Paper No. 4
Presentation Time: 1:55 PM

SPATIAL VARIATION IN ^{10}BE EROSION RATES AND INCREASING RELIEF IN THE SOUTHERN ROCKY MOUNTAINS

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Measurements of cosmogenic ^{10}Be in alluvium imply erosion rates on a 10^3-10^4-year timescale for small (0.01-47 km^2), unglaciated basins in northern Colorado, southern Wyoming and adjacent western Nebraska. Basins that formed in Proterozoic cores of Laramide ranges are eroding more slowly (23 ± 7 mm kyr^{-1}, n = 20) than adjacent basins draining weakly lithified Cenozoic sedimentary rocks (69 ± 31 mm kyr^{-1}, n = 20). Erosion rates are correlated with rock resistance and, for a given rock type, to basin slope, but not to mean annual precipitation. We also estimated longer-term (> 10^5-year time scale) erosion rates for the granitic core of the Front Range by measuring the concentration of ^{10}Be and ^{26}Al produced mainly by muon interactions at depths 1.7 to 10 m below the surface. Concentrations imply erosion rates of 10-40 mm kyr^{-1}, similar to shorter-term erosion rates inferred from surface sediment. The spatial distribution of erosion rates taken with stratigraphic evidence imply that relief in the southern Rocky Mountains increased in the late Cenozoic; modern relief probably dates from post-middle Miocene time.

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T21. Peaks to Plains: Late Cenozoic Landscape Evolution of the Rocky Mountains and Western Great Plains
Sunday, 27 October 2013: 1:00 PM-5:00 PM

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