

Antarctic sea ice variability in the Weddell, the Bellinghausen and the Amundsen Seas

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Sea ice is an important, highly variable feature of the Earth's surface, both reflecting and influencing climatic conditions. Sea ice covers approximately 7 percent of the world oceans, significantly reduces the amount of solar radiation absorbed at the Earth's surface, greatly restricts the transfer of heat from the ocean to the atmosphere in winter, and influences global atmospheric and oceanic circulation. In this paper, monthly through interannual variability of the sea ice between 0° and 120°W is analysed for the 23-year period 1979 through 2000.

The monthly Polar Gridded Sea Ice Concentrations data set derived from the Nimbus-7 Scanning Multichannel Microwave Radiometer (SMMR) and the Defense Meteorological Satellite Program's (DMSP) DMSP-F8, F11 and F13, Special Sensor Microwave/Imager (SSM/I) generated by NASA team algorithm were used. This data were acquired from the National Snow and Ice Data Center (NSIDC) and are gridded on the SSM/I polar stereographic grid (25 x 25 km) provided in two-byte integer format.

Principal Components Analysis in S-Mode was performed on pre-processed sea ice data (anomalies from which have been removed continent and perennial open water), in order to provide a regionalization of the selected Antarctic region in several areas of similar temporal behaviour. The temporal patterns were correlated to Southern Hemisphere surface air and sea temperature and climatic variability indices like SOI, RSOI and PDO.