**Atmospheric
Chemistry
and Physics
Discussions**

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

Anonymous Referee #2

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This paper shows the application of satellite products to MM5 simulation in Mexico City area. MM5 simulations with and without satellite-derived land surface parameters were compared to observations. This paper shows how satellite products can be used to adjust the default setting of the mesoscale model and yield more realistic results. This paper should be of interest to readers, especially with the upcoming additional field activities planned for 2006. Other studies (e.g., in Houston) have shown how significant improved land cover info is in meteorological simulations (and in biogenic emissions as well).

However, the influences of parameter adjustments can overlap one another. It is still unclear which adjustment makes which difference and what is the mechanism. This

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paper only shows two sensitivity simulations: one with MM5 default settings, and one with all modified surface properties, and there is no other simulation case in between. Added discussion will help clarify this important aspect of the paper.

The discussion about urban heat island (UHI) also needs claification. You use satellite-observed skin temperatures to constrain deep soil temperature using equation (1) and tested correlations (page 9872). Certainly the satellite-constrained temperature is consistent with satellite observation (Fig 8 and Fig 16). However, this data assimilation method conceals the realistic reason of UHI formation: soil moisture availability difference between urban land (like cement road) and rural are (like grassland). Deep soil temperature is at most an indirect effect, and its weak diurnal variation is not the real drive of UHI formation. Unfortunately this paper sets the soil moisture to a constant (page 9869, first paragraph). How do you determine this constant over this big area, and what is the constaned value?

The discussion in section 5.1–5.4 is mainly about the landuse type and corresponding table characteristics. In my understanding, your modified case uses surface albedo and vegetation fraction directly from satellite products, and other surface properties from satellite-derived landuse and table values. Is this correct? Is the landuse type used for estimating surface emissivity (5.4) from MM5 default data or MODIS?

Other comments:

Figures 17 and 18 are too noisy and unclear. The difference between FDDA and non-FDDA looks even greater than the base and modified case. I suggest the removal of the FDDA cases since they are not directly related to this topic, and you did not mention them in any other part of this paper. Keeping the comparison between base and modified simulations is enough. It will be more interesting if you could add comparison for wind direction, which is important for pollutant transport.

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 9861, 2005.