

ES SEMINAR SERIES

12:30-1:30 pm
09/29/2021

SSB 160 / [Zoom](#)

Claire Lukens

*Unraveling a geochemical mystery in
New Zealand soils: Weathering, volcanic
ash, and landscape evolution*



Abstract: Chemical weathering is one of the major ways that rock is converted into soil, liberating nutrients that become available to biota. Weathering rates are influenced by climate and erosion, and the weathering of silicate minerals is an important carbon sink in the global climate system. Because climate, erosion, weathering, soils, and biogeochemical cycling are so intertwined, these relationships have been studied from many different perspectives. In this talk, I will introduce the geomorphologist's take on soils and long-term weathering, including the geochemical methods we use to quantify weathering rate and intensity. I will present some recent work from New Zealand, where soils and weathered rock present a rather baffling geochemical story. Here, volcanic ash likely provides the bulk of rock-derived nutrients, even though no visible ash layer is present in the soils. My coauthor and I constrain the likely source of the volcanic ash using trace element geochemistry from ash, soils and rock. Along with measurements of denudation rate from cosmogenic nuclides and a simple soil mixing model, we interpret the history of this landscape and the weathering of its soils over the past 27,000 years, including quantifying likely anthropogenic soil loss.



Bio: Claire Lukens joined the ES program in January 2021, as an Assistant Professor of Surface Processes in the Dept. of Life and Environmental Sciences. A Seattle native, she obtained her undergraduate degree at Colorado College and her MS and PhD in Geology at the University of Wyoming. Prior to coming to UC Merced, she spent 4 years as a postdoctoral fellow in Physical Geography at Victoria University of Wellington, New Zealand. Between her undergraduate and graduate degrees, she spent several years as an environmental educator in the old growth forests of western Oregon, teaching hands-on science to K-12 students.