

Interactive comment on “Hydrological drought across the world: impact of climate and physical catchment structure” by H. A. J. Van Lanen et al.

Anonymous Referee #3

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There are several research articles published in recent years related to drought at global scale. Some of the articles published based on quantification of hydrological droughts. Based on these several articles, I believe in the technical contributions, however the results look to be not well validated. Even different articles talk about different results with large variation in their discussion. When we talk about global hydrological drought, there are so much uncertainties involved (for example: land use pattern and ground water depletion) and it is not easy way to quantify drought episodes when we incorporate human induced dynamics. Even at the catchment scale we see large difference in hydrological droughts simply by incorporating slope of the watersheds.

The authors demonstrated a simple approach to quantify hydrological droughts for dif-

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ferent climatic patterns. The manuscript can be improved further. I have following suggestions for the authors: 1. For the controlled experiment, how the scenarios are chosen? Is it based on the certain existing conditions? 2. The authors can highlight their result in comparison to other findings for global drought. For, example, whether there is an increasing or decreasing pattern in drought? This will be a good contribution by the authors and strengthen the manuscript. 3. There is no validation of the model output. Is there anyway to validate the results? 4. When the climate pattern differs, the precipitation and evaporation pattern will differ. These two variables act as major driver of drought without much human intervention. There can be a discussion how it changes across different climatic patterns and where there is likely of more drought events. This discussion will lead to further involvement of land use and groundwater components. 5. HBV model concepts might be useful for small to regional scales. Is there any limitations of using this concepts for large scale? 6. When the streamflow is considered for hydrological drought analysis most of the times the peaks are not able to be captured properly or even near to them. This will affect in choosing the threshold level for identifying the actual drought events. How these limitations can be overcome? 7. Considering groundwater component might be challenge for quantifying hydrological droughts. The reason being large scale exploitation in many part of the world. Therefore this component will have a varying impact on streamflow. A small discussion can highlight this issue. There are other issues but the above concerns can be addressed by the authors before publication. The authors have done a good job, however it needs revision before final decision.

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