

## ***Interactive comment on “Hydrological Modeling in an Ungauged Basin of Central Vietnam Using SWAT Model” by A. Rafiei Emam et al.***

### **Anonymous Referee #1**

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#### Summary

This paper presents a standard application of the SWAT model for a watershed in central Vietnam. It is not clear and also not communicated by the authors, what the novel aspects of this study are. Any revised version should clearly communicate the novelty of the application and show how it goes beyond the state of the art.

#### Review Comments

1. Essentially, this paper compares two models to estimate river discharge for an ungauged catchment (catchment 1): Model 1, called “regionalization approach” here, multiplies observed river discharge from a neighboring catchment (catchment 2) with the ratio of the two catchment areas (catchment 1 area/catchment 2 area). Model 2 is the SWAT model. Subsequently, Model 1 is taken as the truth and Model 2 is

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calibrated to reproduce that postulated truth. This approach is questionable. Normally, one would expect model 2 to perform better than model 1 (otherwise – why build it?), so why calibrate it to match model 1? A better approach may have been to set up and calibrate the SWAT model for both catchment 1 and catchment 2 and then transfer calibrated parameters from catchment 2 to catchment 1.

2. The calibration strategy is unclear to me. Three types of data area used: River discharge, actual ET and crop yield. Calibration against these targets is done sequentially, but I expect that a number of SWAT parameters will be sensitive to more than one of these targets. How are you dealing with trade-offs between the targets? A formal multi-objective calibration approach would probably have been appropriate.

3. P1, Line 29 and following: This states the main motivation for the study. However, to me this reads like a rationale for a consulting project, not for a scientific research paper.

4. Calibration with actual ET from MODIS: How was this done? At the HRU level or catchment level? How did you make the match between grid-based MOD-16 and SWAT? I guess in eq 2  $ET_a$  would be better symbology than  $Q$ .

#### Details

1. P1, Line 18: Nash-Sutcliffe

2. P1, Line 24: hydraulic models

3. P3, Line 23: “MODIS time series data” is too unspecific. Please state which MODIS products have been used. Are these potential ET or actual ET products or both?

4. P3, Line 31: “slope”

5. Eq 1: I guess  $Q_{gw}$  is capillary rise of water back into the soil zone, so should be  $+Q_{gw}$ , not  $-Q_{gw}$ . The term “soil infiltration” for  $w_{seep}$  may not be optimal. “Deep percolation” may be better.  $ET_a$ : Please always specify if this is reference, potential or

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actual ET. I guess in this case it is actual ET.

6. Please use continuous line numbering throughout the paper to facilitate the review process

7. P5, Line 10ff: Here the term “regionalization” is used for parameter transfer between catchments, while further up it is used for what is now called “ratio method”. Please be consistent.

8. P6, Line 1: “thickness” should be “width”, you could also use the term “sharpness”.

9. Page 8, Line 25f: This procedure for dealing with the bias in the MODIS potential ET sounds very “ad hoc”. Should be justified better.

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