

Snow and Ice Research Group – New Zealand: Monthly video seminar

Using the isotopic fingerprints of winter storms to understand vapour pathways

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The variability of synoptic circulation and associated shifts in vapour transport pathways exert a major influence on stable isotopes in paleoclimatic records. For this reason, understanding the interaction between precipitation isotopes and vapour pathways on a seasonal timescale can lend insight into the interpretation of long-term climate archives. Snow pit isotope data and snow accumulation records were obtained over the 2004-05, 2005-06 and 2006-07 winter accumulation seasons at two alpine field sites in the Canadian Rocky Mountains. Isotope stratigraphies exhibited little post-depositional change on a seasonal timescale, which enabled the identification of an isotope fingerprint from each major storm system. Temperature is found to control 47% of the variability in $\delta^{18}\text{O}$ and it is hypothesized that vapour pathways are an important second order control on stable isotopes in this region. To investigate this further, 10 major storm events were modelled with a coupled orographic-Rayleigh distillation model. This results in a 39% improvement in the prediction of $\delta^{18}\text{O}$ compared to results obtained without accounting for orography. These trajectory modelling techniques will be applied to the analysis of a ~100 m ice core from the Whitehall Glacier, Antarctica. This site is only 12 km from the coast and is expected to contain a high-resolution record of temperature, greenhouse gas concentrations and trace elements for the past 300 years.

Wednesday 3 June 2009, 1pm-1:50pm

All interested are welcome to attend.

Video meetings are held every month over the Access Grid. Video rooms are sited at most universities. The locations of the video conference rooms for each campus are:

Massey: Room 4.40, Social Sciences Tower, Massey University, Palmerston North.

Canterbury: Room 164, Level 1, Geography-Psychology Building, Canterbury University, Christchurch

Otago: Teaching Facilities South West corner, Information Services Building

Victoria: Library RB106



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