

Does the Siple Dome Ice Core Provide Evidence of Abrupt Changes in Siple Coast Ice Dynamics?

K.C. T aylora, J.W.C. Whiteb, J.P. Severinghausc, E.J. Brookd, P.A. Mayewskie, R.B. Alleyf, E. J. Steigg

aK.C. Taylor: Desert Research Institute, University and Community College System of Nevada, 2215 Raggio Blvd, Reno, Nevada, 89511

bJ.W.C. White: INSTAAR, University of Colorado, Campus Box 450, Boulder, Colorado, 80309 USA

cJ.P. Severinghaus and A. Grachev: Scripps Institution of Oceanography, University of California, 8675 Discovery Way, San Diego 92093-0244

dE.J. Brook: Department of Geology and Program in Environmental Science, Washington, State University, 14204 NE Salmon Creek Ave, Vancouver, WA 98686

eP.A. Mayewski: Climate Change Institute, Bryand Global Sciences Building, University of Maine, Orono, Maine 04469

fR.B. Alley: Environment Institute and Department of Geosciences, Pennsylvania State University, 512 Deike Building, University Park, PA 16802

gE. J. Steig: Quaternary Research Center, University of Washington, Sciences, 19 Johnson Hall, University of Washington, Seattle, WA 98195-1360

The Siple Dome Ice core shows the temperature and accumulation rate on the summit of Siple Dome change abruptly (~6°C in ~40 years) at 15 and 22 KYR B.P. The local climate changes were not accompanied by a regional climate change, which would be expected for a change of this magnitude. This makes it difficult to attribute the local climate changes to changes in regional ocean, atmosphere, or sea ice conditions. An alternation mechanism is suggested where abrupt changes in the surface elevation of the ice streams (~100 m in ~40 years) altered atmospheric flow patterns around and on the summit of Siple Dome creating a large but local climate change. This hypothesis is consistent with the ice core data, but needs to be evaluated with ice flow and atmospheric modeling. If this interpretation of large and abrupt changes in the ice dynamics is correct, it indicates the Siple Coast region was a likely contributor to abrupt increases in sea level.