The poleward transport of heat, moisture and angular momentum that governs the global climate is affected by a combination of mean flow, planetary scale waves and cyclonic activity. Previous studies indicated that the small-scale features (e.g. synoptic and mesoscale cyclones) are very important in these transports. Our study evaluates the role that synoptic scale and mesoscale cyclones play in polar climate systems, particularly on seasonal and interannual timescales.

Due to the limited amounts of data in the polar regions, much is still unknown about the climatology of these important small scale features of the Southern Hemisphere's climate system. In large part, this is due to the fact these cyclones are not resolved in the global reanalysis data sets such as the NCEP/NCAR and ERA Reanalyses. In contrast, the AVHRR Polar Pathfinder dataset includes twice-daily composites of calibrated and georeferenced channel data at 5 km resolution for 1982-2004. Further, archived output from the Antarctic Mesoscale Prediction System (AMPS) contains data from January 2001 to present with horizontal resolution ranging from Antarctic-wide at 30 km, to 3.3 km and less over smaller regions. These new sources of data have the potential to reveal important characteristics of small scale processes in the climate system. Our project is the first to compare cyclone climatologies from these new high-resolution sources and reanalyses for the Antarctic and Southern Ocean region. Our results reveal large differences in cyclone counts between the Reanalyses, AVHRR and AMPS datasets, which we subsequently discuss.