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# *Interactive comment on* "The Air-temperature Response to Green/blue-infrastructure Evaluation Tool (TARGET v1.0): an efficient and user-friendly model of city cooling" *by* Ashley M. Broadbent et al.

**Anonymous Referee #3**

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This study presents a simple urban climate numerical model aimed at being used as decision support tool by urban planners. The paper first presents the principles and equations of the model, then an evaluation of simulated surface temperatures and air temperatures against remote-sensed observations and in situ measurements, and finally an example of application for urban planning scenarios evaluation.

The model is intended to by applied for evaluating urban design choices at very fine scale but is however based on very simple approaches:



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Discussion paper

(1) The concept of urban canyon used in TARGET (without considering various building heights, street directions, street intersections, public spaces like squares etc.) is no more realistic for such spatial resolution.

(2) Some of the parameterizations are based on many simplifying assumptions, e.g.:

»Radiation calculation: it does not account for diffuse/direct partitioning of incoming radiation and applies sky-view factor approach, nor multiple radiation reflections inside the canyon. The calculation for tree canopy are not detailed so that it is not clear if the radiation transmission through foliage canopy is considered etc.

» Storage heat flux: it is calculated following an empirical formulation with constant coefficients (Eq. 5). It is not clear how they are prescribed (despite biblio references), and how they could make possible to represent the spatial heterogeneity of urban material properties.

(3) To run the surface model in offline mode, i.e. without retro action of surface processes on the low-level atmospheric conditions and without horizontal advection effect, is also a strong limitation. The spatial extend of cooling effects of green or blue infrastructures cannot be correctly captured.

The evaluation of TARGET surface temperatures on the first experimental site is good. But there is very little details about how this evaluation is done and what experimental data are used. The evaluation for the second site shows important biases of the model both for surface temperature and air temperature. This clearly highlights the limitations of the model to accurately simulate the urban climate at such a fine scale, and especially to reproduce the spatial variability of microclimate depending on urban landscape heterogeneity. The comparison to fixed stations data for air temperature shows important biases with an overestimation of air temperature in built-up environments and an underestimation in vegetated environments. One can then expect an important overestimation of the cooling effect of green infrastructures in case of greening scenarios evaluation.

In conclusion, the simplicity of the numerical tool makes it not suitable for microscale urban climate modelling, and for an accurate evaluation of urban design strategies. In the light of this finding, I do not recommend the publication of this paper.

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