



Effect of the extreme summer 2018 on the carbon and water budgets of a subalpine coniferous forest in Switzerland

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Forest ecosystems play a major role in the global cycles of carbon and water. This exchange of carbon and water is strongly affected by drought events and heat waves. Focusing on direct measurements, this study uses long-term (> 20 years) eddy covariance measurements of CO₂ and H₂O vapor fluxes from the ICOS Candidate Class 1 Ecosystem site Davos (CH-Dav) to study how this forest responded to the extreme summer 2018. The forest is located at 1639 m above sea level and is dominated by Norway spruce (*Picea abies* (L.) Karst). The first CO₂ and H₂O flux measurements at CH-Dav started in 1995 and continuous eddy covariance flux measurements are available since 1997. This long set of continuous measurements presented here allows a comparison of multiple drought events over the past two decades (e.g. 2015, 2003) and potential trends in ecosystem functioning. Our main questions are: 1) Did the forest experience water shortages at this site in 2018? 2) How did the summer 2018 affect NEE and the contributions of GPP and Reco compared to other (extreme) summer conditions? 3) Did water use efficiency increase in 2018? 4) How did 2018 compare in these aspects to 2015 and 2003?