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MINKE WHALE HABITAT IN ANTARCTIC SEA ICE

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Understanding the role of sea ice as marine wildlife habitat, and its impact on patterns of distribution was our primary objective. Many cetacean species are found in association with sea ice, a dynamic and complex region of the Antarctic marine ecosystem. Whale surveys are often conducted on Antarctic vessels that enter sea ice, but few have used standardised sea ice data collection methods. None have attempted to determine the extent to which sea ice can be categorized in an ecologically meaningful way for whales, particularly how the patchiness of whale distribution in ice relates to the heterogeneity of the ice landscape. A standard shipboard sea ice data collection system (ASPeCt (Worby,1999)) has been developed to measure complexity in sea ice structure. Surveys were conducted in the Weddell Sea, East Antarctica and the Ross Sea over three Antarctic seasons, with whale sightings collected simultaneously with ASPeCt sea ice data. To investigate the relationship between minke whale distribution and sea ice characteristics we fuzzy coded the classifications for a subset of the data, then used multiple correspondence analysis to explain variability at a high temporal sampling resolution. Marginal frequencies for fuzzy-coded ice variable modalities were examined to characterize ice in each data set: marginal frequencies for records where minkes were sighted indicated potential habitat. Ordination through multiple correspondence analysis explained variability among the fuzzy-coded records according to the influence of the original ice variables: complexity was high, different seasons and locations had clearly different ice characteristics. Shelf habitat, distance to the ice edge, proximity to the SB of the ACC and independent axes derived from standardized ASPeCt classifications were used to define minke whale habitat in each region, over a range of seasons. Multivariate and spatial analysis confirmed seasonal and spatial differences in minke whale habitat were most strongly related to sea ice type and shelf habitat. Satellite images of sea ice were ground truthed against our fine scale sea ice data to determine the utility for extrapolation of minke whale distribution into unsurveyed areas.