



The 8200 B.P. climate event in the Southern Hemisphere

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The event that occurred approximately 8200 years ago is the largest excursion in climate since the beginning of the Holocene. In this event we observe the climatic response to a perturbation which provides a probe with which to investigate the stability of interglacial climate. This is of particular concern in the present environment of concern over climate response to greenhouse forcing.

The 8.2 kyr event was marked by abrupt, widespread cooling in the Northern Hemisphere, but questions remain about the timing and extent of the event, and in particular its presence in the Southern Hemisphere.

Here we present new high resolution methane data through the 8.2ky event from Law Dome, Antarctica (DSS), together with, a new augmented record from GRIP, Greenland. The Law Dome site has a high accumulation rate (late Holocene average 0.68 m ice-equivalent) which provides rapid trapping of gas. This gives small uncertainties between ice and gas chronology (“ Δ age”) and minimizes attenuation by smoothing. The Law Dome record shows an apparently short duration event with amplitude similar to that observed in Greenland, but uncertainties in flow thinning and accumulation rate prevent a definitive timing in the south. However, the high resolution GRIP methane data provide an additional constraint on the width of the event that allows for refinement of the Law Dome age scale.

The atmospheric methane signal also provides a marker of the Northern Hemisphere event which can then be used to synchronize other ice core data series through this period. Evidence from the North Atlantic indicates that the 8.2ky period was marked by two events, and using the methane synchronization, we present Law Dome isotope and trace ion chemistry data that constrain the extent of changes near coastal East Antarctica at this time.