

Interactive comment on “Modelling stream flow and quantifying blue water using modified STREAM model in the Upper Pangani River Basin, Eastern Africa” by J. K. Kiptala et al.

Anonymous Referee #2

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Overview:

This paper highlights an approach of incorporating remotely sensed satellite data in distributed hydrological modeling. Such an approach is warmly welcome in the sub-Saharan Africa where most hydro-met stations are pitted against vandalism and lack of capital investment from relevant authorities. It is worth noting there a relatively few hydrologists who are conversant with the technical details of manipulating raw remotely sensed data into meaningful hydrological signatures as presented in this paper.

The paper goes into deeper depths of detailing the model structure but with limited fo-

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cus on results and discussion – especially on the capabilities of the modified STREAM model in capturing the various hydrological signatures over space and time. This is one of the major weaknesses of this paper on and above several typo errors. Specific comments

Abstract

Line 1: The sentence could have a better meaning if “water uses” could be replaced with “water resources management”.

Line 11: The abbreviation “STREAM” needs to come after a description of the full name. This is applicable to all abbreviations in the document. Introduction

Page 15773, Line 2: ,...impacts of different scenarios; The word “management” is missing here! Otherwise what scenarios are we talking about?

Page 15774, Line 10: “resultant” should be replaced with “resulted”

Page 15775: Line 15-20: This paragraph highlights challenges of applying remotely sensed data in hydrology, notably in hydrological modeling. This paragraph could benefit more if the authors could read the following article [Schultz G.A. 1993. Hydrological modeling on remote sensing information. *Advances in Space Research*, 13 (5):149-166)]. Most hydrologists are only used to conventional hydro-met data sets and lack technical know-how of how to manipulate RS data in hydro-studies. This is a big challenge on wider adoption of RS data in hydrological studies.

Model development

The use of an 8-day aggregate (8-day time step) need more clarification. The authors indicate that this time step correspond to time scale that characterizes agricultural water use. I am lost here...what agricultural water use are they talking about? Is it irrigation scheduling? I am not convinced by this statement and have the feeling that the authors chose this time step mainly for convenience given the fact that the MODIS products are available on 8-day aggregates. If this is the case, then, what uncertainty

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is introduced by this “convenience”?

Results and discussion

The authors have not provided a rigorous analysis of results and discussions as what readers would have expected. The paper would have benefited more if the authors could have developed and analyzed at least a few water use management scenarios in the Pangani basin using their modified STREAM model and compare with baseline (the current situation). Otherwise the paper does not abide to the tone in their abstract and even introduction of the paper. Naturally, the use of a model in water resource management is in providing answers to the typical question “what if?”. This is what the authors need to highlight in this paper, and also water resources managers want to read and hear the same as well.

The authors have noted that the motivation of modifying the STREAM model was due to failure of the earlier version to account for actual transpiration in a realistic way. They have also provided references to support their argument. However, as a reader, I am more interested to see a comparative analysis of the two versions of the model, with focus on actual transpiration and possibly other parameters as well. Possibly, a Table or graphical representation would suffice.

Lastly, the authors need to address sensitivity and uncertainty issues of their model. This is a typical issue in hydrological modeling and the authors cannot escape this.

Figures

Figures 5 (a-d): It would be nice to have scatter diagrams as well.

The authors need to be consistent throughout the document. They have used both “Figure” and “Fig.” in the text.

Summary

This is a paper worthy publishing in HESS once all the above comments are addressed.

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