



Influence of 2018 summer drought on NEE of a Swiss alpine grassland

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According to IPCC high elevation areas are highly vulnerable to climate change. Since these ecosystems have a considerable carbon stock, it is crucial to investigate the influence of extreme climate conditions such as drought on net ecosystem CO₂ fluxes (NEE), the difference between the two components gross primary production (GPP) and ecosystem respiration (Reco). Grasslands cover 20–30% of Swiss landscapes and have a significant carbon stock of about 11% (of total carbon stock of Switzerland according to Bolliger et al. (2008)). However, relative changes in GPP and Reco can transform an ecosystem from a net carbon sink to a net carbon source to the atmosphere, especially under changing environmental conditions.

In this study, we aim to understand the impact of extreme summer drought on NEE and evapotranspiration of a Swiss alpine grassland by comparing the year 2018 to the preceding 3-year period. In addition, we studied the influence of a change in snow cover on winter fluxes as an important indicator of climate change.

To perform this study, we used continuous eddy covariance data measured for about 4 years at Crap Alv (Alp Weissenstein, CH-AWS, Swiss Fluxnet) located at 2000 m a.s.l. in the Grisons, eastern Switzerland. The site is grazed in summer for about three months from mid-June to mid-September and thus is extensively managed. We hypothesize that the extreme 2018 summer drought reduced carbon uptake while increasing ecosystem respiration and therefore reduced the capacity of the grassland for net CO₂ uptake.

Bolliger, J., Hagedorn, F., Leifeld, J., Böhl, J., Zimmermann, S., Soliva, R., Kienast, F., 2008. Effects of land-use change on carbon stocks in Switzerland. *Ecosystems* 11: 895–907.