Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-525

Anonymous Referee #1

Referee comment on "Contrasting changes in hydrological processes of the Volta River basin under global warming" by Moctar Dembélé et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-525-RC1, 2021

I enjoyed reading this manuscript. The authors used a distributed model for assessing climate change impacts on different fluxes and discharge output in Volta basin. The ms is quite elaborated and fits well with HESS standards. I only have several concerns regarding “dynamics” and “uncertainty” results presented in the manuscript. Moreover, climate gradient in the basin seems to ruin (dominate) AET patterns censoring vegetation dynamics.

Specific comments:

-Title is very catch but I couldn’t find much on “dynamics” presented in the results except for the Fig5, 13 and 14.

-In addition to Fig13, the readers would be curious to see Lahaa and Blösch (2006) type seasonality figures for regime (a kind of dynamics) changes/shifts in the basin. The seasonality indices could be adopted to low and high flows as done in different other papers below. Event definition is key here for counting them i.e. Q95 and Q5 for low and high flows.

-Seasonality shift is only mentioned for rainfall at line 491 in conclusions but there is room for assessing shifts in high and low flow occurrence (dynamics) and seasonality.

Figures 4-6-9 in Laaha and Blösch (2006) DOI: 10.1002/hyp.6161 are good examples.

Similar applications in climate research:

https://mdpi-res.com/d_attachment/water/water-12-03575/article_deploy/water-12-03575-v3.pdf

https://mdpi-res.com/d_attachment/water/water-11-00925/article_deploy/water-11-00925-v2.pdf

-Fig 11, 12, S38, S49 (AET in particular) are mostly dominated by climate gradient and not showing vegetation dynamics. The authors should find a way to exclude the dominant effect of rainfall using a normalization procedure. A new procedure is proposed in this paper

Example:

https://www.preprints.org/manuscript/202111.0225/v1

However, there must be other methods approaches in the literature for deblurred AET pattern maps by removing climate gradient.

https://www.researchgate.net/publication/338208138_Image_Deblurring_Techniques_-A_Detail_Review

-Line 196: "Uncertainties in the model inputs and outputs are assessed in terms of variability be"

Indicating V_2 estimation (or even COV coefficient of variation) as uncertainty assessment is quite ambitious without a systematic uncertainty propagation like in GLUE by Keith Beven.

In short, this vague sentence should be revised as smth like "variability in the model inputs and outputs are assessed using V_2 statistics".