

Evidence for Rapid Surface Elevation Changes Around Siple Dome During the Deglacial

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Unlike other deep Antarctic ice cores that were purposely drilled at locations where the influence of ice flow on the record would be minimized, the Siple Dome core is strongly influenced by changes in ice flow because it was collected on an ice ridge that separates two active ice streams. The Siple Dome core was collected 200 km away from the Byrd core site, which is not directly influenced by ice streams.

Comparison of the Siple Dome records to the Byrd and other records shows there were two episodes of rapid temperature changes (15 ka BP and 22 ka BP) at the summit of Siple Dome which did not occur at other locations. These local elevations changes are interpreted to be the result of surface elevations changes on the summit of Siple Dome and the surrounding ice streams. Changes in air flow and katabatic winds caused by the changes in the surface topography may have amplified the local temperature change. The two episodes are thought to be decreases in surface elevation on order of many hundreds of meters in a few hundred years.

The following causes are being considered to explain the rapid changes in surface elevation, but none of them are entirely satisfactory.

- 1) A break up of the portion of the Ross Ice Shelf between Roosevelt Island and the Siple Coast caused by ocean warming.
- 2) An ice stream surge event similar to what is happening now on some ice streams but with a larger amplitude and shorter duration.
- 3) Rapid discharge of a sub glacial water system
- 4) Sea level rise

Despite the uncertainty in the physical process that caused the rapid surface elevation changes at Siple Dome, the core shows the Siple Coast of WAIS responded with large and abruptly local changes to the gradual changes in forcing of last deglacial.