SEDIMENTATION OF THE PANAMA CANAL RESERVOIR: COSMOGENIC NUCLIDE ESTIMATES OF BACKGROUND SEDIMENT YIELD

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The Panama Canal is an engineering marvel. Vital to the operation of the canal is the large and consistent supply of water from the Rio Chagres basin mediated by Lake Alhajuela, the reservoir to the Panama Canal. In addition to water, the headwater basins supply sediment that reduces the storage potential of the reservoir.

We chose the headwater basin of the Rio Chagres to investigate the background rates of sediment generation in a tropical montane environment. Development of the headwaters of the Rio Chagres is minimal and is mostly contained to the Rio Piedras tributary. We collected eight sediments from small tributaries to determine sediment generation on steep hillslopes using cosmogenic ^{10}Be. We collected nine sediment samples at major tributary junctions down the drainage network to determine the spatial distribution of sediment generation rates. A sediment sample taken from the mouth of the Rio Chagres, at Lake Alhajuela, provides an integrated sediment yield estimate from the entire basin. Since the slopes of the Rio Chagres basin are steep, sediment delivery from the hillslopes to the river is by a combination of landslides and diffusive hillslope processes. To understand better the sediment delivery processes we analyzed additional grain sizes for eight samples.

Preliminary results from two samples collected from the Rio Chagres at the confluence of Rio Piedras and the confluence of the Rio Chagricito suggest basin wide erosion rates of 80 ± 11 and 70 ± 9 mm ky^{-1}, respectively. These values are similar to the suspended sediment yield data, which can be interpreted as an average basin erosion rate of 95 mm ky^{-1}. These preliminary results suggest that the mostly undisturbed tropical Rio Chagres basin is supplying sediment at similar rates as the long-term basin wide sediment generation. The network analysis of ^{10}Be provides natural rates of sediment yield with which to compare to long records of suspended sediment loads. Such analysis is particularly important in tropical basins that are ecologically fragile and are susceptible to human disturbance.