



# 2012 GSA ANNUAL MEETING & EXPOSITION

4-7 November | Charlotte, North Carolina, USA

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Paper No. 8

*Presentation Time: 9:00 AM-6:00 PM*

## FLUVIAL RESPONSE TO PRECIPITATION CHANGE: BE-10 IN PAIRED TERRACE AND MODERN STREAM SEDIMENT SAMPLES, PISCO RIVER, PERU

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The response of drainage networks to climate change is frequently investigated with models, but natural experiments are rare. We present the results of Be-10 analyses for 7 pairs of detrital sand samples from the trunk and tributaries of Quebrada Veladera, a moderately large (~300 km<sup>2</sup>) tributary of the Pisco River. Each pair consists of quartz separated from the sediment on the modern channel bed and excavated from the base of an adjacent fill terrace. We correlate this terrace with the age-equivalent terrace on the main stem of the Pisco River, which previous OSL dating shows to have been deposited at ~20 ka, during a period of unusually high precipitation. Slope-area analysis shows no evidence of transient behavior in the modern Quebrada Veladera, although it is likely transport-limited. Terrace samples were taken from >3 m below the terrace surface, obviating the need to correct for post-depositional Be-10 production. Be-10 concentrations of all samples range from  $1.01 \times 10^{-5} \pm 2.52 \times 10^{-3}$  to  $3.77 \times 10^{-5} \pm 4.61 \times 10^{-3}$  atoms/g, corresponding to apparent erosion rates from 102 to 33 mm/kyr. The terrace samples exhibit a much wider range of concentrations and thus erosion rates than the modern ones. Comparison reveals a negative correlation between upstream drainage area and the residual Be-10 erosion rate (i.e., terrace minus modern). This trend is consistent with model predictions for increasing drainage density in response to an increase in the amount and intensity of precipitation. As channel heads propagate upslope, erosion accelerates in low-order drainages before higher-order ones. We infer that the cosmogenic signal of this initial acceleration was preserved in the lowest levels of the terrace.

Session No. 166

**T23. Landscape Dynamics: Gullies and Rivers (Posters)**

*Tuesday, 6 November 2012: 9:00 AM-6:00 PM*

*Hall B (Charlotte Convention Center)*

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