AGU 100 ADVANCING EARTH AND SPACE SCIENCE FALL MEETING Washington, D.C. | 10–14 Dec 2018

U13B-18: Ancient landscapes along the U.S. mid-Atlantic coast record glacial isostatic adjustment (Invited)

Monday, 10 December 2018
14:32 - 14:35
Walter E Washington Convention Center - eLightning Theater I

Previous studies have documented major changes in rivers along the U.S. mid-Atlantic coast late in the last glaciation phase of the ice age. Seismic reflection data show that the Hudson River diverted eastward from its ancestral channel at 40-30 ka. Sediment cores in the lower Delaware River record a transition to an aggradational regime at ~25 ka, while dated bedrock terraces in the Susquehanna and Potomac Rivers both reveal a pulse of rapid incision from 30-15 ka. We explore the hypothesis that changes in the evolution of the Hudson, Delaware, Susquehanna, and Potomac Rivers during the late glacial (30-20 ka) are caused partly or entirely by the growth of the peripheral bulge associated with the Laurentide Ice Sheet.

Our results show that each river responds uniquely to the peripheral bulge, depending on the path of the river with respect to the pattern of spatially variable uplift. We find that a late, rapid glaciation of the Laurentide Ice Sheet and the associated crustal deformation predicts river diversions that are consistent with the late-glacial diversion of the Hudson River. These simulations are also consistent with a shift to a depositional regime in the Delaware River and incision in the lowest reaches of the Potomac River. However, the simulations predict minimal change in incision for the Susquehanna River due to GIA alone, suggesting a different driver for its rapid pulse of incision. Our results show that the evolution of rivers within unglaciated regions of the U.S. east coast is strongly governed by the local geometry of the peripheral bulge.

Authors

Tamara Pico
Harvard University

Paul R Bierman
University of Vermont

Jerry X Mitrovica
Harvard University

Ken Ferrier
Harvard University

J Taylor Perron
MIT---EAPS

Jean Braun
Universite Joseph Fourier

Find Similar

View Related Events

Day: Monday, 10 December 2018