

## ***Interactive comment on “The Interactions between Soil-Biosphere-Atmosphere (ISBA) land surface model Multi-Energy Balance (MEB) option in SURFEX – Part 2: Model evaluation for local scale forest sites” by Adrien Napoly et al.***

**Anonymous Referee #2**

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This article evaluates the performance of an improved version of ISBA (as a part of SURPLEX platform) which has been introduced in the first part of the two paper set by the authors. The main improvement to ISBA was the implementing multiple energy balance (MEB) approach and inclusion of a litter canopy layer model. The performance of the improved model in simulating energy fluxes is assessed against standard ISBA and observation over 3 forested site in France and also over 42 Fluxnet network all around the world. I think this article is well written and constructed. Evaluation of the models is done well and clearly shows that the modified version of the model specially implementing the litter model improves the heat flux estimates. Therefore, I recommend this

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article for publishing with minor changes.

Title: Change the title to: “The Interactions between Soil-Biosphere-Atmosphere land surface model with a Multi-Energy Balance (ISBA-MEB) option in SURFEXv8 - Part 2: Model evaluation for local scale forest sites”

P3. L83: Remove “from kilometer resolution” or change to “at the resolutions of kilometers”

P4. L92: What DIF stands for? Is it ISBA-DF in Boone et al. 2000? Also correct it in P7 L203.

P4. L 93: change to “ The prognostic soil temperature is represented by  $T_g$  for  $N_g$  soil layers”

P4. L 93: Change to “ soil volumetric water content and water content equivalent of frozen water”

P4. 104: Are you referring to the part 1 of this article? Boone et al. 2017a?

Correction should be done in reference section and also line 835.

P4. 108: change to “water content equivalent of snow”

P4. 118: change “models” to “simulates”

P4. 125: Change to “litter water content equivalent of ice”

P6 168: Correct T to  $T_g$

P6 191 Correction “assess”

P7 210: Ags??

P7 L 12 : Define ECOCLIMAP

P8 230: Add “leaf are index (LAI)”

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P9 L 270 : Change Rnet to Rn as it is in eq 1

P9 L 273 : Remove “is”

P9 279: Is these averages based on the results of the all models at all three sites? For which variable? SWnet?

P9 287: correct Fig 3b to Fig 3c and a,b,c to the figures

P9 294: Based on table 4, RMSE is higher than 8 Wm<sup>-2</sup> for Barbeau!

Also, is this average AE for all the models and sites? It does not seem to be correct. Check your calculations please. The values of RMSE and AE are not quite similar across the models as it is mentioned in the text.

P10. 304. Define RCA, replace “one” with “1”

P10. 317. Except with ISBA for Le Bray!

P10 327. Do you mean good results for the sensible heat flux?

P 16. Can you also include a figure for Rnet comparison?

P19 548: New paragraph “ In terms of prospective”

P19. 549: MEB or MEBL? Define SIM

Section 5.3: In world wide assessment, is it possible to report also the results with MEB? It would be interesting for readers to see how including litter layer will affect the results.

Table 1. needle? You mean needle?

Table 2: Correction required : “Mean annual temperature” and “annual rainfall “

Change the number of Fig 11 to Fig 2. Change order of Table 1 and Table 2. Try to number figures and tables in the order that they are mentioned in the text.

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Figures 4b and 5b: Hard to see the lines. Can you possible change the scale of the y axis ? also add the units in on Y-axis. Shaded are is not shown well in the figures.

Figure 9: what is the total depth of the soil for WG (better to change it to wg ). Can you specify on the figure?

Figure 10: Correct the Y-axis title to G RMSE also litter thickness should be in cm on X-axis title.

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