

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2020-669

Anonymous Referee #2

Referee comment on "Enhanced Watershed Modeling by Incorporating Remotely Sensed Evapotranspiration and Leaf Area Index" by Sangchul Lee et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2020-669-RC2>, 2021

Use of remotely sensed evapotranspiration and LAI to constraint hydrological models is explored in this work by Lee et al. The authors attempted to show the added values of using remote sensing products (ET and LAI) in addition to stream flow to reduce predictive uncertainty of SWAT model. The topic is relevant and interesting however the presented work has limitations which need to be addresses to be accepted for publication.

Major issues:

Apart from the issues raised by RC1, the authors didn't explain how the uncertainty of the remotely sensed ET and LAI may have affected the model calibration and validation process apart from mentioning that the ET product was well-validated against in-situ eddy covariance flux tower measurement (line 258).

3000 model runs for optimizing 27 parameters seem too low and this may have affected the number of acceptable PARs.

The manuscript failed to describe the model set up and inputs properly, for example, the ranges of precipitation, climatize variables and stream flow used in the calibration and validation of the model. How many HRUs and their size in relation to the RS-ET and RS-LAI resolutions.

Why the authors prefer to use SWAT built-in weather generator?

The validation period should not include the calibration period. This affects reliability of the model validation. How different is the model validation result if it was validated only for the period of 2013 to 2014?

It is not clear for me use of the consistence between ET and LAI at HRU-level (section 2.6). This section doesn't clearly demonstrate the added value of including the RS-LAI since the simulated ET and LAI are not compared with the RS-ET and RS-LAI. Do the authors compared the consistency of simulated ET and LAI when the model was calibrated and validated using only streamflow observations?

The manuscript also failed in addressing the limitation of the method used in their work.

Minor comments/questions

Ln 201-2015: Rephrase. It is not clear from the paragraph how the sublimation/soil evaporation is calculated.

Ln 208-209: What is base temperature?

Ln 222: Why is SWAT model built-in weather generator used? Explained how SWAT generated weather these climatic variables.

Ln 268: Provide reference for Savitzky–Golay (SG) filter approach

Ln 403 -407: How is the spatial variation of precipitation considered?

Ln 443: Fig 5 Change the vertical red lines to horizontal red lines

Ln 448: Fig. 6 – Legend for ET, correct the values of last range

Ln 489-492: What is "Modeling hydrological models" mean?