

Dear Reviewer,

Thank you for your comments and suggestions. Our response is indicated below your comments in blue font.

Major revisions are anticipated before the manuscript is considered for publication in the journal NHESS:

- This paper investigates future changes of surface water availability in Austria. Usually, researchers may use the previous observed data to verify the mathematical model, and then apply the model to deduce the trend in the future. Nevertheless, I am sorry it is difficult for me to find the evidences to prove the result is reliable.

Thank you for your comment. Using bias corrected regional climate model projections for assessing future climate conditions on a regional scale is an extensively used method and subject of thousands of studies. Of course, one could question the reliability of future climate projections, but again, there are immense efforts taken to assess the biases and errors in climate models to quantify the uncertainty of future projections.

Questioning the “mathematical model”, which we assume means the climate model projections, would imply to discard all studies where future climate projections are used, until the model is verified.

To this end, we think that these climate projections are still the best tools at hand, though prone to biases, errors and uncertainties, just because there are no other tools available. Given the vast demand on information on future climate impacts, there seems to our understanding to be no other, more reliably method.

Here are some specific publications on the datasets and methods used to provide these climate scenarios for Austria:

On the evaluation of Regional Climate Models over the European domain:

[doi:10.5194/gmd-7-1297-2014](https://doi.org/10.5194/gmd-7-1297-2014)

On the evaluation and guidelines for using the OEKS15 data set:

[doi:10.1016/j.cliser.2020.100179](https://doi.org/10.1016/j.cliser.2020.100179)

On the downscaling/bias correction method:

<https://doi.org/10.5194/hess-21-2649-2017>

Considering the representation of trends of the CWB in observations and models, we calculated trends within the reference period. Both the observations and the median across the model ensemble indicate a slightly positive trend, with +6.0 and +2.4 mm/year ( $\pm 3$ mm/year uncertainty range) respectively. We therefore assume, that the given model ensemble is able to reproduce the observed climate trends, although uncertainties still persist, but are thoroughly discussed throughout the paper.

- No quantitative result is found whether in the parts Abstract or Conclusions.

Thank you for your comment, we will provide most important quantitative findings in the Abstract as well as in the Conclusion section. To be more specific, we will add the numbers of the main findings, e.g. increase in average CWB during future time periods on an annual basis, as well as future return periods of a 2003 event under different emission scenarios.

- The parts “2 Data” and “3 methods” may be merged.

Thank you for your comment. However, we think that separated sections make it easier to follow the content, since the methods section has already a rather deep hierarchy with 3 levels. Merging Data and Methods would increase these to 4 and in our opinion would reduce readability. Of course we are open for an editorial advice to restructure the article

- Description of the method is too tedious. The part “3 methods” may be greatly simplified. Many discussions, e.g., lines 102-106 and lines 121-130, may be moved to the part “Introduction” or “Discussion”.

We see your point in suggesting putting these paragraphs in the introduction or discussion section since they give basic information on the topics. However, we think it would be hard to understand for the reader, if there is a rather detailed introduction to CWB or AED in the Introduction, were the general topic (drought and water availability) is presented.

We will try to shorten these paragraphs and condense the information to the most important points.

- Language errors or problems exist through the manuscript. Too many explanations included in the brackets, e.g., lines 269-274, make the paper unsmooth. Some long sentence, e.g., lines 63-65, is not readable. The first of the word, Where, in line 118, may be lowercase.

Thanks you for your comment, we will go through the manuscript and will try to streamline and shorten the text. Considering your specific points:

Lines 269-274:

Figure 4: Monthly climate change signal of the CWB for lowlands in the upper panel and mountainous areas in the lower panel; (a,d) observed average monthly CWB in the reference period 1981-2010, where the shading denotes for the spatial variability of the CWB climatology, (b, e) ensemble median monthly climate change signal of the CWB for RCP4.5 (blue) and RCP2.6 (turquoise) for the near future in bold colour and the far future in pale colour, the shading denotes for the ensemble spread given by the 10th and 90th, (c, f) ensemble median monthly climate change signal of the individual CWB terms; rainfall: blue, snow melt: magenta, AED: green.

Lines 63-65:

Although the body of existing literature points towards changing future water availability in Austria a comprehensive synopsis of all relevant processes altering surface water availability ~~across different elevations based on state-of-the-art regional climate projections~~ is not accomplished yet, or just for small spatial entities (Hanus et al., 2021).

- Some tables, e.g., Table 2 in page 9, are not easy to understand.

Yes, we try to make the table more easy to read.