

Temporal Chemical Weathering in the Río Yahuecas Watershed

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Silicate weathering is an important process for the consumption of atmospheric CO₂. Chemical weathering in tropical watersheds on volcanic bedrock results in some of the highest weathering rates in the world meaning that these areas are particularly important for CO₂ consumption. Río Yahuecas is a 2nd order stream monitored by NEON in the Adjuntas municipality of Puerto Rico. The 9.5 km² watershed is predominantly tropical moist/wet forest with a small agriculture research station. The area has an average annual rainfall of 1168 mm and average annual temperature of 25°C. The watershed experiences a dry season from December through March and a wet season from May through November, with large precipitation events due to tropical storms or hurricanes occurring between June and December. The bedrock in the area is mapped as mainly Anon Formation, a volcanic breccia, tuff, and tuffaceous sandstone; the Lago Garzas Formation, a volcanic breccia, volcanic sandstone-claystones, calcirudite and pillowed basalts; and the Yauco Formation, a siltstone, sandstone, claystone, limestone, and conglomerate; the watershed also includes small areas of porphyritic hornblende dacite. The goal of this project is to calculate bimonthly chemical weathering rates in the Río Yahuecas watershed. NEON has monitored the Río Yahuecas (GUIL) site since 2018 and provides a minute-interval continuous dataset for river discharge. Stream and precipitation chemistry samples are analyzed approximately bimonthly. This frequent and prolonged sampling allows us to calculate approximately 100 chemical weathering fluxes across including data during wet and dry seasons. This will allow us to capture temporal variation in chemical weathering and seasonal differences that are not generally captured in other stream export weathering studies.