

Dear editor and referees,

We would like to express our gratitude towards the time and effort that you dedicated to providing valuable feedbacks to help in improving this journal paper. Below, we provide a point-by-point response (in yellow) to the reviewers' comments.

Sincerely,

Nariman

**Further amendments suggested by the reviewers are:**

- Figure 1 quality should be improved

Answer: We provided a figure with better resolution in the revised manuscript (Page21, L: 620).

**Abstract:**

Page 1; Line 8: replace "...withdrawal" by "... demand"

Answer: Thank you, changes applied.

**2. Materials and methods:**

Page 3; Lines 77/78: Change "Figure 1(b))... (Figure 1(b))... (Figure 1(c))" into "Figure 1b))... (Figure 1b))... (Figure 1c))" as in the remaining of the text.

Answer: These changes were made throughout the text.

Page 3; Lines 75-86: In the whole "2.1 Study area" description references are missing, e.g. sources of information/data on water demand/use, annual average precipitation/annual potential evaporation are from, GIS-data for springs, qanats, and wells...

Answer: We added the sources of data (Page3, L: 79, 80).

Page 3; Line 82: replace "Mahmoodi et al., (2020a)" by "Mahmoodi et al. (2020a)"

Answer: Thank you, changes applied.

Page 3; Line 92: replace "(Emami and Koch 2019;..." by "(Emami and Koch, 2019;..."

Answer: Thank you, changes applied.

Page 3; Lines 93/94: also here references for the data used for SWAT-setup (land-use, soils) are missing

Answer: The references were added (Page3, L:94).

Page 4; Lines 103/104: "...where the comparison showed a good agreement between simulated and observed PE (synoptic station, Figure 1d)." Reading this I was expecting a map/figure showing results for PE, instead the location of the synoptic station is shown. Maybe reformulate..." "...where the comparison showed a good agreement between simulated and observed PE at the synoptic station shown in Figure 1d)."

Answer: Thank you for the suggestion. We revised it in the text.

Page 4; Lines 119/120: "RCP8.5 is selected since actual green-house gas emissions of the last decade have followed the RCP8.5 trajectory closer than any of the other RCPs (Sanford et al., 2014)." This statement was probably correct in 2014 – we are now in 2021 and to my understanding in recent year RCP8.5 has lost its importance in climate change impact studies because it is seen as unrealistic (see: <https://www.nature.com/articles/d41586-020-00177-3>). Think about reformulating...

Answer: Thank you for sharing this reference. Basically, we agree that the plausibility of some scenarios with high CO<sub>2</sub> emissions, such as RCP8.5, can be discussed in light of recent developments in the energy sector. However as it is mentioned in IPCC (2021, Page 22-23) the projections from these scenarios can still be valuable. Accordingly, we reformulated this part in the text as "RCP8.5 is selected since actual green-house gas emissions of the last decade have followed the RCP8.5 trajectory closer than any of the other RCPs (Sanford et al., 2014). Although the projections driven from scenarios with high CO<sub>2</sub> emissions (e.g. RCP8.5) have been criticized as mitigation measures are not accounted for (Hausfather and Peters, 2020), the projections from these scenarios can still be valuable (IPCC, 2021) as they not only agree with historical total cumulative CO<sub>2</sub> emissions, but are also plausible for future projections given current and stated policies (Schwalm et al., 2020)".

### Reference

Hausfather, Z. and Peters, G.P.: Emissions—the 'business as usual' story is misleading. *Nature*, 577, 618-620, <https://doi.org/10.1038/d41586-020-00177-3>, 2020.

IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

*Schwalm, C.R., Glendon, S. and Duffy, P.B.: RCP8. 5 tracks cumulative CO2 emissions. Proc. Natl. Acad. Sci., 117, 19656-19657, <https://doi.org/10.1073/pnas.2007117117>, 2020.*

Page 5; Lines 130/131: “Therefore, it can be assumed that the parameterized SWAT model can sufficiently represent the future climate conditions.” Change to “Therefore, it can be assumed that the parameterized SWAT model is sufficiently applicable the future climate conditions.”

Answer: Thank you. We modified it in the text.

Page 7; Lines 207/208 & 219: change “Vu et al., (2019) ... Richter et al., (1997)” to “Vu et al. (2019) ... Richter et al. (1997)”

Answer: Thank you, changes applied.

### 3. Results:

Here you should decide either to introduce the abbreviations GWD and GWR, and use these afterwards or not to introduce/ use these abbreviations. At the moment it is a mixture, e.g. “groundwater demand is higher than GWR.” (page 8, line 230).

Answer: Thank you for pointing this out. We used the abbreviations for the sections 3.1.1 and 3.1.2.

Furthermore, in the text there is a mixture of tenses. While usually present is used, sometimes past tense is used, e.g. “...indicators have been significantly...” (page 9, line 260), “...21 IHA have indicated significant...” (page 12, line 359); change to “...indicators are significantly...”, “...21 IHA indicate significant...” (check the whole text!).

Answer: Thank you for bring this to our attention. We used the present tense and harmonized it throughout the text.

Page 9; Line 278: “...none of minimum streamflows are expected...” change to “...none of minimum streamflow indicators is expected...”

Answer: Thank you, changes applied.

Page 10; Line 296: “...by around two month...” change to “...by around two months...”

Answer: Thank you, changes applied.

Page 10; Line 308: “...WUS in near and far future, are similar...” change to “...WUS in the near and far future are similar...”

Answer: Thank you, changes applied.

#### **4. Discussion:**

Page 12; Line 350: “Shahid et al., (2018)” change to “Shahid et al. (2018)”

Answer: Thank you, changes applied.

Page 12; Line 356: “...indicators are representing substantial...” change to ...indicators show

Answer: Thank you, changes applied.