2015 GSA Annual Meeting in Baltimore, Maryland, USA (1-4 November 2015)

Paper No. 240-2
Presentation Time: 1:55 PM

USING ^{10}BE TO DECIPHER THE INCISION HISTORY OF THE POTOMAC RIVER NEAR GREAT FALLS

BIERMAN, Paul R., Department of Geology and Rubenstein School of Environment and Natural Resources, University of Vermont, Delehanty Hall, 180 Colchester Ave, Burlington, VT 05405, pbierman@uvm.edu

The Great Falls of the Potomac River are a spectacular cascade preserved as a National Park and heavily visited by the public. However, little is known about the rate at which the falls erode or the ages of the well-defined bedrock terraces downstream of the falls left high and dry by incision of the Potomac River.

Field mapping and measurement of cosmogenic 10-Be in 106 rock samples collected from the Great Falls area of the Potomac River show that the river has cyclically incised into rock and the position of the knickzone, now at Great Falls, has shifted upstream over the later Pleistocene. Simple 10-Be exposure ages increase downstream from just a few thousand years at the base of the falls to ~200 ky 10 km downstream. Ages also increase with elevation above the modern channel.

The latest incision began after 37 ka (coincident with expansion of the Laurentide ice sheet) abandoning and exposing a strath terrace (the old river channel) hundreds of meters wide beginning at Great Falls and ending at Black Pond, 3 km downstream. Prior to 37 ka, the primary falls of the Potomac River were likely at Black Pond. Ongoing incision siphoned water away from these paleo-falls, leaving them high and dry by 11 ka. Downstream of Black Pond, the strath terrace surface is covered with fine-grain sediment and the few exposed bedrock outcrops are weathered and frost-shattered from periglacial processes active during the Last Glacial Maximum.

Exposure ages of samples collected along three different vertical transects down the walls of Mather Gorge downstream of Great Falls indicate incision, at rates between 0.4 and 0.75 m/ky, continued into the Holocene. The ^{10}Be data are more consistent with continued channel lowering through this 3 km reach than the steady retreat of a single knickpoint. Although the Potomac basin was not glaciated, incision was likely catalyzed by forebulge-induced uplift in concert with changing climate.

Session No. 240

T57. Soil to Sediment—From Geologic to Modern Time Scales: A Session to Honor the Work of Milan Pavich
Tuesday, 3 November 2015: 1:30 PM-5:30 PM

Room 331/332 (Baltimore Convention Center)

Geological Society of America *Abstracts with Programs.* Vol. 47, No. 7, p.614

Back to: T57. Soil to Sediment—From Geologic to Modern Time Scales: A Session to Honor the Work of Milan Pavich

<< Previous Abstract | Next Abstract >>