

Hydrol. Earth Syst. Sci. Discuss., author comment AC1
<https://doi.org/10.5194/hess-2021-100-AC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC1

Veronika Forstner et al.

Author comment on "Response of water fluxes and biomass production to climate change in permanent grassland soil ecosystems" by Veronika Forstner et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-100-AC1>, 2021

We are glad about the positive feedback and thank Referee #1 for the constructive and helpful comments. We agree that the structure and writing of the manuscript needs improvement. Therefore, we will carefully revise our manuscript to improve readability and presentation of our findings. We agree that the abstract and conclusion need to be written more concisely, focusing on the key findings and conclusions, and we revise the manuscript accordingly. Key findings that we intend to highlight include:

Elevated temperature reduces the amount of non-rainfall water and thus total precipitation particularly during the growing season. This is found both in the manipulative and the observational approach.

Elevated temperature increases actual evapotranspiration and aboveground biomass in energy-limited grassland ecosystems but has the opposite effect under water-limited conditions. This is most evident from results of the observational approach, but also found in the manipulative experiment during exceptionally dry periods.

Results of both approaches suggest that elevated temperature reduces seepage and thus groundwater recharge in energy-limited grasslands, but not necessarily under water-limited conditions.

Elevated atmospheric CO₂ is found to reduce both evapotranspiration and aboveground biomass in the manipulative experiment. Possibly, grassland productivity is adversely affected by reduced evaporative cooling of plants or adaptation of the plant species composition.

Manipulative and observational climate change experiments complement one another. Thus, the two approaches should be combined.

We agree and will propose a more accurate title that covers the contents more comprehensively, such as "Response of water fluxes and biomass production to climate change in permanent grassland soil ecosystems".

We plan to include in-depth discussion, in particular, on the strengths and limitations of the two approaches. For this purpose, we consider separating the results and discussion as suggested by the reviewer.

