

Large scale atmospheric circulation modes and Antarctic sea ice changes in a changing climate.Marilyn Raphael[†];[†] UCLA, USALeading author: raphael@geog.ucla.edu

This research examines the way in which large scale atmospheric circulation modes influence sea ice variability, with particular emphasis on Antarctic sea ice. These circulation mechanisms influence sea ice in different regions around Antarctica and at different seasons, with the result that the variability in Antarctic sea ice has strong regional and seasonal signatures. Over the period of record indications are that much of Antarctica is warming, led by the Antarctic Peninsula. Concurrent with this warming, and contrary to what is predicted, the average sea ice extent is increasing and this increase has strong seasonal and spatial expressions. The variability of Antarctic sea ice is affected by the Southern Hemisphere Annular Mode (SAM), the Pacific South American pattern (PSA), (which is in turn excited by ENSO), the Semi-Annual Oscillation (SAO) and Zonal Wave three (ZW3) . Using present day observed relationships between Antarctic sea ice variability and the large scale atmospheric modes of circulation, this research examines the way in which these relationships, and therefore sea ice, might change in future, warmer, climates, from a seasonal perspective.