

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## Comment on hess-2021-520

Anonymous Referee #2

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Referee comment on "On the similarity of hillslope hydrologic function: a clustering approach based on groundwater changes" by Fadji Zaoua Maina et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-520-RC2>, 2022

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I think this is interested study that is worthy of publication. However, a lot of improvements have to be made for its current form. I agree with that ground water dynamics may be a good proxy of surface hydrological processes in some places. However, this may not be the truth in some other areas. So this proposed approach may have its limits. This have to be clarified in the introduction and discussion. There are a lot of indices and methods used in this study were not presented in the Methodology section. I also feel that the methods section did not clearly present how the authors process the data and generate the results. In addition, and especially, discussion of the findings of this study has to be strengthen. currently, the discussion is weak, maybe due to the reason that the results and discussion were combined. References are needed for the interpretations. Explanation of the results and comparions with other published studies have to be improved.

1. the abstract lacks quantified description
2. line 41-44, references are needed to support this statement.
3. line 106, maybe give some examples of such models
4. line 138, maybe starting with a sentence to tell the reads the pupose or the reason of using ParFlow-CLM in this study

5. line 164, provide the examples of the application of ParFlow-CLM
6. line 239-240, what were those thresholds tested, specify
7. line 238-243, what were the thresholds of drainage area you finally used?
8. line 316, the clustering approaches have to be introduced in the methods section
9. line 369-379, most of the part would be better to move to the methods section
10. section 3.2.3, why were surface runoff not considered? I think it might be one of the most important hydrological processes.