SIZE CHARACTERISTICS OF CHLOROPHYLL PARTICLES IN THE SOUTHERN OCEAN

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Chlorophyll samples of suspended particles in the surface water and from various depths were collected in the Southern Ocean south of Australia as well as in the tropical and the subtropical seas along the cruise tracks between Japan and the Antarctic sea during the austral summer of 1983/84. Size fractionations were made of chlorophyll particles into 5 different size classes of 0.21–1 μm, 1–3 μm, 3–20 μm, 20–100 μm, and larger than 100 μm. Surface chlorophyll *a* concentrations in the Antarctic and the subantarctic seas were very similar to those in the tropical and the subtropical seas, respectively. The average concentration of surface chlorophyll *a* was 1.7 times higher in the subantarctic sea than in the Antarctic sea. The results of size fractionation indicated that nannoplankton (3–20 μm) predominated with less variations in the Southern Ocean without any significant difference between the Antarctic and the subantarctic seas, making a contrast to the tropical and the subtropical seas. Relative abundance of the smallest size class (0.2–1 μm) was quite low in the Southern Ocean as compared with that in the tropical and the subtropical seas. It was obviously lower in the Antarctic sea than in the subantarctic sea with a greater variation in the former sea. The largest size class (>100 μm) showed relatively low abundance but greater variations in the Southern Ocean as well as in other areas. No greater variation was observed in the vertical size distributions in the Southern Ocean except for the smallest size class. (p. 85–97).

PROTIST ALONG 150°E IN THE SOUTHERN OCEAN: ITS COMPOSITION, STOCK AND DISTRIBUTION

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Surface seawater samples were collected along 150°E in the Australian sector of the Southern Ocean during 8–16 February 1984. Protists in the samples were analysed by light and electron microscopy to elucidate the quantitative and qualitative characteristics of their distribution.

The predominant group of protists was dinoflagellates throughout the areas examined. The subdominant group was diatoms in the Antarctic water and coccolithophorids in the Subtropical water. Transitional change between the subdominant two groups was observed in the Subantarctic region.

Two major peaks were observed in the horizontal distribution of the total cell volume: One locating in the northern part of the Antarctic Ocean was dominated by diatoms, and the other locating in the northern Subantarctic area dominated by dinoflagellates.

The significance of fronts as biological boundary was investigated. Subantarctic Front (SAF) was the major southern boundary for the species of dinoflagellates and coccolithophorids in their southward distribution. Antarctic Polar Front (APF) and/or Subtropical Convergence (STC) were the major boundaries for the northward distributions of diatoms, coccolithophorids and siliceous cysts. In dinoflagellates, however, SAF as well as STC was the major northern boundary of their northward distribution.

Amoebae and colorless dinoflagellates were the common and the main components of the heterotrophic protists. The ratio of the colorless cell volume to the total cell volume was varied from 0% to 25% (7% in average) throughout the whole areas surveyed. (p. 99–115).