

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2021-151

Anonymous Referee #2

Referee comment on "Land use and climate change effects on water yield from East African forested water towers" by Charles Nduhiu Wamucii et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-151-RC2>, 2021

General comments:

This is a very interesting study; however, I feel that it suffers from two main deficiencies that would need to be addressed in a revised version of the manuscript. The first is that there does not appear to be an overarching research question that is being addressed. Given what the authors know about the general climate of eastern Africa, it should be possible to suggest where the various water towers should plot on the baseline Budyko curve, and then test to see if in fact that was the case. The second issue is the absence of any specific consideration of the uncertainties associated with the estimates of the variables (P, PET, NDVI) used in the analysis. My concern here is that the authors spend considerable time discussing temporal changes in water balance components that may or may not fall outside the range of uncertainty associated with these components.

Specific comments:

Page/line

3/3 How was potential evaporation estimated?

3/2-8 What are the uncertainties associated with the estimates of P, PET and NDVI?

3/27-30 Can catchments deviate from the Budyko curve under stationary conditions?

7/Figure 3c How significant are these changes given the uncertainty associated with w?

12/Figure 8 Why is there a general overprediction of Q?

12/3-4 How much of the greater sensitivity of water yield to climate changes rather than land use changes is due to the form of equation 1? Is the differential sensitivity simply a function of the formulation of the Budyko curve, or is it real?

15/2-4 "... which further proves the presence of anthropogenic influence ..." – does it really "prove" it?

19/Figure A4 How can you get different shapes for the baseline Budyko curves for the same w value (e.g. Aberdare Ranges vs. Mt Meru)?

I have attached other specific comments and suggested edits on the manuscript.

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-151/hess-2021-151-RC2-supplement.pdf>