Changing storm behavior and its links to winter sea ice processes in the Ross Sea

Antonia Louise Radlwimmer, Inga Smith, Greg Leonard, Fabien Montiel

University of Otago

In this talk I present work showing that the intensity and frequency of surface level storms in the Ross Sea has been increasing over the past decades and how this may be affecting sea ice processes in the region. The increase has been especially pronounced for wintertime storms. When an extra-tropical cyclone system develops in or enters the Ross Sea in winter, it is typically accompanied low air pressures, high air temperatures and strong winds. This influences the sea ice which fills the Ross Sea during winter. Ice attached to the coast may break away from it (breakout). Ice drifting freely may be forced into or out of certain areas (polynyas). I quantify the increase in storm intensity and frequency using a storm index. This index uses the temperature and pressure anomalies accompanying the storms to identify storm events in a straightforward way with very low computational cost. 2m air temperature and surface air pressure data are taken from weather stations in the Ross Sea region and from reanalysis (ERA5). The occurrence of storm events is then correlated with ice fractions derived from the satellite ARTIST sea ice concentration product in McMurdo Sound and other areas. A link is revealed between the changing storm behaviour and a change in the patterns of winter sea ice movement related to breakout or polynyas.