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Paper No. 4

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## SPATIAL VARIATION IN <sup>10</sup>BE EROSION RATES AND INCREASING RELIEF IN THE SOUTHERN ROCKY MOUNTAINS

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Measurements of cosmogenic <sup>10</sup>Be in alluvium imply erosion rates on a 10<sup>3</sup>-10<sup>4</sup>-year timescale for small (0.01-47 km<sup>2</sup>), 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<sup>-1</sup>, n = 20) than adjacent basins draining weakly lithified Cenozoic sedimentary rocks (69 ± 31 mm kyr<sup>-1</sup>, 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<sup>5</sup>-year time scale) erosion rates for the granitic core of the Front Range by measuring the concentration of <sup>10</sup>Be and <sup>26</sup>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<sup>-1</sup>, 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.

Session No. 68

**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

*Mile High Ballroom 3C (Colorado Convention Center)*

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