



Southern Hemisphere zonal waves and Antarctic Peninsula temperature trends

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During the late 20th century, the Antarctic Peninsula (AP) region has shown one of the largest observed regional surface warming trends globally, in contrast to much of the Antarctic region. Previous studies have attributed this warming to trends in the Southern Annular Mode (SAM), trends in west Antarctic sea ice cover and ocean warming in continental shelf west of the AP. In this study, a possible influence of the SH zonal wave one (ZW1) on AP surface temperature is explored using local station observations, satellite and reanalysis data. ZW1 is the dominant pattern of the SH zonally-asymmetric circulation, and there is evidence that it is linked to large-scale atmosphere-ocean interactions in the South Pacific basin, as well as airflow over the west Antarctic region. Evidence is presented of a seasonally-dependent relationship between AP surface temperature and ZW1 amplitude and location that is concentrated in the austral fall-early winter. The primary mechanism of this influence is found to be through east-west shifts of a region of southerly airflow related to ZW1. The reasons for the strong seasonal dependence of this relationship are also discussed