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Interactive comment on "Evaluating a landscape-scale daily water balance model to support spatially continuous representation of flow intermittency throughout stream networks" *by* Songyan Yu et al.

Anonymous Referee #1

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Sunny Yu and coauthor present work modelling intermittent streamflow in two Australian catchments. Overall the paper is well-written and covers a topic that is of huge interest right now. I have some concerns about how the work is presented and will describe them below.

-Authors do not discuss how much data is required to assess low-flows. I fully acknowledge that it can be very difficult in getting long-term data sets. The data that they use here covers a period from January 1, 2005 through December 31, 2017, so 13 years. I do not think that this is a long enough period of time to quantify, characterize, or model

low-flows.

-Related to this, I am left wondering why the authors would choose a model that they know overestimates streamflow following a rainfall even when they are specifically interested in the lower-end of the streamflow continuum in systems that are dominated by streamflow that is mostly from rainfall.

-Some of the language is very vague. For instance on MS line 121-122 "If streamflow can be simulated at an acceptable accuracy...." but do not provide any guidelines for what is an acceptable accuracy.

-There is absolutely no explanation of the metrics that the authors used to characterize streamflow. Olden and Poff 2003 describe that it is really hard to characterize intermittent streams with metrics because the metrics that are used to describe one type of intermittent system are not the best to describe other types of intermittent systems. We also know that intermittent streams that are close in proximity to each other can behave very differently from each other from Margaret Zimmer, Adam Ward, and Katie Costigan's work. There's no discussion of metrics or how even close intermittent streams can behave differently in the manuscript. I also thought having to flip between a table and a figure to figure out what they were displaying could be improved.

-Related to this, the discussion seems to be over emphasizing the implications of the results. Yes, this is an important first step to modelling intermittent streamflow. However, their results only show that the modeled and observed streamflows have a R^2 of less than 0.56! I would not say that this is "fair to good overall alignment" like the authors say in line 299. There is also no discussion, as I mentioned above, about how difficult it is to transfer metrics and results from this coastal Australian sites to other phyiographic areas. They admit that the two catchments used here are similar but the models preformed very differently for them.

I think that this is a great first step in being able to model intermittent streamflow. However, I am worried about the model choice overestimating low-flows– the ones

they focus on here– and I think that they are over emphasizing the strength of their findings. I think that we have a long way to go before we are able to apply the results of case studies like this to better understand intermittent systems as a whole, but this work is a great step towards that direction.

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