COSMOGENIC NUCLIDES RECORD RAPID RATES OF ICE-SHEET THINNING AND VARIABLE GLACIAL EROSION AT MT. WASHINGTON, NEW HAMPSHIRE, USA

Koester, Alexandria J., Shakun, Jeremy D., Bierman, Paul R., Davis, P. Thompson*, Corbett, Lee B., Goehring, Brent M., Anthony C. Vickers, Anthony C., Zimmerman, Susan R.

Session S3 Empirically testing paleoglaciological hypotheses and models

Poster Presentation

The lateral retreat history of the Laurentide Ice Sheet during the last deglaciation is relatively well-constrained by radiocarbon and cosmogenic exposure dating; however, its thinning history is less certain due to a lack of direct constraints on ice thickness over time. Reconstructing the timing of ice-sheet thinning is necessary to better understand the ice sheet's response to climate change, contribution to sea-level rise, and freshwater input to the ocean. To improve constraints on the thinning history of the Laurentide Ice Sheet during the last deglaciation, we measured 20 ^{10}Be exposure ages and six *in situ* ^{14}C exposure ages along a vertical transect on Mt. Washington, New Hampshire, the tallest mountain (1917 m a.s.l.) overridden by the ice sheet outside of the Arctic. Most of the ^{10}Be ages above 1600 m a.s.l. record total exposure histories 2 to 5 times longer than regional deglaciation ages, consistent with non-erosive cold-based ice on the upper reaches of the mountain that did not fully remove nuclides inherited from prior periods of exposure. The apparent antiquity of high-elevation features likely reflects the survival of the landscape under this cold-based ice. High-elevation ^{14}C concentrations are near saturation, suggesting that the ice sheet did not cover the top of the mountain for long and/or began thinning relatively early during the last deglaciation. Below 1600 m a.s.l., ^{10}Be exposure ages are indistinguishable over a ~700 m range in elevation and imply rapid ice-surface lowering at 14.7 ± 0.6 ka. This accelerated ice sheet thinning at Mt. Washington coincides with quickened ice margin retreat to the west and south recorded by Connecticut Valley varves during the Bølling Interstadial; together, these records suggest rapid ice volume loss in interior New England in response to this Northern Hemisphere warm event.