

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2020-371

Anonymous Referee #2

Referee comment on "Surface representation impacts on turbulent heat fluxes in the Weather Research and Forecasting (WRF) model (v.4.1.3)" by Carlos Román-Cascón et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2020-371-RC2>, 2021

GENERAL COMMENT

The authors analyze the performance of four land surface models (LSMs) in reproducing the sensible and latent heat fluxes. The model performance is assessed using sensible and latent heat fluxes from the second intensive observational period of the BLLAST campaign. The fluxes consist in area averaged values calculated using observations at five different land covers and a high resolution LC classification, CESBIO, derived from Landsat-5 data. Although the derivation of the fluxes may be subjected to considerable uncertainties, the study goes beyond the more traditional comparison against fluxes at one location. The manuscript is well written and provides a clear description of the results with a detailed characterization of the LSMs performance. The evaluation should be useful to refine the LSMs formulation in order to improve the representation of the surface fluxes. The manuscript could be accepted as it is. I provide below a few specific comments, all of the of minor character, that the author should consider to further increase the value of the manuscript.

SPECIFIC COMMENTS

1. In order to isolate the effects of the LSMs the authors can inspect the sensitivity to the initial and boundary conditions. The authors used the NCEP-FNL data to create the initial and boundary conditions and one wonders about the sensitivity of the results to this choice. This is particularly relevant for the initialization of the soil temperature and moisture in WRF. Inspecting the impact of other sources of initial and boundary conditions (e.g. ERA-5) would be a valuable addition.
2. Do the authors have any hypothesis for the different performance of CLM4 in reproducing urban fluxes (Fig. 7)?

3. In order to generalize LSMs performance for the present region, other days should be analyzed to see if results are consistent. This may be well beyond the objectives of the present study, but some discussion in this direction could be added to Section 5.