

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
<https://doi.org/10.5194/hess-2021-100-RC2>, 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Comment on hess-2021-100**

Anonymous Referee #2

---

Referee 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-RC2>, 2021

---

Thanks to the authors (Forstner et.al) for their nice work. I hope the provided review is a helpful contribution to the submitted article.

The authors addressed the effects of climate change on water balance and the productivity of the grassland ecosystem by using two different climate change experiment approaches, namely manipulative and observational. Moreover, the authors pointed the effects of the modified climatologic conditions on the relationship between water balance and hydroclimatic and ecohydrological indicators. The authors also included non-rainfall water input into the water balance calculation. Nevertheless, I think some points can be improved.

### **General comments:**

- The paper is well structured, yet it is not easy to follow the authors' thoughts. Thus, the article would profit from general proof reading to shorten some sentences. The field setups etc. are already difficult to follow, therefore it might be better to add key findings of the study into short and clear sentences, especially in the conclusion.
- Secondly, please consider deepening the discussion. For example, describing the effect of climate change on soil water availability, and/or soil moisture change. Moreover, a detailed comparison of the approaches about their effects on the water balance components. For example, by addressing how the weaknesses/strengths of the two experimental approaches influence understanding the relationship between climate change and the water balance & ecosystem productivity.

## **Specific comments:**

### **Introduction**

- Line 56: there is a typo error, please change 'biomes' to 'biomass'
- Line 90, 'these research questions..' is a bit ambiguous description since in the former parts of the introduction the research questions were not clearly stated. The general need for the research and usability of the hydroclimatic and ecohydrological indicators were mentioned. Please consider re-structuring the paragraph which starts with line 90.
- Line 91: '... are one major tool...' please consider to re-write as '...are major tools' or 'is one of the major tool'
- Line 101: 'GSP' abbreviation is not clear, please consider to write the abbreviation just after '...between growing season P' or in the line of 103 after '..growing season precipitation. Since many abbreviations were repeatedly used, it's helpful for the reader to have a clear explanation of each abbreviation.

### **Methods:**

It can be nicely followed, and it is a well-written section. But, to clarify the reader, you might consider describing soil water availability. To be sure what the authors mean by 'soil water availability is conveyed to the reader clearly. It might be helpful for the reader to evaluate the water balance components of the sites if you give an average duration of growing period/non-growing period of the plots (GS,RO,SE).

- Line 138: there is a typo error, please write 'the Alps'
- Line 158: 'Data from these stations...', here "these stations" are not a clear words-group. Is it the weather station and the mechanical snow cover separation system or are there multiple weather stations in the one plot, or does it refer to all weather stations that were used in the study? Please think to restructure the sentence.
- Line 158: please consider splitting the paragraph when you mentioned another experiment setup (here is RO)
- Line 159-160: please think to restructure the sentence since it is difficult to understand
- Line 235: the unit of the aridity index, please check
- Line 245: there is a typo error: please change 'statically' to statistically

### **Results and discussion:**

The results were nicely stated. NRW was nicely discussed through the different sites & setups. However, it would enrich the paper if the authors add more opinion on the differences of the approaches for estimating the impact of climate change by commenting

on the limitations/advantages of the approaches. Detailed opinion on how climate change influences soil water availability by describing the processes and the experimental approaches' challenges help to deepen the discussion.

- Line 256: ' the lysimeter solely enriched with CO2...' is not a clear sentence, since there are 2 lysimeters for C2T0 ( except the year 2017 & 2018). Therefore, here either the authors referred to the years 2017 and 2018 or it is the average of the two lysimeter data. Please consider re-structure the sentence.