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FIRST DENUDATION RATE ESTIMATES FOR RIVER BASINS IN CENTRAL CUBA FROM GEOCHEMICAL, COSMOGENIC ISOTOPE, AND SEDIMENT YIELD DATA

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The Cuban landscape has been heavily influenced by agriculture for centuries; yet, there are few erosion rate estimates at the drainage basin scale. To understand how erosion has changed over time, we compare backgrou erosion rates from ^{10}Be to recent measurements of sediment yield and dissolved load flux. Such data are critical for understanding how human actions affect mass flux off the landscape, and for guiding future developmer Erosion rates, modeled from in-situ ^{10}Be measured in quartz river sand from 8 basins in central Cuba, range from 1.5 to 70 m/My (mean = 30 m/My). For the same basins, chemical denudation rates calculated using basin-specific precipitation runoff estimates and total dissolved solids measured in stream water range from 28-108 m/My (mean = 59 m/My). Countrywide, data from 32 sediment/flow gauging stations maintained during the pea Soviet-assisted industrial agriculture suggest suspended sediment yields equivalent to 4.4-128 m/My (mean = 48 m/My). In central Cuba, chemical denudation rates and ^{10}Be background erosion rates are inversely related t slope, possibly because harder igneous/metamorphic rocks compose the highlands while weaker carbonate rocks compose the flatlands. These datasets suggest that more mass is lost by solution than by physical erosion, that human activity has increased erosion rates compared to background levels. Background erosion rates in Cuba are similar to other tropical landscapes; chemical weathering rates are consistent with other Caribbean isl and high compared to global data.

In 2 basins, erosion rates calculated from duplicate measurements of ^{10}Be (1.5 & 2.6 m/My) and ^{26}Al (1.8 & 3.0 m/My) were ~50X lower than chemical denudation rates (89 & 108 m/My). Both ^{26}Al and ^{10}Be concentrations indicate long term, near-surface (>>100 ky) sediment residence; stream water geochemical data are consistent with the presence of evaporite deposits. We suspect that rapid chemical denudation enriches remaining sedim in quartz, which lingers at or near the surface in these low slope (0.5°) basins. The discrepancy between cosmogenic-based background erosion rates and chemical denudation rates highlights the importance of considering chemical denudation when examining landscape change, particularly in lithologies subject to chemical weathering.

Session No. 124--Booth# 298
T15. Soil Forming Processes and Quaternary Landscape History (Posters)
Monday, 23 September 2019: 9:00 AM-6:30 PM

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