



Response of the Antarctic Stratosphere to Two Types of El Niño Events

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This study is the first to identify a robust ENSO signal in the Antarctic stratosphere. Following the recent ocean-atmosphere literature, El Niño events between 1979 and 2006 are classified as follows: “warm pool” El Niño events (warm SST anomalies in the Niño 4 region) and “cold tongue” events (warm SST anomalies in the Niño 3 region). The MERRA meteorological reanalysis is used to examine the Southern Hemisphere stratospheric response to both types of El Niño events. Consistent with previous studies, “cold tongue” events do not impact temperatures in the Antarctic stratosphere. The polar stratospheric response to “warm pool” El Niño events is larger and is distinct from the response to “cold tongue” events. “Warm pool” El Niño events shift the South Pacific Convergence Zone (SPCZ) to the central Pacific, enhance precipitation and cloud top heights in the southeastern edge of the SPCZ, and increase planetary wave driving in October and November. These conditions lead to higher polar stratospheric temperatures during austral summer ($>2\text{K}$ at 70hPa), as compared with neutral ENSO years.