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DIFFERING MARINE ECOLOGICAL REGIMES OVER A MESO-SCALE DISTANCE IN THE SOUTHWEST ATLANTIC SECTOR OF SOUTHERN OCEAN; RESPONSE TO SEA ICE RETREAT OR EDDIES?

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Significantly different marine ecological regimes were observed over only a meso-scale distance in the Southwest Atlantic Sector of Southern Ocean. This was apparent during early summer with Shackleton Fracture Zone as a natural boundary and it does not seem to be an isolated case to a single year. In the vicinity of South Shetland Islands, mostly to the west of Elephant Island, chlorophyll level as well as krill abundance was low. On the other hand, chlorophyll biomass was at an enhanced level and there were substantial concentrations of krill to the east of Elephant Island, which is the northwestern part of the Weddell Sea. In this biologically richer part of study area, open-water to ice-line gradient was seen in a number of aspects including the size composition of phytoplankton assemblage and krill aggregation characteristics. This area is more strongly affected by the annual cycle of sea ice retreat and also by the influence of Weddell Sea water than the other, western part of the study area. Krill concentrations found in this richer area are likely to have come from nearby under-ice habitat, which developed during the preceding winter, rather than having been transported by eastward-flowing water currents. This does not support the prevailing concept of krill distribution that greatly resorts to krill being moved on circum-Antarctic flow. The process that often promotes and maintains elevated biological activity in this area, not long away from typical unproductive waters, appears to be related to the timing of sea ice retreat and subsequent weather conditions in the area. Bottom topography-induced turbulence and the resultant nutrient supply may also play a role. The relative importance of different processes deserves to be a focus of future study.