

PHYSICAL AND BIOLOGICAL DETERMINANTS OF KRILL-SEABIRD AGGREGATIONS NEAR ELEPHANT ISLAND, ANTARCTICA

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To study how Antarctic seabirds find prey, we constructed a map of the distributions of Antarctic krill and seabirds north of Elephant Island (61°S, 55°W) during December 2001 and asked whether distributions of foraging predators were more influenced by physical or biological factors. A hydrographic front, characterized by a sharply delineated change in sea temperature and salinity, was detected along the insular shelf break, and three different water masses were mapped: offshore, inshore, and intermediate. Krill swarms were positively correlated with phytoplankton concentration and with a hydrographic front that was likely part of the Weddell-Scotia Confluence. This information was used to test whether distributions of foraging birds were more dependent upon krill swarms or physical oceanography. The physical factors in this study were the three different water masses identified by temperature-salinity relationships. Biological factors were krill abundance and phytoplankton concentration. Seabird and krill aggregations were affected by the position of the hydrographic front. Overall, total seabird abundance was more correlated with biological factors. Seabird feeding aggregations were numerically dominated by Cape Petrels (*Daption capense*), and were located within a zone of intermediate water mass, where krill swarms were highly concentrated. Chinstrap penguins (*Pygoscelis antarctica*) were attracted to the near shore side of the hydrographic front, and selected considerably lower krill concentrations than did aerial predators. Multi-species feeding aggregations were located in proximity to the front where krill was highly concentrated

Keywords: aggregations, Antarctic krill, behavior, biological, Cape Petrels, Chinstrap Penguins, Elephant Island, hydrographic front, multi-species, physical, seabirds