Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.24523

# Chemical weathering of ultramafic rocks at the Rio Cupeyes NEON site, SW Puerto Rico

**AMANDA ALBRIGHT OLSEN**[1], THOMAS KORSTANJE[2] AND WILLIAM MCDOWELL[3]

[1]Univeristy of Maine
[2]University of Maine
[3]University of New Hampshire Main Campus
Presenting Author: amanda.a.olsen@maine.edu

The weathering of mafic and ultramafic rocks in tropical environments is a major consumer of atmospheric $CO_2$. Although chemical weathering rates are strongly controlled by climate, few studies of mafic rocks include calculated weathering fluxes over a range of yearly conditions. We calculated bimonthly weathering fluxes at Rio Cupeyes Core Aquatic NEON site, a 4.26 $km^2$ watershed in western Puerto Rico that has been continuously monitored since 2018. The Rio Cupeyes watershed is located on serpentinite bedrock, which is depleted in essential plant nutrients including K and P, has a low Ca to Mg ratio, and contains high concentrations of heavy metals. The watershed experiences wet and dry seasons as well as hurricanes resulting in high flow events.

Watershed-integrated chemical weathering fluxes were calculated using sensor discharge data and stream and precipitation chemistry collected approximately twice monthly from 2018 to 2023, yielding over 100 distinct weathering flux measurements. The average Ca to Mg ratio for stream samples is 0.1; average Mg concentrations are 1340 mmol/L and vary little with season or discharge. Average Ca concentrations are 130 mmol/L, and average K concentrations are 6 mmol/L. Because Mg is the dominant weathering-derived cation, seasonal changes in weathering fluxes are controlled by variations in discharge, which span three orders of magnitude. This means that measuring chemical weathering yields infrequently and extrapolating those data over the calendar year could dramatically over or underestimate weathering yield for Rio Cupeyes.