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Presentation Time: 9:00 AM-6:30 PM

BETTER UNDERSTANDING THE GEOLOGY OF CENTRAL CUBA THROUGH STREAM SEDIMENT COMPOSITION ANALYSIS USING X-RAY DIFFRACTION

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Limited data are available concerning the bedrock geology of Cuba due to restricted access to the country; this limits interpretation of landscape change over time, including deciphering trends in stream water geochemistr rates of erosion, both natural and influenced by human actions. An international (Cuban-US) collaborative project focused on understanding mass transfer from source to sink has measured erosion rates, water quality, an water chemistry for 25 watersheds in central Cuba. Here, we provide the geologic context for these data by using quantitative XRD to determine the composition of river sediments.
Using X-ray powder diffraction for mineralogic analysis, we scanned 26 stream sediment samples, each from a different watershed, in two grain sizes (<63 µm and 250-850 µm), both washed with water to remove fine-grain particles and unwashed for a total of 104 scans. Samples were 1) ground to a powder with an agate mortar and pestle, 2) scanned on a standard glass slide (unwashed), 3) rinsed with tap water in a ceramic dish, 4) dried, 5) ground, and 6) scanned on a zero-background plate (washed). Scans were performed from 5-55˚ in 2Θ space at 2˚/min using a Rigaku MiniFlex II diffractometer. Diffractograms were analyzed and quantified for mineral abundances using the Rietveld module in Rigaku PDXL (v. 1.6.0.0).
Preliminary results show that quartz, feldspar, and calcite are present in most samples; quartz is the most abundant mineral. Amphiboles, clays, and micas are also common; additional testing is required to accurately dete specific phases. While quartz dominated sediment across the watersheds, significant amounts of calcite suggest that the mineralogy of the stream sediments is useful both as a marker for watershed geologic characteristic as a proxy for weathering intensity. These analyses provide insight into the lithology of the watersheds and their erodibility. Overall, in combination with other data such as water chemistry and erosion rates, mineralogical analysis can be used to determine the lithologic influence on local sediment and river water composition in each watershed.

Session No. 124--Booth# 299
T15. Soil Forming Processes and Quaternary Landscape History (Posters)
Monday, 23 September 2019: 9:00 AM-6:30 PM

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