

The revised version of the manuscript has been significantly improved. The authors addressed with great detail all comments made in the previous review. However, I still found some mistakes in the revised manuscript.

Line 76: The references for soil moisture and LAI assimilation are too old, some new references are provided:

*Rahman, A., Zhang, X., Houser, P., Sauer, T., Maggioni, V., 2022. Global Assimilation of Remotely Sensed Leaf Area Index: The Impact of Updating More State Variables Within a Land Surface Model. Front. Water 3, 789352. <https://doi.org/10.3389/frwa.2021.789352>*

*Bonan, B., Albergel, C., Zheng, Y., Barbu, A.L., Fairbairn, D., Munier, S., Calvet, J.-C., 2020. An ensemble square root filter for the joint assimilation of surface soil moisture and leaf area index within the Land Data Assimilation System LDAS-Monde: application over the Euro-Mediterranean region. Hydrol. Earth Syst. Sci. 24, 325–347. <https://doi.org/10.5194/hess-24-325-2020>*

*Xu, T., Chen, F., He, Xinlei, Barlage, M., Zhang, Z., Liu, S., He, Xiangping, 2021. Improve the Performance of the Noah-MP-Crop Model by Jointly Assimilating Soil Moisture and Vegetation Phenology Data. J Adv Model Earth Syst 13. <https://doi.org/10.1029/2020MS002394>*

Line 80: References are too old. The four-dimensional variational method (4DVar) assimilation method is also proposed by Bateni et al. (2014) and Xu et al. (2019).

*Bateni, S.M., Entekhabi, D., Margulis, S., Castelli, F., Kergoat, L., 2014. Coupled estimation of surface heat fluxes and vegetation dynamics from remotely sensed land surface temperature and fraction of photosynthetically active radiation. Water Resour. Res. 50, 8420–8440. <https://doi.org/10.1002/2013WR014573>*

*Xu, T., He, X., Bateni, S.M., Auligne, T., Liu, S., Xu, Z., Zhou, J., Mao, K., 2019. Mapping regional turbulent heat fluxes via variational assimilation of land surface temperature data from polar orbiting satellites. Remote Sensing of Environment 221, 444 – 461. <https://doi.org/10.1016/j.rse.2018.11.023>*

Line 91: He et al. (2021). assimilated land surface temperature and LAI observations into the 4DVar framework and improves ET and GPP estimates.

*He, Xinlei, Xu, T., Bateni, S.M., Ki, S.J., Xiao, J., Liu, S., Song, L., He, Xiangping, 2021. Estimation of Turbulent Heat Fluxes and Gross Primary Productivity by Assimilating Land Surface Temperature and Leaf Area Index. Water Res 57. <https://doi.org/10.1029/2020WR028224>*

Line 121: Delete the dot after “For instance,”. “Leaf area index” should be “LAI”.

Line 127: You need to mention the full name of CONUS.

Line 414: “spatial simulation” change to “regional simulation”.

Figure 2 and 5: “ubRMSE” change to “ubRMSD”.

Line 535: “dry-sub humid” or “sub-dry humid”? Please unify

Line 536: “bias” change to “BIAS”.

Figure 10: Remove RMSD results.

Line 576: “RMSD” change to “ubRMSD”.

Line 692: “bias” change to “BIAS”.

Line 696: “semi-humid”?

Line 733: “HeiHe drainage basin” change to “HeiHe river basin”.

The data and statistical indices in supplementary materials also need to be updated.