

VERTICAL DISTRIBUTIONS OF TEMPERATURE,
SALINITY AND GEOSTROPHIC FLOW ALONG
120°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 the differences, oceanographic analyses were made along the meridian sections of each sector (12.5°E/37°E/75°E/114°E/155°E/175°E/170°W/90°W/the east Drake Passage/30°W). The analysis of this 120°W section is the series of the above meridian sections. JACOBS (1965) summarized oceanographic section observed by STD during the ELTANIN cruise from 28 December 1963 to 17 January 1964 (Fig. 1). Vertical distributions of temperature, salinity and geostrophic flow, almost to the sea bottom from 55°S to 70°S near the pack-ice line along 120°W in the Pacific sector of the Southern Ocean were analysed using the ELTANIN's data.

The temperature value of 0°C or less at the Antarctic Surface Water is distributed from the southernmost part of the section as far north as 63°30'S (Fig. 2). The Polar

Table 1 Geostrophic volume transport through 120°W.

Along 120°W										(10 ⁸ m ³ /s)
Depth (km)	Station									
	227	228	229	230	231	234	236	238	239	
0-1	11 30	11 20	-5 54	18 11	4 52	0 97	0 17	7 40		
1-2	4 83	5 65	-2 58	5.52	3 64	0 54	0 73	3 64		
2-3	1 25	3 77	-2 34	2 10	2 19	0 28	0.72	2 01		
3-4		0 84	-0 64	0 89	0 68	0 13	0.46	0 91		
4-5				0 09			0 09	0 29		
Total	17 38	21 46	-11 10	26 71	11 03	1 92	2 17	14 25		

									(10 ⁸ m ³ /s)
Depth (km)	Station								
	239	240	241	242	243	244	245	Total	
0-1	1 85	-0 04	4.26	3 26	1 84	1 75		61 05	
1-2	0 44	-0 33	2 50	1.28	1 58	0 92		28 36	
2-3	0 24	-0 21	1 58	0.62	0 99	0 36		13 56	
3-4	0 17	0.07	0 53	-0.04	0 37			4 20	
4-5	0 02	0 01	0 02	-0 04				0 65	
Total	2 72	-0 50	8 89	5 08	4 78	3 03		107.82	

+; Eastward Component; -, Westward Component.

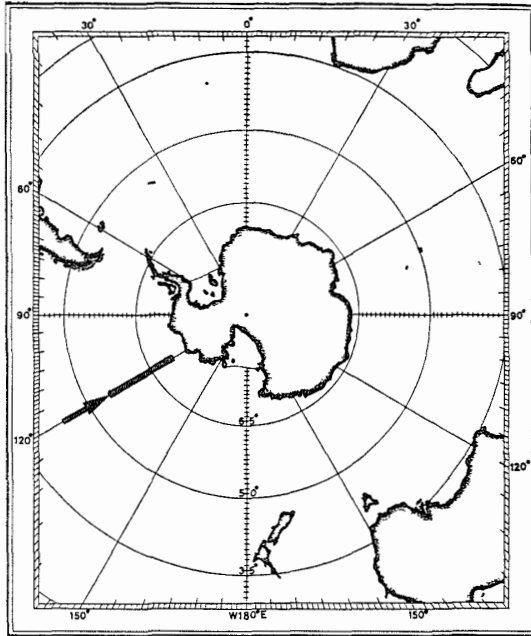


Fig 1 Oceanographic section along 120°W between 55°S and 70°S in the Pacific sector of the Southern Ocean surveyed by the ELTANIN.

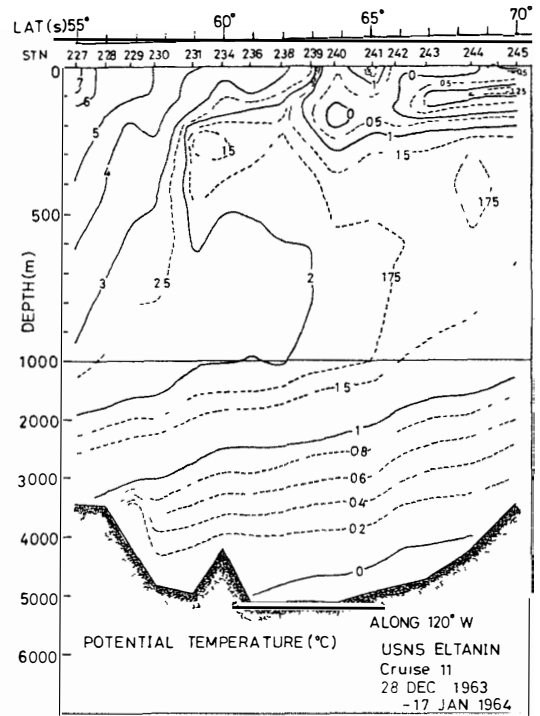


Fig 2 Vertical distribution of potential temperature along 120°W

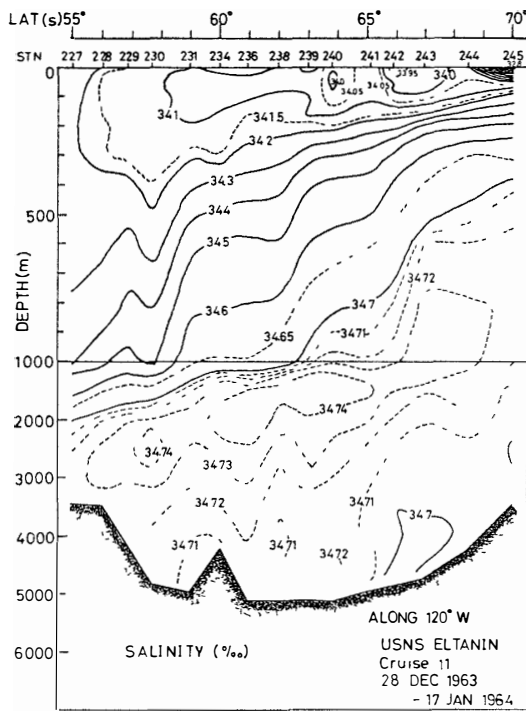


Fig 3 Vertical distribution of salinity along 120°W

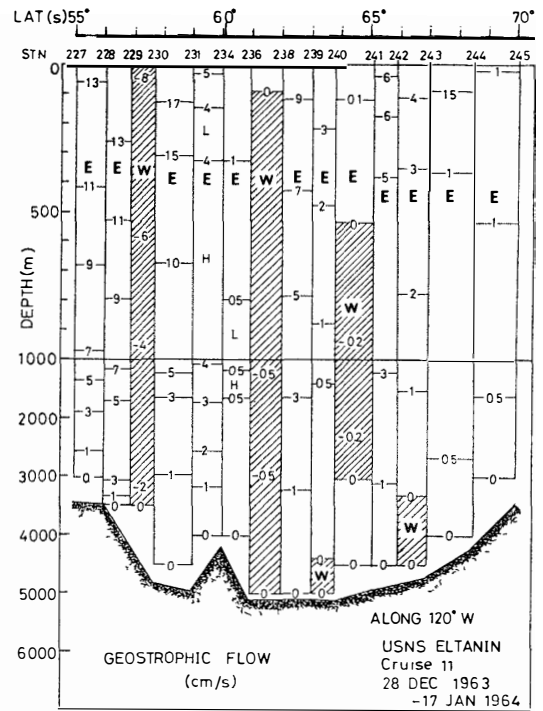


Fig 4 Vertical distribution of geostrophic flow along 120°W. Hatched and open bars show west- and east-ward flows, respectively.

Front is located around St. 231 (59°S). The temperature minimum layer was between -1.48°C at 75 m (St. 245) and -0.37°C at 150 m (St. 240) from 70°S to 64°S. The temperature maximum layer of the upper Warm Deep Water dropped from 600 m (2.31°C) at St. 234 (60°S) to 800 m at St. 240 in and around the Polar Front, and then rose to 300 m (1.74°C) at St. 245 (70°S). The salinity maximum layer of the lower Warm Deep Water rose from 3000 m (34.278‰) at St. 227 (55°S) to 800 m (34.729‰) at St. 245 (Fig. 3).

On the whole, the geostrophic flow along this section made an eastward movement (Fig. 4). The maximum speed of the geostrophic flow was 17.5 cm/s (eastward flow) between St. 230 and 231, and the flow speed in and around the Polar Front was comparatively high (9.5 cm/s). The total geostrophic volume transport through 120°W was $107 \times 10^6 \text{ m}^3/\text{s}$ (eastward flow) between 55°S and 70°S (Table 1).

References

- JACOBS, S. S. (1965): Physical and chemical oceanographic observations in the Southern Oceans. USNS ELTANIN Cruises 7-15, 1963-1964. Lamont Geol. Obs. of Columbia Univ., Tech. Report 1-CU-1-65, NSF GA-194.

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