

This study presents the development of a single-layer urban canopy model, based on the Town Energy Balance approach, for the PALM large-eddy simulation model, referred to as PALM-SLUrb. This model enables the PALM modeling framework to perform large-eddy simulations (LES) coupled with a single-layer urban canopy parameterization, without relying on the self-nesting strategy typically required in the PALM-4U system for simulating megacities with huge urban coverage and avoiding the complications associated with partially resolved urban features in intermediate-resolution domains.

By integrating a computationally efficient urban canopy model with a high-resolution LES system, this work helps in bridging the gap between fully resolved 3D urban canopy models, which are computationally expensive, and overly simplified urban parameterizations. As a result, it expands the applicability of the PALM modeling framework to a wider range of urban climate studies.

Although the validation presented is relatively simple, focused on experiments aimed at verifying numerical correctness of the implementations rather than realistic urban scenarios, the results demonstrate that PALM-SLUrb performs satisfactorily when compared to fully building-resolved simulations. This supports growing evidence that simplified urban canopy models, (as suggested in the intercomparison work by Lipson et al., 2023 and noted by the authors) can deliver competitive accuracy at significantly lower computational cost.

In general, the paper is well written and detailed, with all equations clearly presented, as expected for a technical journal like *GMD*. The limitations of the model (“*At the current stage, SLUrb should be considered an experimental model, meaning it has not yet undergone comprehensive testing and evaluation against a wide range of empirical data across diverse scenarios*”) are clearly stated, and the future work needed to improve the current state of PALM-SLUrb is thoroughly described. Finally, I think that all comments from the previous reviewers have been properly tackled.

I therefore recommend the manuscript, for publication, after very minor remarks.

Here are just some minor comments:

-Line 97: Please change the reference, as the implementation of the bulk urban canopy parameterization TERRA\_URB in the ICON atmospheric model system capable of running LES simulations, has now been published by Campanale et al. (2025): Campanale et al., *Investigating urban heat islands over Rome and Milan during a summer period through the TERRA\_URB parameterization in the ICON model*, Urban Climate, Volume 60, 2025, 102335. ISSN 2212-0955. <https://doi.org/10.1016/j.uclim.2025.102335>.

-in the development outlook, the authors could dedicate a few lines to how they plan to evaluate the model against observations in real city-scale experiments in future works.