

Signals of climate change and the Southern Annular Mode in Antarctic stable isotope records

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Recent trends in Antarctic climate have presented somewhat of a paradox-cooling over the East Antarctic while most of the rest of the Southern Hemisphere has warmed and the Peninsula has warmed dramatically. These contrasts have now been interpreted as the signature of the Southern Annular Mode, a large scale feature of the atmospheric circulation. Here we discuss how ITASE records may capture different aspects of these changes - both the mean surface temperature signal and the signal of the SAM itself. We show that records from ITASE sites are not equal in capturing variance associated with these climate signals. Interestingly, the highest accumulation sites (Pine Island - Thwaites drainages) do not show a clear SAM signal, while sites with lower accumulation near the divide do. We also look at the relative strengths of all candidate climate signals -SAM, ENSO, Pacific-South American pattern, etc.-in each of the cores. Understanding of the mechanisms behind the signals may be improved through comparison with other types of data (accumulation, chemistry, temperature) and through modeling. Reconstructing indices of surface temperature and the SAM back in time through the ITASE window of 200-1000 years is of critical importance to understanding the dynamics of Antarctic climate.