HESSD

Interactive
comment

Interactive comment on "Diagnosis toward predicting mean annual runoff in ungauged basins" *by* Yuan Gao et al.

Anonymous Referee #1

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The authors aims to develop nonparametric mean annual water balance model for predicting mean annual runoff in ungauged basins, which often remains a challenge for hydrologists. The manuscript can advance prediction in ungaged basins, and it is relevant to HESS. I have following comments that needs to be discussed (addressed) at this stage.

(1) How the soil water storage is determined? It varies at seasonal scale. How does it will affect your analysis? It is worth to highlight following article that developed a three-parameter streamflow elasticity model as a function of precipitation, potential evaporation, and change in groundwater storage applicable at both seasonal and annual scales. https://hess.copernicus.org/articles/20/2545/2016/

(2) What do mean by Climate variability in your study? does it mean distribution of

climate variables, for example, distribution of rainy days with in the season. This type of analysis are important and they have a direct influence on the soil water storage. This can be discussed as a scope of the future work. The magnitude and seasonality of the climate variables affects water availability (storage). This may be included as a future scope of the work. Please see this article: https://www.nature.com/articles/s41467-020-16757-w

(3) Are you using SCS method to find the infiltration loss? Does this loss is connected to shallow water storage?

(4) Baseflow plays an important role in the runoff analysis. Are you including this factor in your analysis. Can addition of the seasonal baseflow characteristics will improve the results?

(5) How the curve numbers are derived? Did you derive the composite curve numbers, i.e., one value for a watershed?

(6) How the bedrock topography are determined?

(7) I assume the shape parameter is kept constant for a given watershed, and it is calculated based by creating a time series based on the spatial (gridded) soil water capacity values. How the shape parameters are calculated? For example, Maximum Likelihood methods?? Do you think the parameter uncertainty (range) will affect the mean flow?

Line 98-100: Can be revised to make it simple.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-353, 2020.