

VERTICAL DISTRIBUTIONS OF TEMPERATURE, SALINITY AND GEOSTROPHIC FLOW ALONG 45°W IN THE SOUTHERN OCEAN (EXTENDED ABSTRACT)

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There are large differences in macro-scale oceanic environments among sectors of Atlantic, Indian and Pacific in the Southern Ocean. In order to examine those differences, oceanographic analyses were carried out along the meridian sections of each sector (12.5°E / 37°E / 75°E / 114°E / 155°E / 175°E /

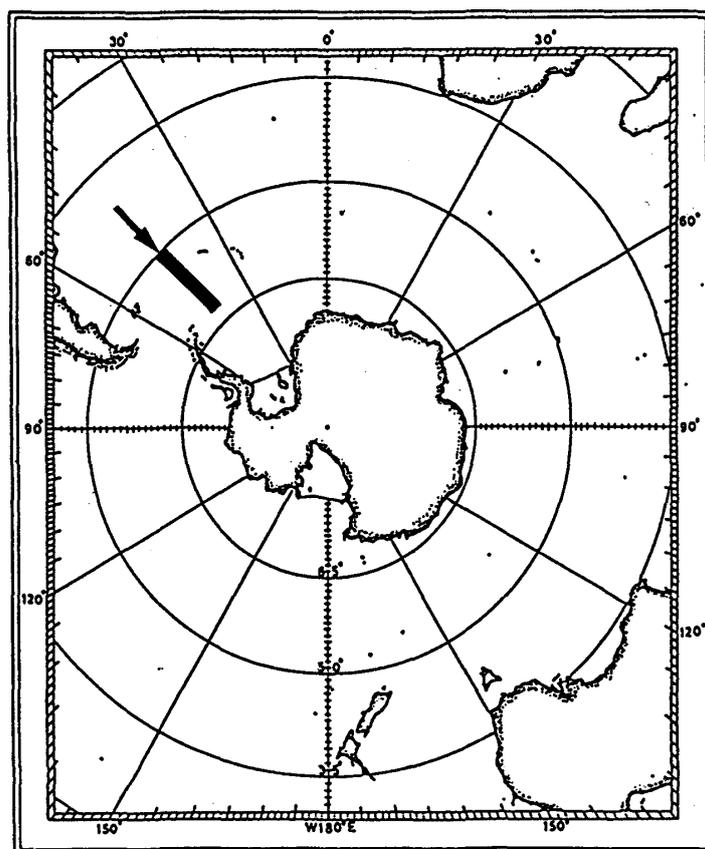


Fig. 1. Oceanographic section along 45°W between 50°S and 62°18.5'S near the pack-ice line in the Scotia Sea of the Southern Ocean surveyed by the KAIYO MARU.

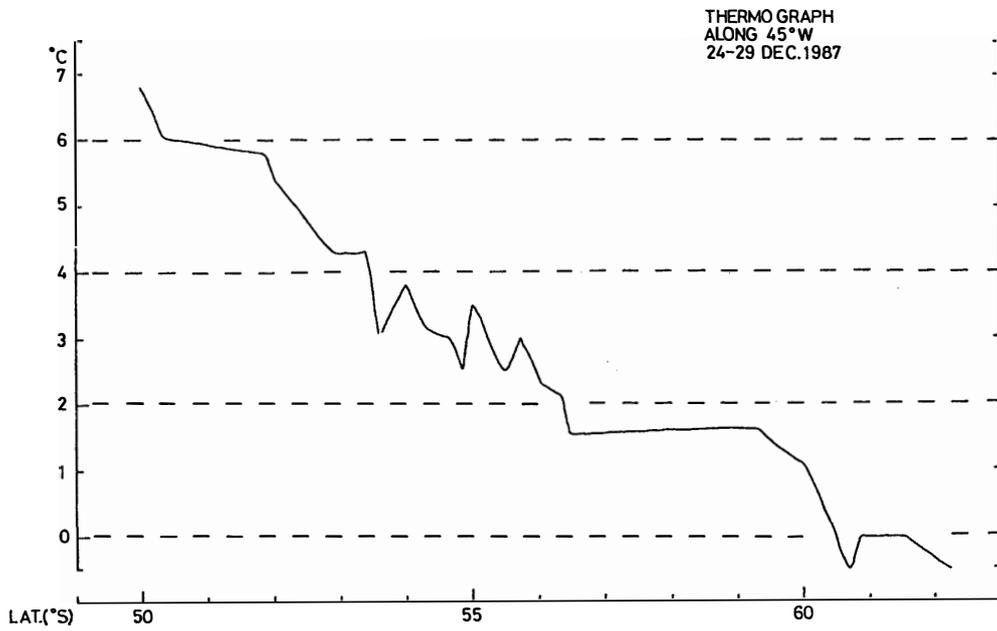


Fig. 2. Continuous record of the surface water temperature by thermograph along 45°W.

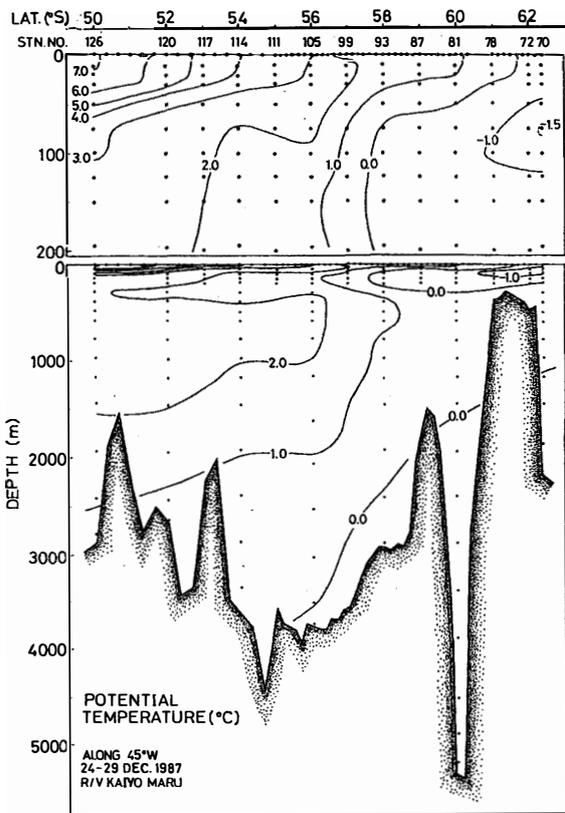


Fig. 3. Vertical distribution of potential temperature along 45°W.

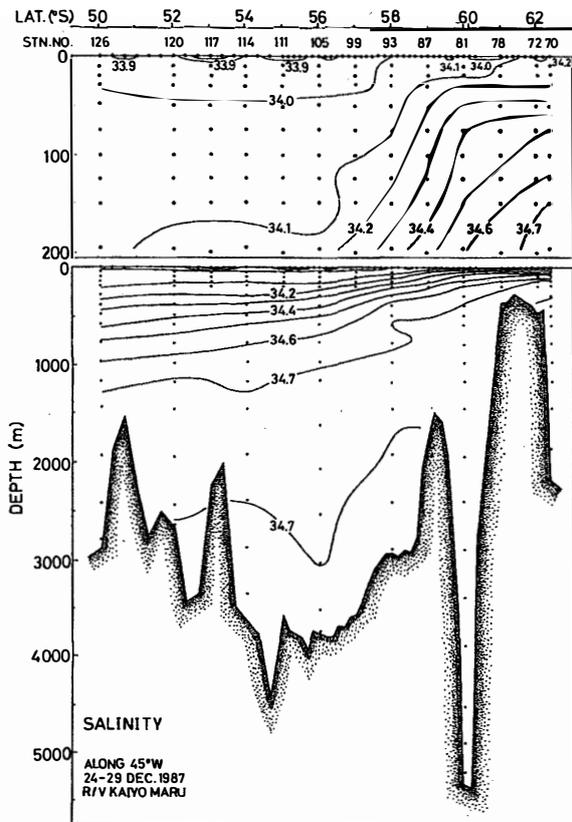


Fig. 4. Vertical distribution of salinity along 45°W.

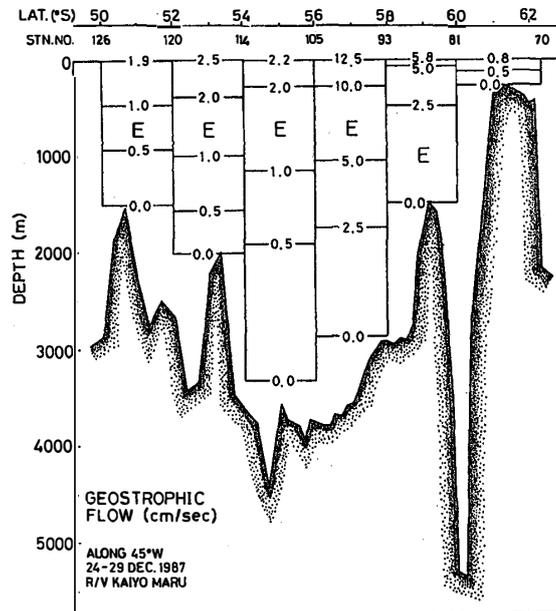


Fig. 5. Vertical distribution of geostrophic flow along 45°W. Open bars shows eastward flows.

Table 1. Geostrophic volume transport through 45°W. ($10^6\text{m}^3/\text{s}$)

Depth	Station						Total
	126	120	114	105	93	81	
0-200 m	0.72	0.99	0.98	5.43	2.09	0.27	10.48
0-1 km	2.27	3.91	3.82	19.51	6.09	0.29	35.89
1-2	0.22	1.16	1.69	7.63	0.55		11.25
2-3			0.86	1.68			2.54
3-4			0.09				0.09
Total	2.49	5.07	6.46	28.82	6.64	0.29	49.77

170°W / 120°W / 90°W / 60°W / 30°W). The analysis of this 45°W section is the series of the above meridian sections.

The fifth Antarctic survey cruise of the KAIYO MARU (Japan Fisheries Agency) was conducted in the waters from Drake Passage to the Scotia Sea in the Southern Ocean during the 1987/88 austral summer. Serial oceanographic observations were carried out along 45°W from December 24 to 29, 1987 (Fig. 1). Vertical distributions of temperature, salinity, density and geostrophic flow, almost to the sea bottom, from 50°S to 62°18.5'S near the pack-ice line along 45°W were analyzed using the KAIYO MARU data.

The Polar Front was located around 56°S, though it was not clearly defined (Figs. 2 and 3). The temperature value of 0°C or less indicating the Antarctic Surface Water was distributed from the southern most part of the section as far as 57°30'S (Fig. 3). The temperature minimum layer below 0°C was distributed

between -1.52°C at 75 m and -0.34°C at 75 m from $62^{\circ}18.5'\text{S}$ to 57°S . The temperature maximum layer of the upper Warm Deep Water rose from 2.31°C at 800 m at 50°S to 0.41°C at 500 m at $62^{\circ}18.5'\text{S}$. The salinity maximum layer of the lower Warm Deep Water also rose from 34.749 at 2000 m 50°S to 34.739 at 800 m at 60°S (Fig. 4). The peaks of the rising layers were located at the shallow bottom topography in the vicinity of the South Orkney Islands around 61°S .

The geostrophic flow along the 45°W section indicated eastward movement on the whole (Fig. 5). The maximum speed of the geostrophic flow was 12.5 cm/s between 56°S and 58°S in and around the Polar Front zone. The total geostrophic volume transport through the 45°W section was $49.77 \times 10^6 \text{m}^3/\text{s}$ (eastward flow) between 50°S and $62^{\circ}18.5'\text{S}$ (Table 1).

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