

Interactive comment on “Ubiquitous increases in flood magnitude in the Columbia River Basin under climate change” by Laura E. Queen et al.

Anonymous Referee #3

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This paper performs a fairly thorough assessment of change in the Columbia river basin as assessed using a combination of GCM and hydrologic models. The assessment is quite good and the authors have done a lot of work for which they are to be commended.

I have concerns though about the novelty of this work. My first concern is the use of GCMs and not RCMs for which CMIP5 simulations are now available over most of North America. My second concern is the use of an analogue based downscaling approach which may be compromised in its ability to represent unseen extremes (I say this without reading the cited paper though but was surprised this was used and not the more fancy downscaling plus bias correction alternatives that are around nowadays). In general, while this study is well presented, I feel there is little I can use in terms

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of methods for my own applications which may pertain to a different catchment. My recommendation is to shift this paper to a more applied journal that may be more inviting of regional contributions where this will be better appreciated I believe.

Alternately the authors must try to capture some novel question in their analysis that may shed light on processes elsewhere. For instance, a significant portion of the flow in the Columbia comes because of melt. Additionally, it is well known GCM simulations are not very reliable in the context of precipitation. Is there a research question in how one could downscale snow and rain using GCMs in a way snowpack dynamics for the current climate period are well represented? Additionally, how this downscaling would compare with the higher spatial scale simulations from RCMs over the study region. There may be other questions too that could be of interest. Given the work the authors have already done, I urge them to identify such questions and change their presentation to addressing these instead of reporting overall changes in the basin.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-474>, 2019.

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