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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Development of reliable future climatic projections to assess hydro-meteorological implications in the Western Lake Erie Basin" *by* Sushant Mehan et al.

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This paper describes the process of developing a climate database for the Western Lake Erie Basin. This process involves the comparison of two sources of climate projections, and the comparison of different bias-correction methods.

Being a hydrological modeller, I am well aware of the large uncertainties involved with climate projections, and studies to investigate, understand, and – hopefully at some point – diminish these uncertainties is urgently needed. Unfortunately, this study did, at least to me, not substantially contribute to understanding these uncertainties.

MAJOR

The overall structure of the manuscript is clear. However, particular sections and paragraphs require restructuring. The introduction contains many sentences that are not placed in context. For example, pollution mitigation strategies are (suddenly and abruptly) introduced, and not referred back to – what was the motivation to discuss this specific topic? Also Western Lake Erie Basin is not introduced, but is – apparently – a hotspot that requires special attention (see p.3, l. 3, '.. specific to the WLEB'). Another example is that 'climate projections at regional scales are unclear' (p.1, l.31), what is meant by "unclear"? The introduction is the foundation of the paper, but right now the motivation and the problem statement are not clear.

Also in the study itself, many choices were not rationalized. For example, why where three out of eight stations used (p. 3, l. 19) and not all, and how does this influence the results? Same concerning the GCMs, I understand that using all might be a lot, but why nine, and why these nine, and how does this influence the results?

This relates to another point; the discussion is currently not well embedded in scientific literature, and therefore does not lead to deeper understanding of the results. For example; only 9 GCMs were used, are they from different 'families' as discussed in the model genealogy of Knutti et al.? and if not, your ensemble is probably too narrow; how would this influence the results and the conclusions of the study? Another example: written on p. 21: 'biases in climate projections occur mainly because of flawed or faulty ideational boundary assumptions and can lead to deleterious outcomes'. The first question from a skeptic could be if these projections have any value at all; can you correct for faulty assumptions simply with using a bias correction or is this just a Band-Aid? or could that be a motivation to opt for SWGs? As uncertainty is one of the topics dealt with in this paper, a more comprehensive discussion of the approaches and assumptions in this study is well in place, or even needed.

MINOR

Some of the methods of the study are presented as conclusions, such as the points at page 22 starting at line 17 and starting at line 20, while these points are actually motivations or methodologies, and not the result or conclusion of this study per se.

Concerning the text; currently the text contains many numbers, which does not necessarily makes it attractive to read (e.g. p. 12, line 14/15). On the other hand, the figures are sometimes not comprehensively discussed (sometimes referred to only once). Consider removing too many individual values from the text, and sketch a more general picture, refer to figures / tables for detailed numbers.

Overall, I recognize that the study has been done carefully, but scientifically, discussion and depth are missing and (maybe because of that) few new lessons are learned.

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