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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Assessing Climate Change-Induced Flood Risk in the Conasauga River Watershed: An Application of Ensemble Hydrodynamic Inundation Modeling" *by* Tigstu T. Dullo et al.

Anonymous Referee #2

Received and published: 5 January 2021

Review to Dullo et al. "Assessing Climate Change-Induced Flood Risk in the Conasauga River Watershed: An Application of Ensemble Hydrodynamic Inundation Modeling"

The manuscript (MS) presents a modeling approach for assessing the potential future impacts of climate change on the future flood risk in a watershed, according to greenhouse gas emission scenarios (RCPs).

The approach is based on a modeling chain combining an hydrological model to esti-

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mate flood hydrographs and a 2D hydrodynamic model to simulate flood inundation.

The MS is well prepared, and I appreciated the sensitivity analyses for the most important parameters of the hydrodynamic model. Also, other specific choices seem sufficiently justified. I would have given minor revisions for this MS, but I rather suggest major revisions as I think that the advancement respect to previous work Gangrade et al. (2019) should be better highlighted. I have read the comments of referee 1, which mainly focus on some limitations in the hydrodynamic modeling. I agree with most of them. Hence my comments will mainly focus on other aspects of the MS.

Specific comments

- Introduction and Conclusions and summary: Please better highlight the advancements respect to previous work by Gangrade et al. (2019), Journal of Hydrology https://doi.org/10.1016/j.jhydrol.2019.06.027
- L 365 referring to Fig. 2: the control and baseline samples of annual maximum peak streamflow (box-plots) may be seen as “significantly different” rather than “comparable”. Indeed, two points need to be clarified in this respect: a) the shown baseline sample is relative to bias-corrected data or not? b) control and baseline samples have different lenghts, so, perhaps a more objective way of comparing them may be to apply some bootstrapping algorithm, or to randomly extract from the baseline sample several sub-samples having the same lenght of the control sample, and compare these somehow.
- Fig. 8. It may be possible to derive the analogous curve for the control scenario hydrographs. How does this compare to the shown baseline and future curves?

Minor points

- L 188: Many researchers consider as a standard choice a period of 30 years instead of 40 years. A comment on this may be added to the MS

- L 476: there is only an indirect demonstration that the model can reproduce well flow velocity. As no direct comparison is performed (data are not available in this sense, as far as I have understood), perhaps this should be downplayed.
- L298: A minimum threshold of 10 cm flood depth was used to judge whether a cell was dry or wet. How much do you think your results can be sensitive respect to this theshold value?

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