



Interpreting ice core records of inter-annual temperature change across the Antarctic Peninsula

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The Antarctica Peninsula has a rapidly changing climate, however there is a paucity of long term meteorological observations of temperature across the region. Decadal to centennial ice cores records can potentially help to fill this gap. Interpretation of the ice cores requires an understanding of the relationship between temperature change and the accumulation record recovered from each Peninsula core site. To facilitate this interpretation, we present an analysis of 22 years (1980-2002) of ECMWF ERA40 surface temperature, precipitation, and accumulation data. Inter-annual variability in temperature is quite similar across the Peninsula. However, changes in the covariance between accumulation and temperature over the Peninsula region at the seasonal and synoptic time periods strongly affect the potential ice core recording of temperature change: with a clear trend in the fraction of inter-annual temperature change recorded along the Peninsula. It is likely that only about 25% of the actual inter-annual temperature change will be visible in the accumulation record at the northern end of the Peninsula near James Ross Island, 70% at Dyer in the central regions, and 120% at the southern end in the Gomez region. This study is likely to facilitate understand of decadal to centennial temperature change obtained from stable water isotopes in this sensitive polar region.