

# The timescale of sediment transport in a small tropical watershed

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How fast are sediments produced, stored and transported in a watershed? This question has important implications for understanding the transfer of carbon, nutrients and pollutants from their continental sources to the oceans. Sediment transport times can be inferred indirectly through the measurement of erosion rates, however uranium-series isotopes have the great advantage of providing a direct measurement of the residence time of sediments in a catchment. Most previous studies have focused on large basins (e.g. Amazon [1,2], Mackenzie [3]), yielding important insights on timescales of sediment transport and chemical weathering. However, the provenance and path of sampled sediments are not well-constrained. In this study, we chose to focus on small catchments (less than a few km<sup>2</sup>) to quantify how much time sediments reside in a tropical watershed where landslides are the dominant agent of physical denudation.

The study area is located in the rainforest of the Luquillo Mountains, Puerto Rico. River suspended and bedload sediments have been analyzed for <sup>238</sup>U, <sup>234</sup>U, <sup>230</sup>Th and <sup>226</sup>Ra isotopes. Assuming that sediments have followed a single, continuous weathering evolution since their production from the bedrock, we inferred that the time elapsed between the onset of bedrock weathering and export of sediments out of the catchment is 100 – 200 years. This contrasts with previous estimates for rivers around the world (1,000 – 500,000 years [1-4]) and is best explained by the landslide-dominated nature of erosion in this region, which delivers to the river weakly weathered soil particles.

Soil profiles will also be studied in order to understand the rate of development of the weathering profile in this region and how physical erosion and sediment transport relate to weathering profile evolution.

## References

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