Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-10-RC2, 2020

Hydrology and Earth System Sciences
Open Access
Discussions

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 #2

Received and published: 13 March 2020

The topic of this paper is certainly timely, and evaluation of how runoff routing, temporal resolution of models and climate impacts on spatial/temporal variability of drying streams is important. The biggest challenge I see in this manuscript is that the hypotheses presented in lines 163-166 are not clear and the framing of the problem and results wanders between computationally efficient streamflow routing to the timescale of importance, to the sub-catchment climate variability, to capturing spatial and temporal patterns of intermittency. With sufficient re-organization, additional details on the individual models and observational data, re-evaluation of the time period of no flow

that allows results to be compared across daily and monthly modes this work could provide interesting insights into intermittent stream research. Given the extent of revisions needed, I do not suggest it to be accepted at this time

Using out of the box hydrologic models (AWRA-L, AWAP) that over predict baseflow will certainly limited the ability to capture no-flow conditions (Figure 7, lines 309-311). These models are not fully described, even conceptually in the paper, making it challenging for a reader to understand which assumptions lead to this over-prediction. A previous study was used to benchmark flow intermittency, but was not explained in the methods.

Some of the methods of examining the low-flows themselves seem questionable, namely, that all days in a month had to have zero flow for the flows in that month to be zero from the AWRA-L outputs (line 187). There is work being done that suggests that a stream that goes dry for 15 days in a year is considered intermittent, so using a consistently dry 30 day window could be an exceptionally high threshold, either way, description of why a given threshold is used is necessary.

The timeframe of observational data included is not clear, and it was not presented with the comparison between model output in Figure 9. The modeled flow from 1911-2016 is included in the paper, with no reference to how well that model actually did at capturing low flows in the calibration time period. Figure 6 is slightly misleading because the dashed line is not a continuous variable and the catchment areas do not increase linearly.

The writing and organization of the manuscript could be improved throughout (e.g. 59 -63). References to the multiple model configurations throughout is particularly confusing (e.g. a table that has the 4 model configurations and associated details with acronyms would be useful). One important caveat relevant to modelling intermittent streams at a daily-time step using contiguous data is not referenced (e.g. stream gaging locations are generally put where there is usually surface water flow). There are several quantitative results (r2) that are presented, yet the discussion poses that the models "showed fair to good overall alignment" which seems to overstate the ability to capture the low flows given how low the r2 was.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-10, 2020.