

Interactive comment on “Observed and simulated hydroclimatology using distributed hydrologic model from in-situ and multi-satellite remote sensing datasets in Lake Victoria region in East Africa” by S. I. Khan et al.

Anonymous Referee #2

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The paper is assessment of an assessment of the hydroclimatology of Lake Victoria basin. The paper sets out to demonstrate the use of satellite data in modeling the water balance of the Nzoia River basin. The specific goals are to 1) quantify the hydrologic cycle of Nzoia Basin at decadal, annual, monthly and daily time scale using in-situ 21-year observational dataset; 2) model the rainfall-runoff relationship using a distributed hydrological model, calibrated by long-term observations, in terms of predictability at the daily flood scale; 3) investigate the hydrological capability of remote sensing data

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(preliminary precipitation) in terms of the reconstruction of water cycle components. This relevance of the study is founded in the general scarcity of ground-based data for fully assessing the hydrology of many tropical catchments. The study results can therefore be replicated in other similar basins where data limitations are prevalent.

Specific comments are given below

1. Does the paper address relevant scientific questions within the scope of HESS? The paper tackles a number of questions regarding the use of remotely sensed data to assess the interactions between precipitation, evapotranspiration, soil moisture storage, groundwater recharge, and stream flow for a tropical semi-arid catchment. These are relevant scientific questions in the field of hydrology

2. Does the paper present novel concepts, ideas, tools, or data? The use of remotely sensed data to augment ground data is an ongoing challenge. The concepts, while they have been around for some time, have not been widely used within developing countries. The use of the CREST model is not well elaborated. The adaptation of the generic processes to Nzoia basin is unclear. Other issues that are unclear include the influence of land-use and soils on the modeling framework etc. The purpose of the daily rainfall data is unclear

3. Are substantial conclusions reached? There is no specific section on conclusions and it is hard to filter the main conclusions from the section on summary and discussions

4. Are the scientific methods and assumptions valid and clearly outlined? The explanation of the modeling approach should be substantially improved. The flow of the discussions is sometimes confusing

5. Are the results sufficient to support the interpretations and conclusions? If the above is done, this will be improved automatically

6. Is the description of experiments and calculations sufficiently complete and precise

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to allow their reproduction by fellow scientists (traceability of results)? This needs to be improved with a better description of the model, the data preparation and interpretation of results. It is unclear what the section on model reconstruction results is supposed to achieve.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes

8. Does the title clearly reflect the contents of the paper? Yes

9. Does the abstract provide a concise and complete summary? The abstract dwells too much on floods which are not specifically tackled in the paper. Concentrate on the subject of the paper. This quotation from the abstract is irrelevant because that's what is expected "Relatively high flows were experienced near the basin outlet from previous rainfall, with a new flood peak responding to the rainfall in the upper part of the basin." Generally the abstract dwells a lot on results that don't need modeling to reach . . . like the months of peak flows which can simply be obtained from gauge readings. The abstract should concentrate on the value of two things (1) Using satellite data in the catchment, and (2) the use of a distributed model

10. Is the overall presentation well structured and clear? The paper layout sometimes gets confused. Like the presentation of results before model set-up and running

11. Is the language fluent and precise? The language is fine though the authors sometimes mix up tenses (is and was). These should be cleaned up because it sometimes becomes confusing 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? No mathematical formulae are shown

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? The reference to flooded makes the paper a bit cluttered. The authors should concentrate on the subject of the paper

Lumping of Hydrologic model setup, calibration, simulation, and verification leads to

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fuzziness and loss of clarity.

14. Are the number and quality of references appropriate? Yes

15. Is the amount and quality of supplementary material appropriate?

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