

This manuscript proposes a method to improve water budget modelling by using the available, but sparse, hydrometeorological data and satellite products. The current manuscript provides a good try to predict hydrological process in data-scarce regions or ungauged basins. Although there are publications related to such topic in ungauged basins, the intent of the manuscript is worthy and significant, and is of interest to readers of HESS. Seeing the potential of this study, I am in general supportive of publication if the following comments are addressed in the resubmission.

My major concerns are:

1. I would encourage the authors to rewrite the methodology section. Give a clear message to the reader what you did and how you did. For example, the manuscript entitled as 'JGrass-NewAge model system'. However, I could not find detail or key information about the method. What's the theory of the method based on? What's the advantage of the method? The headings in method section are the same as those in section 5. Some parts in the results analysis and discussion section are more suitable to be in the methodology section. For instance, it would be better to introduce the indices (i.e., KGE, PBIAS, r) in section 4. In addition, what's the spatial resolution of the HRU? When performing simulation, what are the time step and the spatial resolution of output? There are different hydrometeorological data and satellite products, but it is difficult to readers to obtain their information (e.g., what kind of satellite products). I would suggest the authors providing a table to show all the data and their spatiotemporal resolutions. How did you deal with the different resolutions (especially spatial resolution) of input parameters?
2. Discussion should be enhanced. What's the disadvantage of the method when applying in data-scarce regions with large area? For example, results of figure 5 indicated that the simulated runoffs were underestimated. What's the reason? Was it caused by uncertainties/errors in precipitation products? I could not find any quantitative information about errors of SM2R-CCI. Meteorological stations should observe precipitation, radiation, and etc. Why didn't you use them for

validation and discussion?

3. The authors claimed that the JGrass-NewAGE system are described in a series of papers and not re-discussed in this manuscript. What's the difference between this study and the previous papers? What's the main contribution of this work?

My specific comments are given below.

The numbers in front of the comments indicate page and line number.

1. 1-21. 'up to 2000 mm per year'. It would be much clearer by adding precipitation.
2. 3-1. It should have space between 'given' and '(' . The authors should proof read the manuscript to avoid such mistakes.
3. 3-6. 'the river enters a deep a canyon' contains grammatical errors.
4. 3-18. The elevation values show certain difference compared to those in page 2 line 3.
5. 3-30. It may mislead to conclude 'the seasonal variability of the basin is very high' because the authors claimed that the temperature has small seasonal variability.
6. 4-1. Figure 1. I suggest adding units for axes (also other figures) as well as enlarging the schematic map (at least the text). What does the color represent in figure 1b?
7. 4-15. It seems that the citation appeared in the first time, and 2014b should change to 2014a. The authors should proof read the manuscript to avoid such mistakes.
8. 5-4. What does GIS mean? Please consider defining the abbreviation.
9. 5-9. How did you divide the basin into 402 subbasins? According to what kind of rules? I'm not sure whether figure 1b is your results or not.
10. 5-13. Figure 2 is difficult to read. The texts were small and difficult to guess their meaning. I suggest the authors redraw it.
11. 6-23. Works cited in a manuscript should be accepted for publication or published already. There are many publications describing psychometric constant.
12. 6-27. What's the relation between  $S(t)$  and TB in equation 3? Can you explain

more?

13. 7-26. Semicolon should be replaced with 'and'.
14. 8-4. What does KGE mean? Please consider defining the abbreviation.
15. 8-8. What does 'described in A' mean? Does 'A' represent 'Appendix'?
16. 9-18. It is curious to use J representing precipitation. In addition, precipitation, evapotranspiration, and discharge are components of water budget. Why did you use different section headings (i.e., 5.1, 5.1.1, 5.1.2, ...)?
17. 9-21. I would suggest the authors adding 'the Oromia region (or other mentioned places)' into Fig.1.
18. 10-1. Figure 3a indicates precipitation is highest in southern region. However, figure 3b showed a different pattern (i.e., east shared highest precipitation), especially in JJA.
19. 11-4. How and why did you select only some subbasins? Did you consider r and PBAIS (figure 4, e.g., high r and low PBAIS, and low r but high PBAIS)?
20. 11-10. 'while the it tends to' contains grammatical errors.
21. 11-23. 'within the basin at the internal channels (2)'. What does '(2)' mean?
22. 11-27. I do not think  $r^2=0.92$  is lower than  $r=0.93$  or  $r=0.94$ . I suggest the authors to unify the index.
23. 13-1. Are all the parameters unitless? Why are two  $\alpha[-]$ ? Furthermore, I could not find table 1 in the context.
24. 13-2. Can you number the hydrometer stations and then add these IDs into figures 1b and 5?
25. 14-8. Are Wase-Tana and FlexB commonly used models? Please consider defining the abbreviation.
26. 18-5. Can you provide some radiation, cloud, and wind observations? This may be better to draw the conclusion.
27. 19-9. What does S mean?
28. 19-11. The number of decimal places was set to 3 for precipitation. Is it necessary? I suggest the authors unify the number of decimal places.

29. 21-12. 'figure' should be 'figures'.
30. 26-6. 'et al.'. The authors should list all the authors of a citation and unify the citation style. The authors should proof read the manuscript to avoid such mistakes.
31. Texts of most of the figures are unclear. I would suggest the authors redraw the figures.