

Tuesday 8<sup>th</sup> March 2022, 4.15 pm – 5.15 pm

### The development of new soil landscapes and their relevance for biogeochemical cycles in the 21st century and beyond

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**ABSTRACT.** Good time for soil scientists, bad time for soils? In my talk I will highlight how Global Change affects soils across ecosystems and what this means for future plant-soil interactions and biogeochemical cycles in a warming, crowded world out of balance.

Global Change from the Arctic to the Tropics has accelerated drastically in recent decades, subsequently effecting ecosystems everywhere. Soils and biogeochemical cycling within are no exception. For example, how carbon and nutrients are stabilized in and released from soil is highly affected by changing land use and climate. Despite these changes, soil in earth system models are often not represented mechanistically, but rather given a mostly budgetary “black box” function. No methodological framework is available that accounts for the combined effects of climate, geochemistry and disturbance on soil dynamics at larger scales.

In my talk I will illustrate with a few examples how the gaps in our understanding of soil processes across climate zones and dismissing lateral soil fluxes leads to large uncertainties in predicting future trajectories of the global carbon cycle. I will highlight how the interactions of weathering and disturbance can influence and dominate biogeochemical cycles and microbial processes in soils. I will also discuss some directions where geochemical proxies that are available at the global scale can be useful to model the spatial and temporal patterns of soil carbon storage and turnover.

**BIO.** Sebastian Dötterl works at ETH Zurich as an Assistant Professor for Soil Resources and as an expert on the effects of soil erosion on C cycling in agricultural landscapes. He is co-founder of the [Congo Biogeochemistry Observatory](#) (CBO), a non-profit consortium of researchers who study biogeochemical cycles and atmosphere-plant-soil interactions in tropical Africa with a focus on studying the rapid environmental changes to the African Tropics.

In his research, he applies a wide range of methods such as FT-IR spectroscopy and experimental work on soil C cycling and soil mineral properties. He has worked on the temporal discrepancy between C sequestration (short-term process) and soil genesis (long-term process) as well as the regional and continental scale identification of controls on soil C cycling. His latest work demonstrated that effects of climate on C storage and the temperature sensitivity of soil carbon are mainly indirect through its impact on soil geochemistry. In recent years he has worked predominantly in the Congo Basin and Eastern Africa. He is currently leading one of the largest biogeochemistry projects in the African Great Lakes Regions to establish the basic process understanding on the differences in C cycling between forested and cultivated catchments with varying geology. New projects entail work in Arctic and Alpine environments and the importance of soil development for Arctic Greening and carbon cycling in young, warming soils.

You are welcome to attend in person in Mittelstrasse 43, room 224 or virtually in the [Zoom seminar room](#) (Meeting ID: 661 2561 8101, psw: 123456).

The presentation will be followed by a talk by Dr  
Natacha Van Groeningen, postdoctoral  
researcher from the Soil Science Group, on the  
topic:

“SPRINT: A sustainable plant protection  
transition.”

