

Interactive comment on “Multi-layer coupling between SURFEX-TEB-V9.0 and Meso-NH-v5.3 for modelling the urban climate of high-rise cities” by Robert Schoetter et al.

Anonymous Referee #2

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The manuscript by Schoetter et al. presented a recent development of SURFEX-TEB for coupling with Meso-NH by introducing a multi-layer approach and evaluated the performance of the coupled system in Hong Kong. The manuscript is well written and easy to follow, which thus merits to be published after a minor revision.

The only moderate concern is the lack of comparison in surface energy fluxes between the new and classical schemes. Besides, a few details need to be clarified before publication, which can be found as follows:

- Section 2.3: Please discuss the implication of uniform wall surface temperature with respect to uncertainties.

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- L295: please add Kwok et al. (2020) to the reference list.
- L339: Clarify if this all goes into sensible heating.
- L357: Please clarify how zero-plane displacement is calculated as well.
- L359: Are the other four levels evenly spaced?
- L378: Please explain why this won't be viable when using larger time steps.
- L606: Please provide the prognostic equation, which can go into appendix.

Other technical comments:

- Figure 1: Better to align the basement levels of two approaches at the level: it is understandable that the new approach would apply for grids with much higher buildings.
- Equation 3: Correct the less than or equal sign to " \leq " here and other occurrences.
- L181: please use scientific notation for the numbers.
- L185: "explicited" -> "explicitly given"
- Figure 4: Use dots to represent observations for better contrast and easier legibility.
- Figure 13: correct the unit in y label to be consistent with main text.

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