Dear Editor,

Thank you for your positive response regarding our manuscript. We provide below our final response to Reviewer 2's feedback.

Best,

Comment 1: There is still some sloppiness in the writing - for example, some of the references in the main text do not show up in the reference list, whereas there is a reference in the reference list that does not show up in the main text. This is sloppiness, which may also show up in other areas as well. I picked these up in a quick review.

Apologies for overlooking the omission in the bibliography. We have fixed the reference list.

Comment 2: The authors insist that their focus is on uncertainty estimation, and less on the basic scientitic issue of disaggregating the Budyko theory to individual pixels within a catchment. I am willing to accept this argument, but still they must highlight this issue more in the discussion as a service to science. Methods for this already exist. For example, there is a lot of literature where the applicability of Budyko is extended to monthly time scales using storage carry-over explicitly. While it is true that in the case of spatial disaggregation, this has not been attempted, yet one theory for this does exist in the paper by Thompson et al. (2011) on "catchment ecohydrology" where they use of the notion of downslope groundwater subsidy. The authors should provide a brief discussion on this topic for completeness.

> *Thompson, S. E. et al. (2011). Scaling of ecohydrologically mediated water balance partitioning: A synthesis framework for catchment ecohydrology. Water Resources Research, 47, W00J03, doi:10.1029/2010WR009998*

We thank the reviewer for this useful reference, which is now cited in the manuscript. We added this point to section 5.2 (l. 469-484):

"In particular, ongoing research on linking patch-scale and catchment-scale hydrology should provide critical insights into the effect of the simple spatial disaggregation used in the InVEST model (Thompson et al., 2011)." (l. 478)

The paragraph already discussed how our study relies on a much broader body of literature on hydrologic modeling based on the Budyko model. We decided to limit this discussion to a couple of sentences so that the core of the discussion remains focused on the practical implications of this work for ecosystem services applications.