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Forschungsanstalt Agroscope Reckenholz-Tänikon
Umweltressourcen, Landwirtschaftlicher Umweltschutz

Master Thesis

Root Biomass and Root Turnover in Alpine Grassland

Background

Grasslands are amongst the most widespread land cover on Earth. Quantifying their soil carbon (C) stocks and stock changes is therefore important for the estimation of global C stocks and greenhouse gas emissions. Because root growth and turnover are important C inputs into the soil, we need to understand and quantify these to estimate soil C. For (sub-)alpine grasslands there are however very little data on root growth and turnover. It is assumed that root turnover differs between species and depends on the elevation at which plants are growing; however evidence is weak and should be improved.

Research Questions

- What is the root turnover over one growing-season of alpine grassland plants?
- What are the effects of elevation on root-C biomass and on root-C turnover?

Experiment and Methods

In 2015, plants of *Nardus stricta, Festuca violacea* and *Trifolium nivale* were planted in root growth bags (containing identical soil) on an (sub-)alpine pasture in Ardez (Unterengadin, Graubünden) at 1,700 m and 2,300 m. The plants are now established. For the master's thesis, root turnover will be measured by digging out the root bags at 3 to 4 times at each elevation throughout the growing-season of 2019. In the lab, root biomass and aboveground plant biomass will be determined, and finally root turnover calculated. The effects of species and elevation on plant biomass and root turnover will be tested.

Work Location and Timing

- April to October (possibly December) 2019
- Four to six times throughout the summer: 3 days of fieldwork in Ardez (Graubünden)
- Lab work introduction: April at Agroscope (Reckenholz, Zurich)
- Main lab work, data evaluation and write up: In between, location flexible, possibly Agroscope (Reckenholz, Zurich).

Supervision

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