

Interactive comment on “SWAT use of gridded observations for simulating runoff – a Vietnam river basin study” by M. T. Vu et al.

Anonymous Referee #1

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General Comments (overall quality)

The paper presents a quite interesting work which combined gridded observation data-sets and a hydrological model to study basin hydrology. The work is original providing new results for a poorly rain-gauged catchment in Vietnam, while its novelty is the comparison analysis between six different sourced rainfall data-sets. Surely, the subject lies within the subject areas and scope of HESS. In general, the paper can be worthy of publication because methods and tools are correct and adequate and the results are useful. However, my recommendation is ‘reconsidered after major revisions’ and I explain in detail my concerns that need to be addressed by the authors in a revised version.

Before describing their work, the authors should definitely discuss and cite additional relevant studies in the introduction. Especially, they have to present how the 6 different data-sets have been used in their region in the past and what were the conclusions derived from their use (if any). As I mentioned above, the interesting point in the study is the comparison between the different rainfall datasets and the stations data as well as between the different hydrological catchment responses caused by their use with SWAT. Therefore, this point should be clearer in the introduction and emphasis should be given on what differentiates this work from other similar works.

Moreover, the good structure of the paper along with the accurate title, the complete abstract, the well produced and informative Figures and Tables and the clear results discussion with precise language use (except a few circumstances), rank the paper within good presentation quality standards.

More detailed recommendations:

Regarding the gridded rainfall data: Can the authors cite other works which have used the 6-different source data-sets (or some of them) either in their region or elsewhere? In section 4 for example, they discuss the similarities/differences between the gridded data and the measured rainfall. Are there other studies which evaluate the accuracy of the gridded rainfall data and agree or disagree with the findings of this paper?

Regarding the SWAT model and its use on basin hydrology: The authors provide some related works (all from HESS) but they do not adequately support their choice of using this model in their study. A more thorough description of SWAT capability in simulating flows is needed in the introduction. Apart from the studies mentioned, there are many SWAT papers in other journals, which focus on the quality of rainfall information (source, density, time-step etc) and its importance in SWAT hydrological predictions. Those studies could be more relevant to the work presented in this paper. A journal with such studies is for example the 'Hydrological Processes' journal, where

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the largest number of SWAT papers is published each year.

Regarding Section 3 'the SWAT modeling presentation of the catchment in Vietnam': The authors follow an appropriate approach to model their catchment. They firstly identify the most sensitive parameters and then, they calibrate the model using the auto-calibration tool. However, I think that it is always interesting for the reader to have an insight into the 'best' values identified by the algorithm, which reveal the catchment behavior. Thus, an additional table could be included summarizing the auto-calibration results (percentage or absolute changes) along with the initial values of the 11 most sensitive parameters. Also, what was the catchment division in this study? How many subbasins (and HRUs) were created? Actually, this plays an important role on the total rainfall amount falling on the basin (calculated by the model according to the proximity of each subbasin to each station). Therefore, the authors should justify their preferences and explain if the catchment division is appropriate for the rainfall data used in the study.

Specific questions (addressing individual scientific questions/issues)

In the introduction, page 10682 - lines 10-20 of the discussion paper, I can not understand why the weather generator of SWAT (a distribution code as the authors say) is the reason that interpolation is needed. As I understand, interpolation is done in this paper in order to generate rainfall values from the gridded data for the specific locations of the 3 rain-gauges. The weather generator uses statistical averages (calculated by the user and assigned to the model) of each station to produce time-series data for the same station (and only this station). Then, these data are assigned to the closest subbasins, as exactly happens when completed time-series exist. So, even if the sentence was accurate (it is not), I can not really understand how it could be connected to the following statements. The reason that interpolation is done should be very clear and a justification should be provided on why the authors follow this approach and do not directly use the original gridded data instead of using them just for transferring data to the 3 rain-gauge locations. I think that the direct use of gridded data (more locations

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– more dense information) seems to be a more rational approach to test model performance and compare it with its performance when only the measured data of the 3 stations are used.

In section 2.1 (study area) the authors say that runoff prediction is very important for the agricultural economy of the study region. In general, one could say that this is always true but can the authors better explain and support this statement? Why is surface water important? Is agriculture irrigated in the region? Precipitation is very high (up to 3000 mm/y), so is irrigation really needed? On the other hand, river floods may be of concern in the area. Explain in detail the situation in the region; especially justify why predicting rainfall-runoff is ‘extremely’ important, as written in lines 21-22 of page 10683.

Technical corrections

Some technical issues exist and also need modification.

Firstly, I think that the last 2 paragraphs of the introduction form a short summary of the whole paper. I would delete everything after line 20 of page 10682 and I would only keep a short sentence describing clearly the aim of the paper without providing details on methods and tools here.

Some references in the text do not appear in the list and vice-versa. For example, Stehr et al. at the end of the first paragraph in the introduction is not found in the list. The same happens with Silvina et al. mentioned in section 4. Also, the references of Aleksey, Gewex, Raghavan and Tukey in the list do not appear within the text. Check carefully.

In Figure 1 the catchment outlet should be indicated. Now, the reader can not easily understand where the catchment flows.

Page 10682 lines 15-18: A reference is needed.

Page 10683 line 17: Include the upstream area (km²) for the flow station. Line 24:

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correct o to oC.

Page 10684: The sentence: 'Potential evapotranspiration (PET) may be defined as the evapotranspiration from a large vegetation covered land surface with adequate moisture at all times' is useless but if included, a reference is certainly needed.

Page 10685 Line 1: use 'such as' instead of 'like' Lines 6: Use 'Daily precipitation data' instead of 'precipitation data in daily format' Lines 9-10: The average daily temperature is calculated by the model as the average of the max and min temperatures.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 10679, 2011.

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