

Interactive comment on “Radiative Transfer Model 3.0 integrated into the PALM model system 6.0” by Pavel Krč et al.

Anonymous Referee #2

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We would like to thank the reviewer for their valuable comments. We studied each comment carefully and we did our best to answer all the raised questions and to follow the suggestions. We follow with detailed replies to each individual comment.

This submission describes a new version of Radiative Transfer Model that integrated in PALM. The Radiative Transfer Model has been improved over previous versions, providing a more realistic representation of a wider range of urban scenarios.

From my point of view, this paper is more like a report rather than a scientific article. It Describes the model (section 1-4).

We believe that the structure and content of the manuscript, which thoroughly describes the redesigned RTM model, its implementation and the underlying principles, matches well its assigned manuscript type “Model description paper” in the journal Geoscientific Model Development, and that it fulfills the requirements for the manuscript type that are specified in https://www.geoscientific-model-development.net/about/manuscript_types.html#item1. It also fits the scope of the special issue “The PALM model system 6.0 for atmospheric and oceanic boundary-layer flows: model description and applications in urban environments” (https://gmd.copernicus.org/articles/special_issue999.html). Nevertheless, we tried to strengthen the scientific focus of the article and to reduce the amount of technical details, so the Sections 3.1 and 3.3 (as originally numbered) have been moved to Supplements. We also tried to increase the focus on the specification of the novel contributions in the manuscript.

The originality of the paper needs to be further clarified. It seems the original contribution is only shown in section 5, in which a sensitivity study has been conducted.

We believe that the main original contribution is the authorship of the described model itself and the new features of the model presented in the manuscript, as is specified in “Author contribution” (line 532). We agree that the novel methods and algorithms presented in the manuscript have not been clearly marked as such in

some parts of the paper. To correct that, we have updated the abstract, several section introductions and the conclusion to make this specification more explicit.

Beside, some points need to be clearly, in order to improve the paper further:

Line 177-179: How do it simplified the discretization of other processes? What are the other processes? Do the author make improvement here?

The simplified calculation of view factors values is described in detail in Sections 2.2.1 (legacy discretization scheme) and 2.2.5 (angular discretization scheme). The “accordance with other processes” is meant as a reference to other processes in PALM (unrelated to radiation), which are also subject to spatial discretization, i.e. which have their own discretization errors that can be reduced by increasing the resolution of the grid. This comparison is mentioned in Section 2.2.1. To make this statement more clear, we have reformulated the paragraph and added a forward reference.

Line 450-454: Why does 0.9 be chosen? Is there any reference?

We agree that the choice of the value was not explained properly. To address that, we have added a more detailed explanation of the sub-grid discretization with a reference simulation. However, because the details are rather technical, we have added the new section to the supplements (Section S2.1) instead of the main paper.