

VERTICAL DISTRIBUTIONS OF TEMPERATURE, SALINITY AND  
GEOSTROPHIC FLOW ALONG 114°E IN THE SOUTHERN  
OCEAN IN OCTOBER 1970 (EXTENDED ABSTRACT)

Mikio NAGANOBU\*

*Japan Marine Fishery Resource Research Center,  
3-27, Kioi-cho, Chiyoda-ku, Tokyo 102*

The R/V ELTANIN of Lamont-Doherty Geological Observatory, Columbia University, worked on oceanographic section (STD observation) along 114°E in the Southern Ocean between Australia and Antarctica on October 10-22, 1970 (JACOBS *et al.*, 1972) (Fig. 1). This paper describes vertical distributions of potential temperature, salinity and geostrophic flow, almost to the sea bottom, from 36°56'S to 61°02'S near packice edge off Antarctica along 114°E. The Antarctic Surface Water along this longitude occupied the area between 61°02'S, the southernmost point in the oceanographic section,

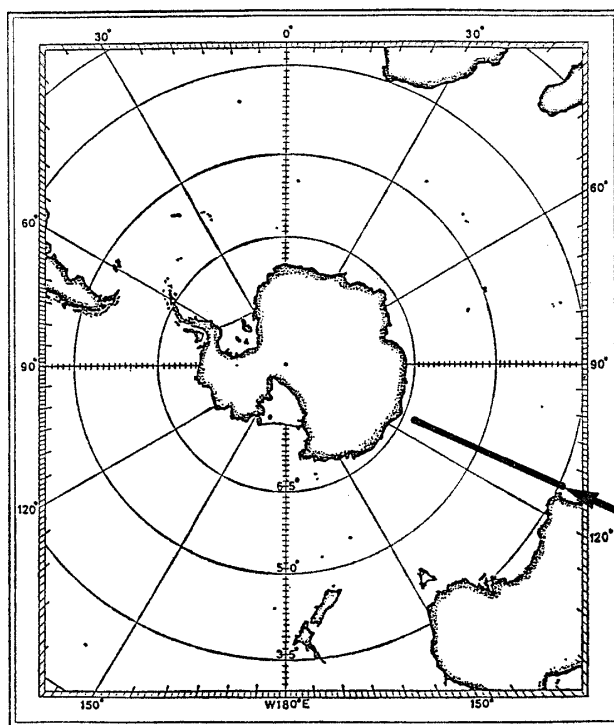


Fig. 1. Oceanographic section along 114°E in the Southern Ocean surveyed by the R/V ELTANIN in October 1970.

\* Present address: National Research Institute of Far Seas Fisheries, 7-1, Orido 5-chome, Shimizu 424.

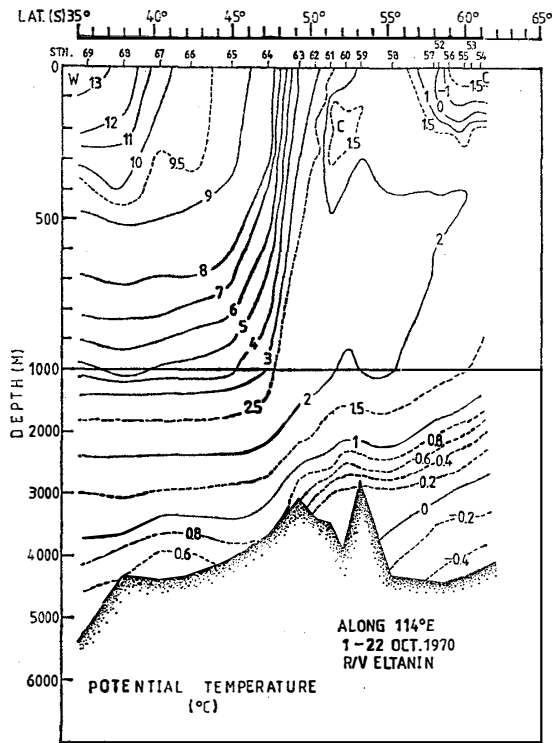


Fig. 2. Vertical distribution of potential temperature along 114°E.

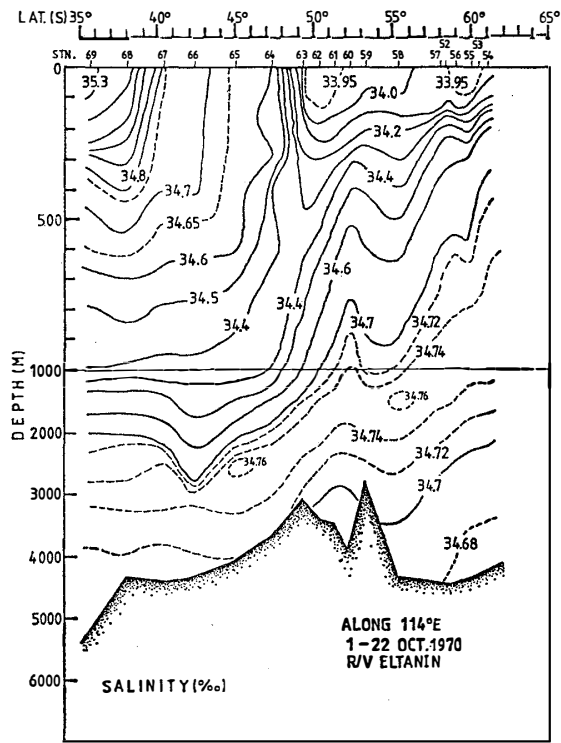


Fig. 3. Vertical distribution of salinity along 114°E.

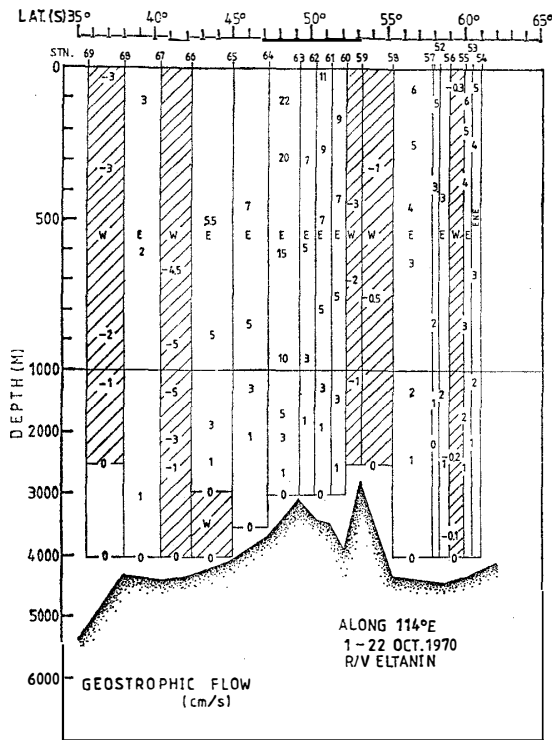


Fig. 4. Vertical distribution of geostrophic flow along 114°E.

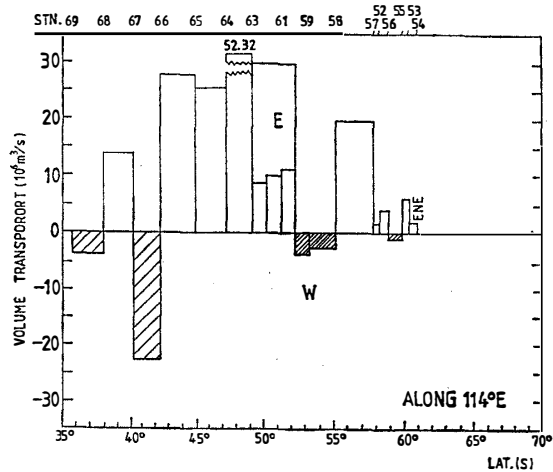


Fig. 5. Geostrophic volume transport through 114°E.

and 58°09'S (Fig. 2). The temperature minimum was  $-1.77^{\circ}\text{C}$  at the depth of 50 m in the Antarctic Surface Water. The temperature maximum was from  $1.83^{\circ}\text{C}$  to  $2.38^{\circ}\text{C}$  in the layer between 400 m and 800 m of the Warm Deep Water. There was a sharp reduction in surface temperature from  $8.87^{\circ}\text{C}$  at  $47^{\circ}34'S$  to  $1.96^{\circ}\text{C}$  at  $53^{\circ}28'S$ . Between 100 m and 500 m, there was also a sharp reduction of temperature from  $8^{\circ}\text{C}$  at  $47^{\circ}\text{S}$  to  $2^{\circ}\text{C}$  at  $51^{\circ}\text{S}$ . In the area having the sharp reduction of temperature, salinity also showed a reduction from  $34.65\text{‰}$  at  $47^{\circ}\text{S}$  to  $33.95\text{‰}$  at  $49^{\circ}\text{S}$ . A salinity minimum layer with  $34.40\text{‰}$  at about  $50^{\circ}\text{S}$  goes down from the surface to 1000 m. On the other hand, a salinity maximum layer of  $34.74\text{‰}$  ascends from 3000 m at  $42^{\circ}\text{S}$  to 100 m at  $60^{\circ}\text{S}$  (Fig. 3). Geostrophic flow was calculated referring to the nearby sea bottom level. The water generally flows eastward with a maximum speed of 22.8 cm/s at the surface between  $47^{\circ}34'S$  and  $49^{\circ}31'S$  (Fig. 4). The geostrophic volume transport between the Polar Front Zone at  $47^{\circ}34'S$  and  $61^{\circ}02'S$  through  $114^{\circ}\text{E}$  was  $110.5 \times 10^8 \text{ m}^3/\text{s}$  (eastward flow) (Fig. 5).

#### Reference

- JACOBS, S. S., BRUCHHAVSEN, P. M., ROSSELOT, F. L., GORDON, A. L., AMOS, A. F. and BELLIARD, M. (1972): Hydrographic and STD data. ELTANIN Reports, Cruises 37-39, 1969; 42-46, 1970. New York, Lamont-Doherty Geological Observatory of Columbia University, 20-279.

*(Received April 12, 1989; Revised manuscript received July 21, 1989)*