

2007 GSA Denver Annual Meeting (28–31 October 2007)  
Paper No. 225–2  
Presentation Time: 1:45 PM–2:00 PM

## **NAMIBIA: INTERESTING LANDSCAPES BUT MONOTONOUS EROSION RATES**

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The Namibian landscape is renowned for its interesting landscapes and hyper-arid coastal plain. However, Namibia's varied landscape is uniformly eroding at  $\sim 8$  m/My (from the moist uplands to the dry coastal plain) based on basin-wide erosion rates measured at a variety of scales (1 to 29,000 km<sup>2</sup>). To estimate these erosion rates, we analyzed cosmogenic <sup>10</sup>Be extracted from sand-sized, water-transported quartz collected from small ephemeral streams that drain the upland, the Great Escarpment, and the coastal plain. At the larger scale, we conducted a drainage network analysis of the Swakop and Omaruru Rivers, which source in the uplands, cross the escarpment where it is least pronounced, traverse the coastal plain, and discharge into the Atlantic Ocean.

Interpreting <sup>10</sup>Be concentrations as basin-wide erosion rates suggest a range of erosion rates from 4.1 to 12.2 m/My with an average of  $8.3 \pm 1.9$  m/My. Considering the small basins in relation to the escarpment, the upland basins are eroding at  $4.9 \pm 0.8$  m/My (n=3), lowland basins at  $7.8 \pm 1.0$  m/My (n=1), and escarpment zone basins at  $8.2 \pm 2.3$  m/My (n=11). As a whole the Swakop and Omaruru basins have area-weighted average erosion rates of  $6.6 \pm 1.8$  (n=7) and  $8.3 \pm 1.3$  m/My (n=4), based on tributary streams. The furthest downstream samples on the Swakop (29,000 km<sup>2</sup>) and Omaruru (8,000 km<sup>2</sup>) give model erosion rates of  $8.8 \pm 1.0$  and  $8.6 \pm 1.1$  m/My, respectively. There is no downstream pattern in the <sup>10</sup>Be concentration along either main stream river nor is there any relationship between erosion rate and basin area in the dataset as a whole. These data suggest that basin-scale rates of erosion vary <3 fold for basins that are 1) different sizes, 2) located in different provinces, and 3) located in different precipitation zones. The <sup>10</sup>Be-based erosion rates also support thermochronologic data that suggest

steady, slow erosion over time. Thus, the slow but uniform landscape erosion suggests that the dramatic Namibian landscape is long-lived.

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General Information for this Meeting

Session No. 225

Quaternary Deposits in Arid Lands: Rates and Processes

Colorado Convention Center: 406

1:30 PM-5:30 PM, Wednesday, 31 October 2007

Geological Society of America Abstracts with Programs, Vol. 39, No. 6, p. 603