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Hydrology and Earth System Sciences
Discussions

Interactive comment on "SWAT-CUP for Calibration of Spatially Distributed Hydrological Processes and Ecosystem Services in a Vietnamese River Basin Using Remote Sensing" *by* Lan T. Ha et al.

Anonymous Referee #1

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In this study, RS data and various data were used to calibrate SWAT ET and other water budget components.

SWAT-CUP is a tool for automatic calibration of SWAT model. So the use of SWAT-CUP with RS data does not guarantee the publication of this manuscript. Thus authors need to modify introduction section to provide novelty of this manuscript. Lines 22-25 on Page 3 are not good enough as an objective of this study.

Lines 1-12 on Page 4, authors indicated surface runoff and baseflow were verified in

this study, however, I cannot find the results/conclusion related with this. Instead of using "verified", either "calibrated" or "validated" is proper term.

Liens 5-6 on Page 5, SWAT model has sub-daily, or hourly runoff module. Authors need a couple of sentences why 3-hourly data were integrated into daily time step data. This process will loss accuracies in SWAT estimation.

Lines 13 on Page 5, more detailed description of irrigation and SWAT ET optimization is needed.

Line 17 on Page 5, total 7,909 HRUs were used. However, I am wondering the spatial resolution of land use and soil data are good enough to capture detailed land use boundaries and soil characteristics? In addition, land uses should not be divided by soil because rainfall falls on land flow through the land surface.

Lines 7-20 on Page 7, the use of DEM with a spatial resolution of 30m, land use data with 300m * 300m are good enough to capture detailed land uses and topographic effects of each HRUs? Did author analyzed the effects of spatial resolution in capturing detailed topographic characteristics? If the agricultural field is less than 300m * 300m in size, we may have false LAI and thus ET estimation. I think cell size of land use is somewhat bigger to capture ET accurately.

Figure 5 on Page 11, authors indicated the ET, P-ET does not match during dry seasons. These mismatch water budget also, since model was not calibrated for flow since author assumed that ET estimation are good enough. In addition detailed description regarding "rating curves" is needed.

"Allen et al, (1998") need to be modified as "Allen et al. (1998)".

Figure 6 on Page 12, The caption of Y2 axis is needed to be modified from "Total Rainfall (mm)" to "Total Precip. (mm)". Also if authors look at the Figure 6, huge difference between blue and red lines are found.

Figure 8 on Page 14, monthly average crop coefficient (Kc) were used in this study?

Any effects of different of water stress (or other stress) in crop growth? Various stresses are simulated in estimating crop growth in SWAT modeling.

Line 13 on Page 15, For LAI simulation with SWAT, the monthly average data were used or monthly data were used in calibration period? No details were provided in this manuscript for this.

Line 5 on Page 16, One single line does not explain what authors did for manuscript calibration of irrigation component.

Lines 20-23 on Page 16, various input parameters were calibrated and alpha factor was also calibrated for accurate estimation of baseflow recession.

So far, I was able to what authors did for this study. However, If I read through the "6. Results and discussion" section, I found additional "methodologies" were described in this section. Thus I recommend authors need to reorganize this manuscript so methodologies used in this study need to be described in "Methodology" section. Only research output need to be explained in "Results and discussion" section. For this, Flow chart will be helpful for potential readers of this manuscript to understand what author did.

On Page 20, it seems author computed Ensemble ET based on ET modules and assumed this is the "Observation" and calibrated the SWAT. However, computed ET, P-ET in Figure 5 during dry/wet seasons can cause mismatches in flow estimation also. Any effects of these discrepancies in ET?

Line 11 on Page 21, I am wondering what author did not calibrate the flow because NSE for ET is only 0.5? There are various factors affecting flow and other hydrologic components. If one looks at Figure 13, we can see over/under estimation of discharge since not calibration was done.

Figure 14 on Page 25, SWAT LAI estimation ranged from 0-2 in general. However, the LAI estimation ranged from 0 to 3 using MODIS. Has crop growth module been

calibrated well enough? Is the land use cell size too big to capture the crop?

The manuscript contains too much information, I think it would be better for potential readers of this manuscript to understand what authors are trying to convey through this manuscript, if shortened.

In conclusion section, I don't see what authors are trying to say based on "objective" of this study. The title and the contents of this manuscript does not match well.

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