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SEA ICE VARIABILITY IN ADMIRALTY BAY, KING GEORGE ISLAND, ANTARCTICA

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This study investigates the variability of sea ice occurrence in Admiralty Bay, King George Island (KGI), Antarctica, since the first observations in 1948. The methodology here applied is based on former studies that classified annual sea ice events, between 1977 and 1999, in five categories with increasing order of intensity and duration. By analyzing monthly sea level mean atmospheric temperatures and monthly surface level mean wind speed and predominant direction, of both observational and reanalysis data, it was possible to judge the meteorological conditions that determined the category of each sea ice event. Analyzing the atmospheric records for each winter between 1948 and 1960, the same classification was applied to the sea ice events observed during this period. Once the bay's sea ice event time serie was composed, its evolution was compared to the air temperature, zonal and meridional surface wind components, antarctic sea ice extent along 60ºW and El Niño–Southern Oscillation (ENSO) indices time series. Mean air temperature, especially for winter, and the wind are the sea ice event's main climatic controls. It is the predominant wind direction that determines the mean air temperature behavior, because of the incoming air masses of different origins. The mean wind speed determines how much it interferes on the bay's sea ice formation and consolidation. When compared to the 1948-1960 period, the principal evidence in the 1977-1999 period is the decreasing frequency of intense sea ice events. This is related to the increasing air temperature trend observed in the KGI region, as well as to the increasing wind speed trend and greater frequency of northerly and north-westerly winds, advecting relatively warmer air masses from lower latitudes. No direct relationships were found between the bay's sea ice events and sea ice extent at 60ºW. The ENSO indices suggest the coincidence of El Niño years with intense sea ice events and La Niña years with less intense sea ice events.