2007 GSA Denver Annual Meeting (28–31 October 2007)
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USING COSMOGENIC ISOTOPES TO INTERPRET LANDSCAPE CHANGE IN NATIONAL PARKS

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Millions visit National Parks each year because of their stunning scenery; yet, for many parks little is known about how the landscapes that awe visitors change over time. Using cosmogenic isotope analysis has allowed us to understand the way in which landscapes at three National Parks in the eastern United States change over time.

In the last 5 years, we have used both USGS and NSF support to investigate landscapes in the Appalachian Mountains and adjacent Piedmont. Shenandoah National Park is situated in the central Appalachian Mountains and stretches from Fort Royal in the north to Waynesboro in the south. The Blue Ridge Province is contained wholly with the Park's boundaries, and this province contains four main lithologies; granite, quartzite, siliciclastic and metabasalt rocks. Initial results from sediment collected in streams draining small basins within the Park suggest that here, the Appalachian Mountains are eroding very slowly (4 to 12 m/My). At these rates, it takes several years to erode the thickness of one human hair! The rocks, slopes, and landscapes of Shenandoah Park are very stable. The story is similar in the Great Smoky Mountains. Erosion rates in this steeply sloped region of the Appalachians average 25-30 m/My, suggesting equilibrium between erosion rates and the long-term uplift of the southern Appalachians. In the Smokys, steeper slopes are eroding more quickly than the gentler slopes. At Great Falls National Park the story is different. Here, the Potomac River flows across the Piedmont province and has cut deeply into the underlying schist. Local rates of incision are quite high,

approaching 800m/My, and Mather Gorge at Great Falls is less than 35,000 years old.

Research conducted in National Parks can be utilized by Park staff to improve management practices, inform park employees and provide science education and outreach to the general public via materials for exhibits, brochures, and the world wide web. Informal education such as that provided by National Parks promotes public understanding of science, enables dissemination of information via collaboration with formal educational channels (research), promotes interest in science, educates the public, and generates an alternative to more formal educational methods.

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