



Weathering processes and pedogenesis in proglacial margins

Context:

Ice masses worldwide are retreating at an unprecedented rate. At the margins of ice sheets and in glacial forefields, new surfaces are colonized by vegetation and new soils are being formed. These processes greatly enhance chemical weathering rates, which in turn provide a negative feedback towards rising atmospheric CO₂ concentrations.

Goals:

The objective of this project is to characterize weathering and soil-forming processes in an Alpine proglacial margin. Data collection was initiated during the summer 2021 in the Otemma glacier forefield (Val de Bagnes) and include vegetation surveys, stream chemistry measurements, soil descriptions and analyses. The successful candidate will supplement the existing dataset with field observations, micromorphological analyses and advanced laboratory analyses. Opportunities will exist to conduct a pilot study in a new glacial forefield. The candidate will integrate plant, soil and water data to reach an integrated understanding of the interplay between plant colonization, soil formation and watershed biogeochemistry. Publication of a journal article is highly encouraged.

Knowledge and skill required:

Broad interest in ecosystem biogeochemistry.
 Affinity for microscopy techniques (optical and electron microscopy).
 Comfort with quantitative data analysis.
 Good writing skills.

Collaboration:

This project will be supervised by Stephanie Grand (stephanie.grand@unil.ch) in collaboration with the groups of Stuart Lane and Gianalberto Losapio from the Institute of Earth Surface Dynamics.

Keywords:

Climate change, carbon sequestration, chemical weathering, pedogenesis, plant colonization, cryptogamic crusts, selective dissolution, electron microscopy

Working place: Géopolis and field work in Wallis