

Tuesday 23rd May 2023, 4.15 pm – 5.15 pm
Seminar room 208, Hochschulstrasse 4

Hydrological extremes alter controls and pathways of soil carbon loss from mountainous watersheds

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ABSTRACT. Floodplains within mountainous watersheds are dynamic reservoirs of carbon, and experience seasonal flooding due to snowmelt and drainage. Climate change is rapidly shifting snowpack levels, making these ecosystems particularly vulnerable to more extreme flooding and drought. The variable hydrology drives spatial and temporal redox gradients within floodplain soils, with largely unknown consequences for carbon storage in and export from such ecosystems.

In this presentation, I will show how extreme flooding and drought events alters controls and pathways of soil carbon loss within a mountainous floodplain system. I will report on an extensive monitoring campaign and associated biogeochemical measurements in a headwater catchment in the Rocky Mountains (Colorado, US). I will examine differences across extremely low and high river discharge years, which foreshadow climate change predictions in such mountainous floodplains. Our results suggest that extreme hydrological events expected with climate change will shift the control on and pathways of C loss from floodplains. Global implications of our findings for predicting climate change impacts on carbon cycling within dynamic floodplain environments will be discussed.

BIO. Marco Keiluweit is interested in how carbon and nutrient cycles in soil and sediments respond to climate and land use change. He completed his PhD at Oregon State University and worked as a postdoc at Stanford University and an Assistant Professor at the University of Massachusetts–Amherst. He is now Associate Professor of Soil Biogeochemistry at UNIL. Marco Keiluweit is particularly interested in fundamental geochemical processes, biotically-mediated or not, that regulate carbon and nutrient cycles in soils. His research combines laboratory, greenhouse, and field experiments with advanced analytical tools such as synchrotron spectroscopy, chemical imaging, and molecular microbiology. His group's work links fine-scale biogeochemical mechanisms to landscape-scale processes within natural and managed ecosystems. Marco Keiluweit has acquired numerous grants and has received several prestigious awards, including US DOE Lawrence Scholar and NSF Early Career awards.