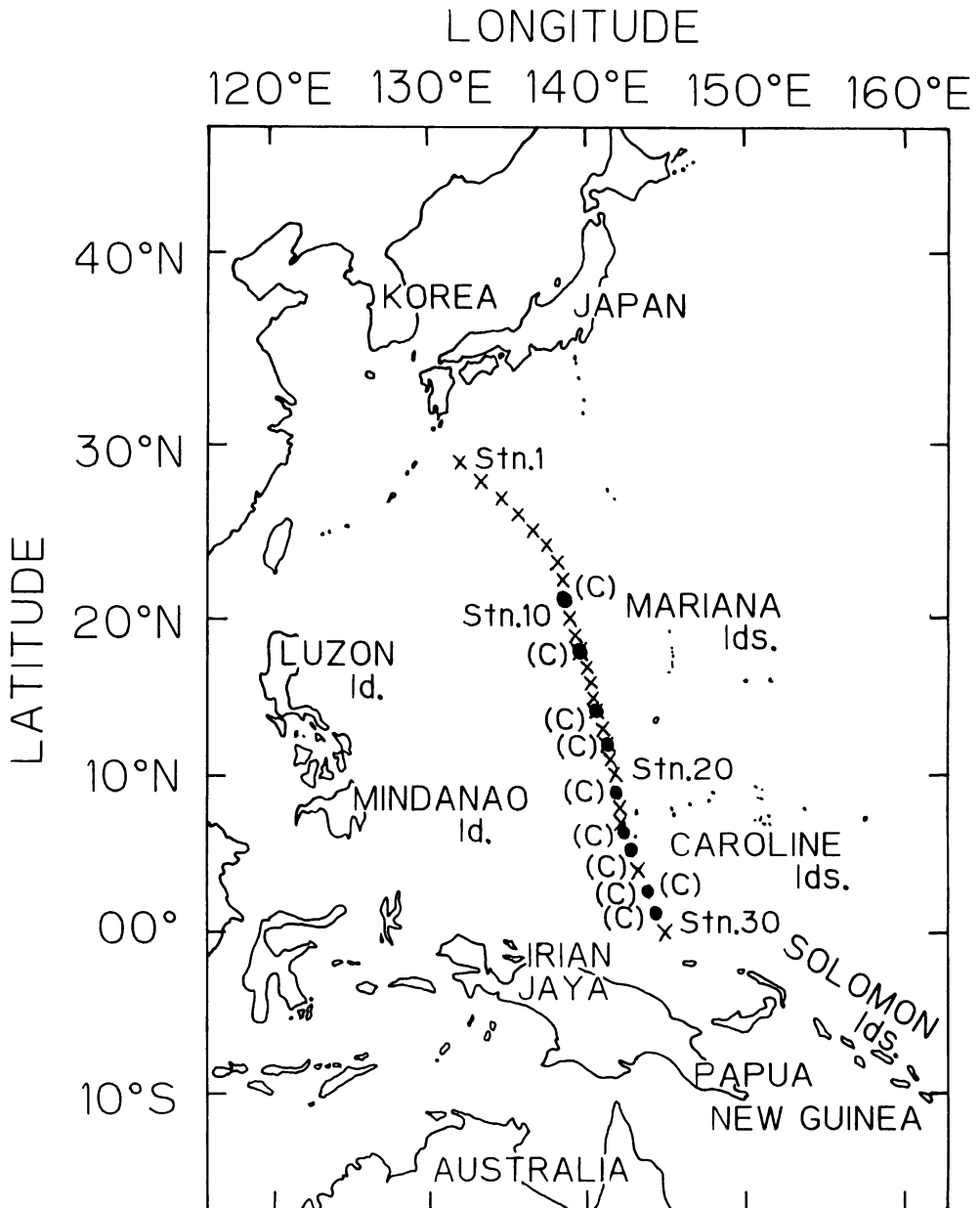


Fig. 1. Map showing observation stations. Symbols: (C) dots, CTD observation; crosses, XBT observation.

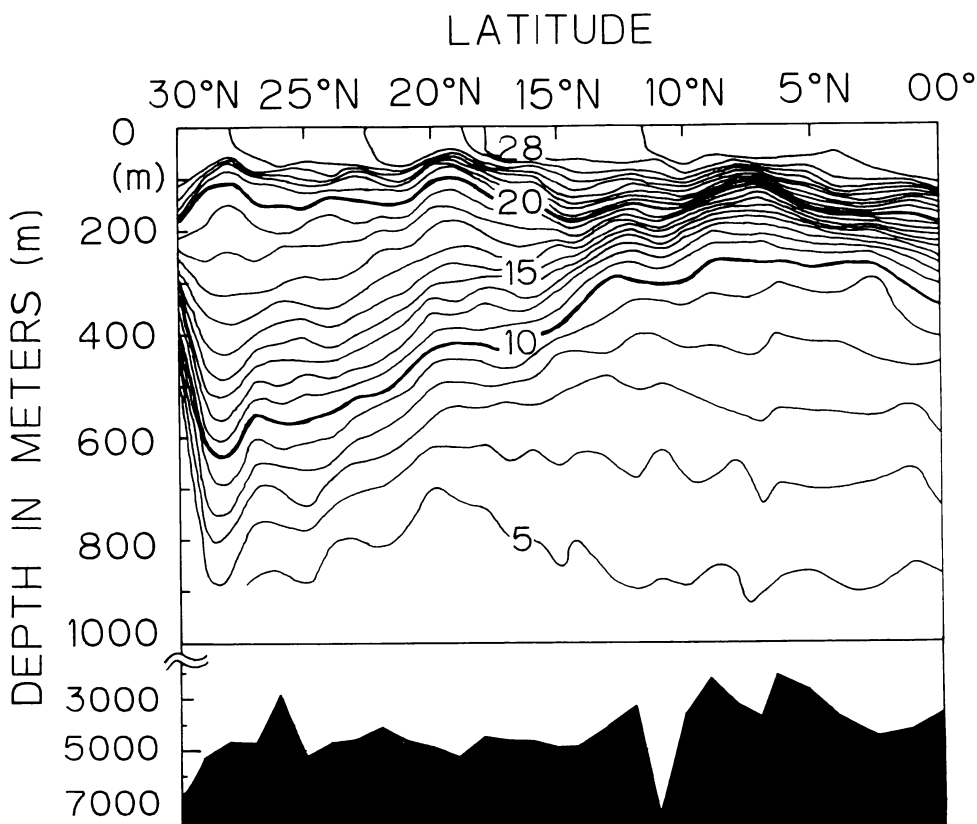


Fig. 2. The vertical distribution of water temperature (C°) between 30°N and the Equator. The sea bottom topography is also shown.

Salinity section

The vertical section of salinity is shown in Fig. 3. The low salinity surface water less than 34.50‰ was as thick as 50 m in the region between lat. 13°N and 03°N. The surface salinity minimum associated with the NECC was located near lat. 09°-00'N and 04°-00'N. The North Pacific Tropical Water, with salinity exceeding 34.70‰, extended as far south as lat. 06°-30'N at a depth of 75–200 m near the southern limit of the NEC. The subsurface saline water, originating in the South Pacific, extended as far north as lat. 06°N at a depth of 50–200 m near the northern limit of the NECC. The North Pacific Intermediate Water, with salinity lower than 34.50‰, extended as far south as lat. 15°N at a depth of 300–800 m.

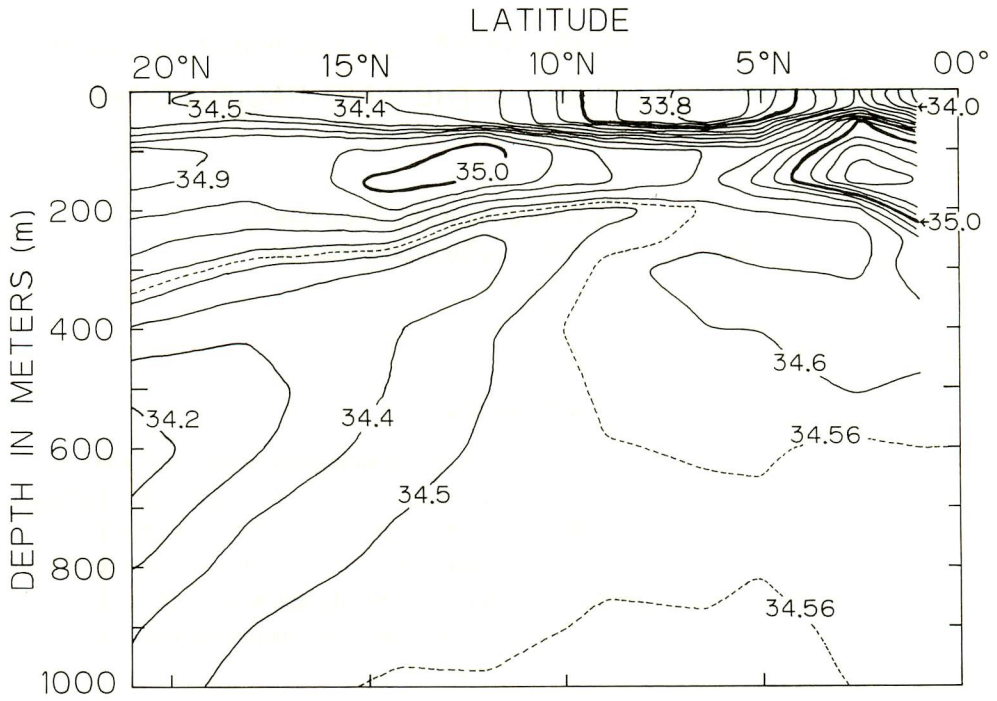


Fig. 3. The vertical distribution of salinity (%) between 20°N and the Equator.