



Universität
Basel

Research Project

SNOSU-FORCE: Changing snow loads and summer drought press alpine plants and force economy

Third-party funded project

Project title SNOSU-FORCE: Changing snow loads and summer drought press alpine plants and force economy

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Organisation / Research unit

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Department

Project Website <https://ppe.duw.unibas.ch/en/mercator/>

Project start 01.04.2016

Probable end 31.03.2020

Status Completed

One third of Switzerland is alpine terrain (including uppermost montane grassland), host-ing an exceptional biodiversity. Alpine grassland provides essential ecosystem services such as erosion control, forage production and high water yield, all teleconnected to adjacent valleys and lowlands. Unusual timing in snowmelt (too early and too late) in combination with summer drought, as a result of climatic warming, will exert so far unexplored changes in state variables, ecosystem services of these vast grasslands and will have a societal impact. Snow cover protects plants from frost and prevents soil freezing, thus, allowing continuous microbial activity (mineralization) throughout the long alpine winter. A shift in the timing of snowmelt will (1) disrupt the close coupling between the provision of soil nutrients and the plant nutrient demands and (2) will cause soils to dry out faster, especially, when followed by a summer drought, inducing plant stress. We will establish a unique snow removal/addition experiment in an alpine grassland at 2500 m a.s.l. in the Swiss central Alps. We will explore plant phenology, productivity, dry matter allocation to storage organs as well as the consequences on biogeochemical cycles (mineralization, up-take and losses of carbon and nitrogen). Snow cover duration also has immediate socio-economic impacts on winter tourism, with the costs of artificial snowmaking playing a central role (high energy and water consumption). We will focus on these specific costs in a case study. Thanks to our long-term networking in the Ursern valley community, we are in an excellent position to explore the expected costs of snow duration scenarios, as we will simulate them for the new expanding Andermatt Sedrun ski arena.

Financed by

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