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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Effect of explicit urban land surface representation on the simulation of the 26 July 2005 heavy rain event over Mumbai, India" *by* M. Lei et al.

Anonymous Referee #2

Received and published: 4 June 2008

The paper explores the role of urban land cover on a heavy rainfall event during India's monsoon season. The primary methodology is coupled atmosphere-land surface modeling framework using senstivity studies.

Primary COmments.

1. The authors should be careful when describing the urban rainfall effect. In recalling Rozoff et al. results, they focused on more than the UHI. They were also concerned about the effect of the urban landscape on convergence, etc (e.g. through roughness; mechanical turbulence). The point I am making is that the urban effect is probably a more accurate reflection than UHI effect. Your results even confirm this later in section

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4.2 of the paper. You should probably adjust this in the conclusions section as well.

2. In figure 6 and related discussion in the text, the authors should be a bit more specific about what TRMM product this is? Is it the TRMM MPA product (real-time or not) (e.g. Huffman et al. 2007), a gridded version of TMI only, etc. I suspect it is one of the TRMM MPA products which is a combination of TRMM, IR, and other passive microwave data. If so, this product should be properly identified in the text and other places.

3. In section 4.1, the discussion about the advection of the UHI downwind is consistent with previous studies in the literature. The authors should refer to some of the previous literature supporting this type of observation.

4. While reviewing figure 8, it became apparent to me that a useful figure or addition to this paper would be to show the urban land cover of Mumbai. This could be done as a separate figure or with urban land cover extent included under the images in figure 8. This would qualitatively show the UHI-spatial variability relative to the land cover.

5. In section 4.1, I would recommend adding another historical reference” in addition to the Niyogi et al. 2006 establishing that the UHI is maximized overnight (maybe something from Oke or Bornstein).

6. In section 4.2, you should refer to previous literature noting the enhancement of convergence due to mechanical turbulence induced by urban roughness.

7. Could the authors clarify whether 0.8 roughness is being used at ever urban grid-point or is this being subjectively adjust based on the assumptions on morphology. Also, I actually think that 0.8 is probably too low in model simulations for large urban CBDs although I know that it is commonly employed. The authors should offer some future direction about the need for improved global urban morphological datasets.

Minor grammar/English/presentation issues

a. In a few places, "the" is need before some words. Please review to capture these

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issues. If the author's first language is not English, it may be useful to have a native English speaker review the text.

b. Many of the figures were somewhat difficult to read (e.g. the value of the numbers). This may somewhat a function of the pdf rendering but please be cognizant of this fact.

c. The authors should be consistent in presentation. For example, in some figures you show the CONTROL and TEB. In some places you say, "Differences" and in other figures you say, "Changes". Just pick one and be consistent.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8773, 2008.

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Interactive Comment