



340-years of atmospheric circulation characteristics reconstructed from an eastern Antarctic Peninsula ice core

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The precipitation delivery mechanisms (PDM) for Dolleman Island (DI), eastern Antarctic Peninsula (AP), are investigated using ECMWF re-analysis and back trajectory (BT) data. The Southern Annular Mode (SAM) and ENSO were shown to influence precipitation delivery and event size. The PDM variability was analysed against the interannual variation of chemical data from two DI ice cores. Nitrate in the ice cores was strongly linked with the ratio of easterly to westerly BTs arriving at DI, as described by a Cross-Peninsula Index (CPI) that is defined in this paper. The CPI was used to reconstruct the atmospheric circulation characteristics for the 340-year ice core record. This analysis highlighted a period of increased easterlies during 1720-1780 and an increase in westerlies over the period 1950-1980, concomitant with a positive trend in the SAM and western AP warming. The reconstruction also revealed periods when polynyas may have been present over the Weddell Sea.