



Factors that influence near surface temperatures over West Antarctica

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Recent studies (Steig et al., 2009; O'Donnell et al., 2011) have suggested markedly different estimates of near surface air temperature change across West Antarctica over the past few decades. Steig et al (2009) finds that the greatest warming occurred during winter. We find that this trend lies within the uppermost 5% of the 50-year temperature trends distribution calculated from the IPCC AR4 pre-industrial control run ensemble suggesting that this warming is at the upper limit of natural climate variability.

Here, the six warmest and coldest winters are analysed using the ECMWF ERA-40 dataset to investigate the underlying mechanisms that drive winter temperature anomalies over West Antarctica. Anomalously warm near surface temperatures are positively correlated with sea-level pressures and 500 hPa geopotential heights over the Peninsula, West Antarctica and Bellingshausen Sea, suggesting that changes in large-scale dynamics are responsible for recent positive trends in West Antarctic temperatures. This is confirmed by energy budget calculations for the region.