AGU 100 FALL MEETING
Washington, D.C. | 10–14 Dec 2018

PP13C-1335: Constraining the timing and rate of southeastern Laurentide Ice Sheet thinning during the last deglaciation with cosmogenic nuclide dipsticks

Monday, 10 December 2018
13:40 - 18:00
Walter E Washington Convention Center - Hall A-C (Poster Hall)

Reconstructing the timing and dynamics of ice-sheet thinning during the last deglaciation is essential for better understanding how ice sheets respond to climate change, contribute to sea-level rise, and input freshwater to the ocean. While the lateral retreat history of the Laurentide Ice Sheet is relatively well constrained, its thinning history is much less certain because it mostly overrode flat terrain. The relatively rugged topography of the northeastern U.S. and southern Quebec is a notable exception, and, together with this region's detailed ice margin retreat chronology and local ^{10}Be production rate calibration, offers a rare opportunity to develop a three-dimensional reconstruction of ice-sheet decay.

We are measuring >100 in situ ^{10}Be and ^{14}C exposure ages from samples of bedrock and boulders across a range of elevations on a dozen mountains throughout this region that were uncovered by the collapse of the southeastern Laurentide Ice Sheet and thus serve as ice-sheet dipsticks. We present an overview of the project, and discuss our inferred thinning histories in the context of existing lowland ice margin retreat constraints including the North American varve record, ^{14}C ages of organic carbon, and ^{10}Be-dated moraines. Data generation is ongoing and findings to date (n=83 ^{10}Be exposure ages) include: early high-elevation thinning in the Catskill Mountains at ~19 ka; evidence for weakly-erosive, cold-based ice cover high on northern New England peaks; and rapid ice-sheet thinning spanning many hundreds of meters in Acadia National Park, Maine at 15.2 ± 0.7 ka, Mount Washington, New Hampshire at 14.3 ± 0.4 ka, and Mount Mansfield, Vermont at 14.2 ± 0.7 ka.

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