**Paper No. 4-12**

# LOW RATES OF BEDROCK OUTCROP EROSION IN THE CENTRAL APPALACHIAN MOUNTAINS INFERRED FROM *IN SITU* [10]BE CONCENTRATIONS

**PORTENGA, Eric W.**[1], BIERMAN, Paul R.[1], TRODICK, Charles D. Jr[1], and ROOD, Dylan H.[2], (1) Department of Geology, University of Vermont, Delehanty Hall, 180 Colchester Ave, Burlington, VT 05405, Eric.Portenga@uvm.edu, (2) Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory, Livermore, CA 94550

We collected 72 samples from spur-ridge and ridge-top bedrock outcrops within the Potomac and Susquehanna River basins and calculated erosion rates utilizing *in situ* [10]Be concentrations measured in quartz. Over one hundred basin-scale erosion rates have been estimated cosmogenically in this region (Reuter, 2005; Duxbury, 2008; Trodick, this meeting); however, only 17 outcrop erosion rates have been measured until now.

Outcrop erosion rates in the Potomac River basin ($n$=46) range from 1.0±0.11 to 66±4.8 m/My, average 15±1 m/My, and have a median of 7.1±0.6 m/My; outcrop erosion rates in the Susquehanna River basin ($n$=26) range from 1.8±0.2 to 28±2 m/My, average 10±0.7 m/My, and have a median of 8.3±0.7 m/My. The average bedrock outcrop erosion rate for the region is 13±1 m/My which is greater than the few other erosion rates measured on bedrock outcrops in the region (4-7 m/My, Reuter, 2005, Hancock and Kirwin, 2007; Duxbury, 2008). Outcrop erosion rates are significantly indistinguishable from the average basin rate of 12 m/My for 62 Potomac River sites (Trodick, this meeting) and significantly lower than the average basin rate of 20 m/My for 79 Susquehanna River sites (Reuter, 2005). Similar rates of erosion for bedrock outcrops and drainage basins suggest that the Central Appalachians as a whole have reached a general state of equilibrium. This is in contrast to some studies which suggest an increase in relief near our study sites (Reuter, 2005; Hancock and Kirwin, 2007).

We observe a weak, positive correlation between bedrock outcrop erosion rates and relief in meters within a 5km radius ($R^2$=0.24; $p$<0.0001), and an even weaker positive correlation between bedrock outcrop erosion rates and elevation ($R^2$=0.11; $p$=0.0042). A weak, negative correlation is observed between bedrock outcrop erosion rates and latitude ($R^2$=0.14; $p$=0.0013). Bedrock outcrop erosion rates were analyzed against mean annual precipitation and temperature but no correlations were significant.

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General Information for this Meeting

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