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Interactive comment on "Satellite-derived land surface parameters for mesoscale modelling of the Mexico City basin" *by* B. de Foy et al.

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The authors would like to thank both referees for their detailed reading of the paper and valuable suggestions. The comments have been used to clarify the presentation and discussion of the present study.

Referee #1:

1. Regarding soil moisture, more detailed discussion was added concerning the availability and applicability of existing soil moisture fields from remote sensing. We had tried using AMSR-E values but found that more analysis was needed for this to work. Supporting citations have been added in the text.

2. Further discussion of emissivity was added including a citation comparing MODIS

values with ASTER ones (Jacob et al., 2004) suggesting that using ASTER values would not change the current problem of too high values. Their greater spatial resolution however will be useful for future work for both the emissivity and soil temperature. Using a 2.5 month average for soil temperature is justified by the fact that it is used to derive deep-soil temperature which varies on this time scale. As recommended, Fig. 16 was modified to show the skin temperature from that day at the original 1km resolution.

3. Sub-grid scale variations. The source and resolution of topography and soil types was added to the text. Consideration of sub-grid scale variation was deemed beyond the scope of this paper and was added to the discussion section. In particular, a study looking at the relative merit of changing the land surface parameters and that of considering small-scale effects was added as supporting evidence (Molders, 2003).

4. Discussion of heat budget uncertainty was reworded to emphasize the need for future sensitivity analysis and suggest current remaining sources of uncertainty. Given the paucity of data on the surface heat budget, this is the best that can be done for the current study.

5. The question of model validation with point source measurements was added to the discussion. Reference was made to the timely study of Rife et al., 2004, who analysed the ability of mesoscale models to reproduce observations in complex flow simulations.

Referee #2:

1. Sensitivity analysis was clarified in the discussion.

2. The treatment of soil moisture was better described and a figure added of this important parameter. The comment about UHI formation is fully on target and

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the text was modified to underline that the UHI is neither caused nor influenced by the deep soil temperature - which is ill-defined in these cases anyway.

3. The text was modified to remove ambiguity. The comment is indeed correct. The base case uses AVHRR landuse and the modified case uses the MODIS landuse in selecting tabulated values.

4. Comparison of wind direction was added to Fig. 18. We were reluctant to remove the FDDA and 5-layer test cases from the plot. The motivation for the study is that FDDA did not improve results for our case, and that using a more sophisticated land surface model such as NOAH over the 5-Layer model was justified by improved results. Showing the statistics for these other cases presents validation of this, as well as context for interpreting the range of model results and the extent to which the current work improves the simulation. This was clarified in the text.

Jacob, F., Petitcolin, F., Schmugge, T., Vermote, E., French, A., and Ogawa, K.: Comparison of land surface emissivity and radiometric temperature derived from MODIS and ASTER sensors, Remote Sens. Environ., 90, 137–152, 2004.

Molders, N.: On the uncertainty in mesoscale modeling caused by surface parameters, Meteorology Atmospheric Phys., 76, 119–141, 2001.

Rife, D.L., Davis, C.A., Liu, Y.B., and Warner, T.T.: Predictability of low-level winds by mesoscale meteorological models, Mon. Weather Rev., 132, 2553–2569, 2004.

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