Geoscientific
Model Development
Discussions

Open Access

[GMDD]

Interactive
comment

Interactive comment on "Assessment of the ParFlow-CLM CONUS 1.0 integrated hydrologic model: Evaluation of hyper-resolution water balance components across the contiguous United States" *by* Mary M. F. O'Neill et al.

Anonymous Referee #1

Authors performed a multi-criteria evaluation of a continental scale integrated hydrologic model to identify sources of bias and error in hydrologic model predictions. While many continental scale hydrologic and land surface models have been developed and validated against observations, none of them have offered such a comprehensive evaluation using multiple point based and spatially distributed observations. Furthermore, many global scale models employ empirical formulations for simulating hydrologic processes to reduce computational time. Therefore, continental scale evaluation of a phys-

[Printer-friendly version](#)

[Discussion paper](#)

ically based model like PFCONUS is new. The study is comprehensive and very well written and organized. While model simulations for a longer time frame would be desired, I am aware of the scale of simulations and analysis done by the authors and only recommend a few minor comments below:

1) Add units of variables defined for each equation.

2) Line 465- Add a label to Figure 3 to identify locations/extent of different river basins or label the basins in Figure 2.

3) Could you please add NSE metric to Figure 4

4) Line 540 – Could you please compare performance of MOD16A2 and SSEBop against FLUXNET data using the same period as PFCONUSv1?

5) Line 561- Correct subplot number. In Figure 6, final row has the same subplot number as the previous row.

6) Line 567- Correct Figure number. It should be Fig. 6

7) Line 690- Update figure number to Fig. 8d

8) For soil moisture comparison- Did you compare top layer simulated soil moisture with the ESA dataset?

9) Line 1325- ESACCI does not have mascon solution.

10) In Figure 9 – Does shaded region show standard deviation of spatially distributed soil moisture?

11) Line 824- Change Fig 7g.h to Fig 6 g.h

12) Line 841- Add "temperature"

13) Line 844-845- It is not clear. Please clarify.

14) For discussion of uncertainty in meteorological forcing using

ParFlow-CLM, I refer authors to Schreiner-McGraw and Ajami (2020, https://doi.org/10.1029/2020WR027639)

15) Figure 10- Add legend to subplots d and e

16) Figure 12 – Why the density of GHCND gauges are smaller in 12g-I compared to 12 j,k,l

Printer-friendly version

Discussion paper