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OLD SURFACES AT THE TOP OF NEW ENGLAND'S HIGHEST PEAKS SUGGEST WEAKLY EROSIVE ICE

BIERMAN, Paul[1], DAVIS, P. Thompson[2], CORBETT, Lee B.[1] and LIFTON, Nathaniel A.[3], (1)Department of Geology and Rubenstein School of Environment and Natural Resources, University of Vermont, Delehanty Hall, 180 Colchester Ave, Burlington, VT 05405, (2)Department of Natural & Applied Sciences, Bentley University, 175 Forest St, Waltham, MA 02452, (3)Depts. of Earth, Atmospheric, and Planetary Sciences, and Physics and Astronomy, Purdue University, 550 Stadium Mall Drive, West Lafayette, IN 47907, pbierman@uvm.edu

Over 100 years of debate surround the extent, thermal regime, and geomorphic impact of the Laurentide ice sheets that repeatedly overwhelmed northern North America during the Pleistocene**.** In order to understand better the timing of deglaciation and the erosivity of the Laurentide Ice Sheet in New England, we sampled bedrock and blocks exposed on Mount Washington including from the peak at 1900 m (New Hampshire) and from Katahdin (on the peak at 1600 m and below) in Maine. In all samples, we analyzed both 10-Be and 26-Al in quartz, rare isotopes formed by the interaction of cosmic rays with Si and O. In two samples, one from the summit of Katahdin and one from the summit Mt. Washington, we measured the concentration of in situ produced 14-C. Both summits are thought to have been buried by late Pleistocene Laurentide ice on the basis of erratics and till mapped on the mountains.

Some samples contain very large inventories of cosmogenic 10-Be and 26-Al indicative of long exposure times, in most cases far exceeding latest Pleistocene deglacial ages. For example, a sample from the summit of Mt. Washington has 10-Be and 26-Al exposure ages of 156 ky and 149 ky. Two other samples from high on Mount Washington (Goofer Point) have average 10-Be and 26-Al ages of 27 ky and 71 ky. At the summit of Katahdin, a sample has an average exposure age of 35 ky. In general, 26-Al and 10-Be exposure ages are well correlated (R^2=0.996) and the average 26-Al/10-Be ratio is 6.65+/-0.47 suggesting at most short (<100 ky) burial after exposure.

In situ radiocarbon ages for summit samples on both peaks tell a very different story. Both the 14-C age of 13 ky on the summit of Mt. Washington and an 11 ky age on summit of Katahdin are consistent with latest Pleistocene exposure of these peaks from under ice. Reconciling the high 10-Be and 26-Al ages with the much lower 14-C ages requires early and long exposure of summits and then burial for several half-lives of 14-C before re-exposure 11 to 13 ky. We conclude that the latest Laurentide icesheet removed little rock from at least some areas on the summits of New England’s highest peaks and thus was frozen to its bed at high elevation.

Session No. 16

S4. Contributions of Cosmogenic-Nuclide Geochronology to Glacial Geology and Geochronology in Northeastern North America—and Vice Versa
Monday, 23 March 2015: 1:30 PM-5:30 PM

Grand Ballroom North (Omni Mount Washington Resort)

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