

Phytoplankton Biomass and Primary Production in the Marginal Ice Zone of the Northwestern Weddell Sea during the Austral Summer

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ABSTRACT. During the austral summer of 1995, distributions of phytoplankton biomass, primary production, and nutrient concentrations along two transects in the marginal ice zone (MIZ) of the northwestern Weddell Sea were examined as a part of the 8th KARP. An extensive phytoplankton bloom, ranging from 1.6 to 11.2 mg m⁻³ in chlorophyll *a*, was encountered along the eastern transect and extended ca. 184 km north of the ice edge. The spatial extent of the bloom was closely related to the density field induced by the input of meltwater. However, spatial extent (ca. 200 km) of phytoplankton bloom along the western transect exceeded the meltwater-influenced zone. The extensive bloom along the western transect was related to local hydrography. Despite low bloom intensity, mean primary productivity (0.62 g C m⁻² d⁻¹) in shelf waters was comparable to that (0.84 g C m⁻² d⁻¹) in the MIZ, and was 3 times greater than that in open waters. A comparison between the historical productivity data and ours also shows that highly productive regions in the Southern Ocean are shelf waters and the MIZ, with emerging evidences of frontal region as another major productive site.

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