Multidecadal Analysis of the Antarctic Dipole (ADP)

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Sea ice plays a major role in our world's rapidly evolving climate. Sea ice is important to our climate because it hinders exchanges between the ocean and atmosphere while also reflecting solar radiation back to space. The strongest sea ice teleconnection at the interannual time scale is between El Niño–Southern Oscillation (ENSO) events and a high latitude climate mode named the Antarctic Dipole (ADP). Due to drastic changes in the Antarctic climate system, an analysis of Antarctic Dipole variability is needed to advance our knowledge and understanding of the coupled climate system in southern high latitudes.

This study examines the life cycles of ENSO warm and cold events in the tropics and associated evolution of the ADP in high latitudes of the Southern Hemisphere. By investigating the Antarctic sea ice edge (SIE) and climate data, we will determine the current state the ADP. The ONI index was plotted from 1979-2019 in order to determine ENSO event years. Then a SIE monthly anomaly series (SIE') was generated and then an EOF analysis was applied to it. This data was then plotted for ENSO event years. The results of this study found no major change in the strength or frequency of ENSO events and that the ADP has remained relativity unchanged in contrast major large-scale changes occurring in Antarctic Sea Ice. This confirmation of the state of the ADP is important because as scientists continue to try to understand the impacts of the warming climate, understanding each facet of climate is increasingly vital.

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