Geoscientific

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Discussions

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Interactive comment on "Role of vegetation in representing land surface temperature in the CHTESSEL (CY45R1) and SURFEX-ISBA (v8.1) land surface models: a case study over Iberia" *by* Miguel Nogueira et al.

Anonymous Referee #3

Received and published: 12 May 2020

In this article the authors describe the role of vegetation coverage on the quality of land surface temperature (LST) over Iberia as simulated by reanalysis from ECMWF and by offline integrations of land surface models (LSMs). This is a subject I believe is of interest for readers of Geoscientific Model Development (GMD). Although the conclusions on the impact of vegetation on LST are entirely expected and not surprising, my assessment is that this article provides useful information on the specific products and models it describes (i.e., ERA-5, ERA-Interim, CHTESSEL, SURFEX), and is thus acceptable for publication in GMD.

Major comments:

The introduction is way too long, with too many details that are not really relevant for this specific study.

Throughout the paper, root-mean-square errors (RMSE) are used together with bias. Considering that RMSE includes the effect of bias, which are not negligible in this study, the two evaluation metrics are very closely related and not independant. The authors should rather use the standard deviation of the errors (STDE) (or the unbiased RMSE as called by certain), which is independent from the bias and provides an estimation of the random component of the errors. If the authors do so, the analysis could lead to different conclusions.

Minor comments:

First paragraph of the Introduction: Why not mention the impact of vegetation on evapotranspiration?

Paragraph starting on Line 53 is too long (general comment, too long paragraphs are more difficult to read).

Line 101: Use "estimate" instead of "constrain"?

Line 107: "... land surface model"

Line 212: "Boone and Etchevers..."

Line 213: What is NIT?

Paragraph starting at line 239: be careful with the use of present and past tenses (not consistent in this paragraph, please also verify the rest of the manuscript for inconsistencies).

Line 279: Is using the median for this spatial upscaling the best way? Have you looked at other approaches?

Line 299: "... the dependence of the fraction of green vegetation coverage on the LAI..." and "may render this approximation invalid". Not sure I understand the link between the two statements.

Line 309: "... should be regarded as an additional product rather than the truth..." I would reformulate, as this is valid for every dataset.

Line 331: "... these spatial patterns were tightly related to the corresponding bias patterns". First, should use the present tense. Second, this relation between RMSE and bias is normal, since RMSE includes the effect of bias (see second item in major comments).

Line 346: "Given these results... " This has already been mentioned.

Paragraph starting at line 353: The word "overestimated" is used twice in this paragraph, suggesting an error. The authors should rather say that the values are "larger than" since they are compared with another model product, and not with observational evidence. Same comment for the word "underestimated" at Line 462.

Paragraph starting at Line 486: If you are using Fig. S2 in the main discussion of this article, it should be with the main text, not in the supplement section.

Line 513: "It is important to highlight that, once again, the roughness length change is not effective by itself..." The evidence provided in this article for that statement is anecdotal, and I don't see any reasons why changes to the roughness length is conditional to changes to the changes to other land surface parameters (in general).

Line 525: Change "robust" by "complete". Same for line 528.

Line 555: Gu et al. 2019 is not in the list of references.

Line 578: "By performily ng some additional sensitivity tests, we showed the importance of the patterns of surface roughness lengths of momentum and heat transfer (z0m and z0h) for LST simulated by LSMs". This was only briefly mentioned in the

main text, and evidently not the emphasis of this article. I don't think this should be listed as one of the main conclusions of this work.

Line 581: the roughness length cannot be "observed" (more like an estimation based on an ensemble of measurements).

Line 595 (and other parts of the paper): I think the authors are exagerating the similarity between the offline and 3D simulations. If these study was done in other seasons, the conclusions would have been very different, as evidenced in Fig. 8 which shows that the evaporation with ERA-5 is very different in earlier months from what is obtained with the offline LSM (CTR). Such differences are also found for the minimum LST in the first months of the year.

Line 597: "... hints into the role played by vegetation in land-atmosphere exchanges". This should be removed or rephrased, because this role of vegetation has been known for a very long time, and evidenced by many other studies.

Figure 6: I guess the boxes are for the 25th and 75th percentiles... should this be mentioned in the caption?

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