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Interactive comment on "Validation of the Martilli's Urban Boundary Layer Scheme with measurements from two mid-latitude European cities" *by* R. Hamdi and G. Schayes

Anonymous Referee #2

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The manuscript presents a validation of an urban surface exchange parameterisation for mesoscale models against measurements of surface energy budgets and surface temperature from two European cities (Marseille and Basel). The paper is interesting and well written, and it contributes to improve our understanding of the modelling techniques used to represent urban areas in mesoscale models. In the following section, there are some minor remarks, mainly aiming at clarify some aspects of the simulation set-up and the implementation of the scheme. Finally I put a suggestion to improve this paper.

Comments

1) Lines 10-13 of the abstract. Strictly speaking, the Urban Heat Island phenomenon depends on the differences between urban and rural temperatures. The urban scheme estimates only urban values, so it cannot reproduce the UHI effect. I think it is better (here and everywhere UHI is mentioned), to refer to the capability of the scheme to reproduce the urban energy budget. 2) Section 3. Did the authors modify the TKE equation to account for the presence of the buildings (as it is done in Martilli et al. 2002)? 3) Equation (2). The contribution of the roof is missing. 4) Section 5.1.3, and Section 5.2.4, about latent heat fluxes. In the way they are estimated, the latent heat fluxes depend fully on the parameters of the Deardorff force-restore scheme with the Penamnn-Monteith formulation used in the vegetated fraction. Please explain simulation set up for this scheme. 5) Section 5.2.2, first paragraph. What is exactly the temperature plotted in Fig. 8 for wall and road? . Did the authors plot the average between the temperatures (2 roads, and 4 walls) for the 2 directions chosen? Please clarify. 6) Section 5.2.2, point 1. If the measurements were recorded in a street with aspect ratio 2, why the simulation was done for an aspect ratio 1.6? Would a simulation with aspect ratio 2 improve the results?

Suggestions

Authors introduce a vegetated fraction in the grid cell, where fluxes are estimated using the Deardorff and the Penmann Monteith formulations. Such calculation is done independently than the urban scheme. However, for the two location tested (Marseille and Basel) the vegetation fraction in each grid cell is relatively low, so that what is really tested is the urban part of the scheme. It would be interesting, if possible, to perform similar validation for a location with higher fraction of vegetation, in order to evaluate both parts. In particular, this could help to determine if this simple approach to account for the presence of vegetation in cities (e. g. independent calculation of the fluxes from urban and vegetated surfaces, and then average of the fluxes) is enough, or if subgrid-scale interactions between vegetated and urban fraction must be taken into

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4257, 2005.