

OLD SURFACES ON NEW ENGLAND SUMMITS IMPLY THIN LAURENTIDE ICE

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The abundance of 10-Be and 26-Al in frost-riven bedrock samples collected from the summits of Mt. Washington in New Hampshire and Mt. Katahdin in Maine is much higher (1.5 to 8 times) than expected had the peaks been covered by active, erosive ice during the last glacial maximum (LGM) about 21.5 ky calibrated 14-C years ago.

Samples from the summits of Mt. Washington have 10-Be model exposure ages of 124 and 22 ky; one sample from Mt. Katahdin has a model age of 25 ky (assuming production rates of Nishiizumi et al., 1989). In contrast, other near-summit samples (n=3) and boulders (n=5) from the Basin Ponds moraine on Mt. Katahdin have an average age of 12.7 +/- 0.7 ky. A single boulder from the well-dated Pineo Ridge moraine complex in coastal Maine (13.2 to 14.0 cal 14-C ky BP) can be used to estimate integrated 10-Be and 26-Al production rates of 5.8 to 6.1 and 38.3 to 40.7 atoms/(g*yr) at 60 m asl and 44 degrees N.

The mountain-top samples are consistent with two different scenarios, both of which have significant implications for understanding the spatial and temporal pattern of glaciation and glacial erosion in New England: 1) LGM Laurentide ice was thinner than previously supposed leaving the top of Mt Katahdin exposed since early stage 2 and parts of Mt. Washington's summit exposed since stage 6, 2) both summits were covered by glacial ice during the LGM, but the ice was thin enough to be frozen to its bed. Thus, the cold-based ice was unable to erode much rock, allowing nuclides to be inherited from prior periods of exposure. In either case, Laurentide ice in the New England area during the LGM was thinner than previously believed, in support of the ICE-3G geophysical model of Tushingham and Peltier.