

Editor decision: Publish subject to minor revisions (review by editor)

We thank the Editor for their suggestions and comments. We addressed the raised points followed by our responses in bold and the quotations we propose to add to the manuscript in italics.

- I found that the fact that GPP improved at 41% of the sites is over-emphasized in the paper. For the majority of the sites a deterioration was observed. Could you modify the discussion to take this into account?

R. This is considered in the Discussion and Conclusion sections. In the Discussion, the overall degradation in GPP is more clearly stated and further illustrated with an additional figure in the Appendix, which highlights the degradation in GPP alongside observed improvements in energy fluxes. In the new version of the article, this is modified as:

“Regarding the GPP, we assess the impact by assimilating the 3-hourly CCI-LST time series over the 34 Warm Winter sites in 2018. Assimilating the 3-hourly LST data results in an overall degradation in GPP, with a median RMSD increase across sites of 7.4%. Among the studied sites, 14 out of 34 shows improvements in diverse conditions such as the grassland CH-Cha and Mediterranean ES-LS2 sites (see Fig. F1 in Appendix F). At the other sites, larger errors were obtained, with RMSD increases of up to 55.4%. For instance, while the cropland CH-Oe2 site exhibits a 36.1% improvement in LE, the RMSD in GPP is increased by 41.3% (see Fig. F2 in Appendix F). Despite the mixed results obtained on GPP, the improvement observed in the 14 sites (i.e., 41% of the sites) is a promising outcome, especially considering the challenge of enhancing model variables that are not closely linked to LST.”

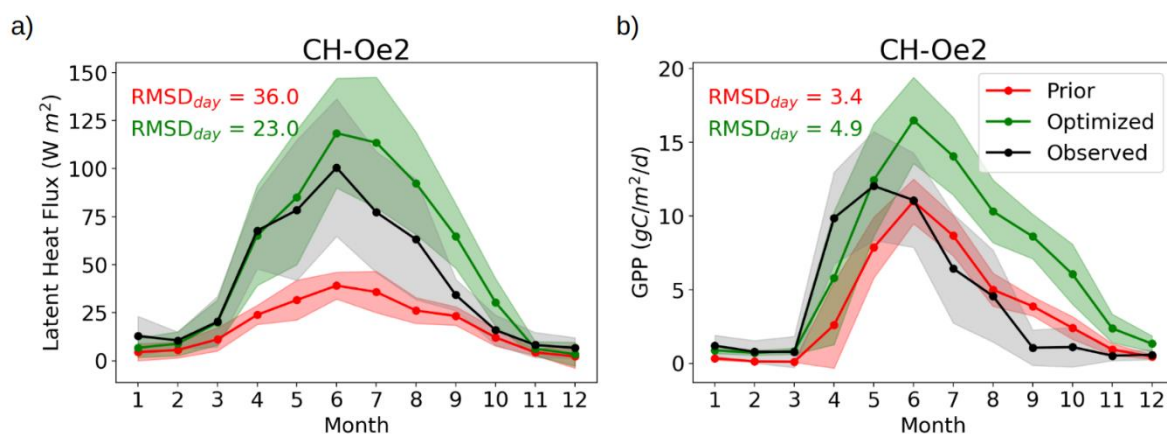


Figure F2. Annual cycle of LE (a) and GPP (b) modeled for 2018 over a cropland site (CH-Oe2) where LE is improved while GPP is degraded after assimilating CCI-LST data. The mean (dot) and standard deviation (shaded area) are represented for in situ observations (black), Prior (red) and Optimized (green) ORCHIDEE simulations. The RMSD on the daily basis (RMSD_{day}) against in situ observations is shown for Prior (red) and Optimized simulations.

In the new version of the conclusions, the improvement in GPP of 41% of the sites is removed:

“Nevertheless, our findings reveal promising outcomes, such as the clear improvement in soil moisture in the twin experiment and the enhancement of GPP at several studied sites.”

- A side remark is that it would also be interesting to see how WUE is affected by LST assimilation. But I understand that this might be beyond the scope of this paper.

R. We recognize that the impact of assimilating LST on WUE is an interesting and closely related topic, however, we agree that in this paper focused mainly on energy surface fluxes, this falls outside the scope of this study. Given the mixed results obtained on GPP, and the need to recalibrate other variables linked to the carbon cycle via the joint assimilation of “biomass” remote sensing products such as LAI or SIF data, we don’t expect relevant outcomes in the analysis of the simulated WUE. We agree that this is a very important variable to look at and that it will be done in the following work.