

Interactive comment on “Effect of year-to-year variability of leaf area index on variable infiltration capacity model performance and simulation of streamflow during drought” by Z. K. Tesemma et al.

Anonymous Referee #2

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The study described the variability of Leaf Area Index (LAI) on Variable Infiltration Capacity (VIC) model simulation. VIC model performance was analyzed using monthly and long-term mean monthly LAI for the period of 30 years.

This is an interesting study and premise of this article is quite promising. However, I suggest that some more effort in putting and restructuring text, readability of the figures. There are some major concerns, which in my opinion, need to be addressed before this study can be accepted for publication.

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In particular, some kind of in situ or other reliable LAI data comparison should be included rather than solely concluding from GLASS datasets. The claimed improvement is not enough. If, for some reason, this particular study area has limited data, then why were these watersheds chosen for the study? It would be easy enough to pick watersheds in the same general region that do have some flux observations.

The manuscript would be more valuable if the authors used multiple data comparisons or theory to explain the observed differences between monthly LAI and long-term mean monthly LAI. The extent of improvement of the VIC model simulation can be understood if more LAI data are compared.

As it stands, the results does not provide any explanation behind the computed outcome. Do the two products differ systematically by land cover, vegetation parameters? Long-term mean monthly LAI not improving the model output, why that might be? The authors may combine Results and discussions to demonstrate complete story of the outcomes.

The methodology is not solid. Consideration of the observed LAI fed model estimates as reference is not appropriate. Rather observed streamflow can be taken as reference to see the improvement of both monthly LAI and long-term mean monthly LAI.

The authors decided to title specified for model performance and simulation of streamflow during drought, however, the manuscript assessed with the findings for both wet and dry climate. How do you justify the conclusion of the paper to the title?

Please replace “variable infiltration capacity” with Variable Infiltration Capacity in the manuscript. Study results are not well analyzed.

Page 10519/Line 3: In most cases canopy storage (mm) in VIC is estimated as 20% of the LAI (Dickinson, 1984). Please explain.

Page 10519/Line 4: Replace “(Deardoff, 1978)” with “Deardoff, 1978”

Page 10520/Line 4: Replace a.m.s.l with above mean sea level (AMSL).

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Page 10520/Line 5/7: Replace a.m.s.l with AMSL.

Page 10522/Line 12-16: Repetition of lines (Page 4 Line 26): Delete

Page 10523/ Line 19: How vapor pressure and solar radiation are used as input in the VIC model? Please explain

Page 10529/ Line 13/14/16: Sect. 4.2.1, Sect. 4.2.2, and Sect. 4.2.3 does not need to be mentioned if not included in the manuscript. Page 15/Line 24: In terms of Nash-Sutcliffe for all catchments. Please provide explanation.

Page 10530/Line 8: The observed monthly LAI showed some bias. Please provide explanation.

Page 10532/Line 7: Replace “develop” and “connect” with “are developed” and “is connected” respectively.

Page 10533/Line 7: Replace “(Zhang at al. 2009)” with “Zhang at al. 2009”

Tables and figures:

Table 2/3: Please include units if available.

Figure 2/4/5: Increase the font size of the labels

Figure 3: What is the significance of placing VIC model parameters “X” before stream flow simulation “Qsim” and “XLAI” after Qsim for successive simulation in the schematic diagram? What is XLAI stands for?

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