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Hydrology and Earth System Sciences Discussions

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

Anonymous Referee #3

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General comments

This study uses five globally gridded high resolution precipitation datasets and one reanalysis dataset to drive SWAT model for streamflow simulation in a catchment over Vietnam, where station meteorological forcing data is limited. It also investigates the response of hydrologic modeling to different forcing dataset, as well as its uncertainty. This paper certainty fits the scope of Hydrology and Earth System Sciences, and the results are potentially interesting as they shed light on application of Hydrologic Response Units (HRUs)-based rainfall-runoff model in poorly gauged or ungauged regions by making use of available global gridded dataset. But I do not recommend its publication in present form, based on my several major concerns below.

Major comments:

1. The global datasets used in this study can be classified into three categories: ground truth-based, satellite-based and reanalysis data. Given that different datasets may have different spatial resolutions that affect simulation, a number of plots showing the grid cell information for each dataset, station locations and information of Hydrologic Response Units (HRUs) are quite necessary.

2. Interpolation of gridded data to three rainfall stations in section 4. I can understand the interpolation when comparing gridded data with station rainfall data, but why it is necessary in deriving forcing data for hydrologic modeling? The authors may argue that such interpolation facilitates using the calibrated parameters based on station rainfall data, but why not calibrating parameters for each gridded dataset independently without interpolation? I think the gridded datasets are not necessarily worse than the three station rainfall data in representing the spatiotemporal distribution of precipitation over the catchment, though they are biased. At least some sensitivity experiments should be carried out to make sure whether using station data calibration with interpolated gridded data is superior to calibrating SWAT by directly using gridded data or not. If the calibration is performed by using gridded data (using center point to represent each grid cell for the input of SWAT model), the statistics in Table 4 may change. And I think this method is more useful in ungauged basins where no station rainfall data (or location information) exists.

Specific comments:

3. The abstract is short of quantitative and detailed conclusions. Please include some statistics about the results, such as the range of Nash-Sutcliffe coefficients and squared correlation coefficients from streamflow simulations driven by different gridded datasets; and which gridded dataset shows the best result in Dakbla River basin, and why.

4. P10681, L9 and hereafter. Please list the references in the order of published year.

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5. P10682, L12. Since the author mentioned “rainfall distribution code (skewed distribution or mixed exponential distribution)” in the introduction, where the code is usually used to generate daily forcing data from monthly values in SWAT. However, the gridded datasets used in this study are available at least in daily time step. So my question is whether the weather generator code being used in this study. If so, I am not sure why the authors do not use the daily gridded datasets for interpolation. If not, the authors should add some clarifications since it is confusing in L12.

6. Please shorten the last three paragraphs of the introduction to avoid mentioning too specific information regarding method and data. For instance, interpolation, calibration period and validation methods etc could be moved to section 2.

7. P10684, L10. Please explain the reason for selecting Soil Conservation Service (SCS) curve number method to calculate surface runoff volume (e.g., Green & Ampt method needs sub-daily precipitation data which is not available for some gridded datasets).

8. Please clarify in section 2.2 whether there are any sub-basins in the modeling area or not.

9. P10688, L25. Is there any specific concern that the calibration period should be after the validation period? Is it because of extreme flood events during 1996-2000 that may affect calibration (Fig.3)?

10. Fig.1, please highlight the river outlet at Kontum station to make it different from other outlets since only the streamflow at Kontum is used in this study.

11. Fig.3, what does “observed station rainfall” mean? Weighted average values based on three rainfall station data? Calculating correlation or lag-correlation between rainfall and streamflow in the calibration and validation periods may help to interpret the statement in P10689, L14.

12. The labels and legends in Fig.4 are too small. What are meanings for the red dots

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in the right panels of Fig.4?

13. P10690, L1. Change “daily average” to “monthly average”.

14. Table 4, why APHRODITE is better than GPCP at daily scale, while the former is worse than the latter at monthly scale? I think incorporating monthly statistics in Table 4 (could be in brackets following the daily statistics) might be helpful for interpretation.

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