

## ***Interactive comment on “Evaluating the performance of SURFEXv5 as a new land surface scheme for the ALADINcy36 and ALARO-0 models” by R. Hamdi et al.***

**Anonymous Referee #1**

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The paper by Hamdi et al. provides a quite comprehensive set of experiment for evaluating a configuration of the SURFEXv5 to be used in ALADIN and ALARO models, considering a set of parameterizations and two difference surface data assimilation schemes. The paper is well written, with a comprehensive bibliography and it provides a valuable reference for the ALADIN consortia and interesting considerations also for the wider NWP community. The implementation of externalized land surface modeling supported by an offline land data assimilation system is of high interest for a fast-track development towards more comprehensive Earth Surface Models. Figures and Tables are overall adequate and illustrate well the results.

I therefore recommend the paper to be accepted in GMD subject to minor text revisions.  
C1299

I report hereafter a set of questions and remarks (indicated as PpageLline).

Abstract: P4055L11: Which scores? Upper-air or surface? Which variables? If details are not appropriate in the abstract then it is better to refer more generally to “forecast performance”.

P4055L13: Similar comment for the sentence reporting “Promising improvements from TEB”: on which variables?

Main text: P4056L9: remove “roughly”

P4056L17: bigger → larger

P4057L3: physic-dynamics → physics-dynamics 2 Model: description and configurations

P4060L25: “For operational application running with long time steps, the TEB scheme is not activated and the town is replaced by rocks.” Why this is done? Is TEB an explicit scheme?

P4062L13: “the” is repeated twice

P4064L4: Which FAO dataset is used for soil texture? Please specify.

P4066L20: “During daytime the three simulations compare relatively well to the observations with a rmse below  $\pm 2^{\circ}\text{C}$ ”. Not sure whether this makes sense, as RMSE is positive definite, so the use of +/- is not justified. Please explain or correct.

P4069L4: This paragraph seems too short and would benefit from further comments. What is the main reason of the marked improvement in daytime fluxes? Please add comments that can help the user to understand why and how SURFEX changes results. In Table 5 results cannot be really appreciated due to the choice of “+ 0 –” symbols, but without quantitative values of the fluxes. I tend to disagree with this choice as other scientists may benefit from having quantitative fluxes errors to compare with SURFEX-Cabauw. Please provide motivations of your choice or consider adding more

quantitative information.

P4071L23: “. . .ie. the EKF is in fact a SEKF” is not easy to read for a non-specialist. I suggest rewording the sentence as “the EKF is simplified by assuming a constant B matrix and it is therefore labeled simplified EKF or SEKF.” or similar wording.

P4073L16: Some considerations on the high values of WG2 accumulated increments on Figure 14. Typical precipitation errors (one the prominent source of error of soil moisture) do not add up to such large values of WG2 (+/- contours are exceeding 100mm). What are the possible reasons for such a large accumulated increments? Or is just the contour being misleading here?

P4074L5: What is a possible reason for the slight low-level deterioration? Which SURFEX configuration is used here (with CANOPY)? Could it be the lack of a newly analyzed land surface state (e.g. soil temperature) partially responsible for the deterioration? Are there planned tests or future investigations (e.g. with the offline land data assimilation providing new initial conditions)?

P4075L3: “The comparison for Belgium shows that the forecast scores are similar between the Extended Kalman Filter and the classical Optimal Interpolation scheme.” This sentence should maybe be reworded to account the benefits of the SEKF that open up to future extension of the land data assimilation system (e.g. using satellite remote sensing and ground-based observed precipitation).

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Interactive comment on Geosci. Model Dev. Discuss., 6, 4053, 2013.