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Interactive comment on "Dust aerosol radiative effect and influence on urban atmospheric boundary layer" *by* L. Zhang et al.

Anonymous Referee #1

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The article studies the aerosol direct radiative forcing of the lower atmosphere. The subject itself is of particular importance for the scientific community. However, I have several major remarks and objections (listed below) that force me to reject the study in the present form.

1. The paper of Zhang (2001) is not available to a wider scientific community. Therefore, it is difficult to judge what the features and performances of the ANL model described there are. 2. WRF model has its own radiation scheme. The authors did not use it, instead they implemented LOWTRAN. Explain the reasons please. 3. I find it rather insufficient the use of single lidar profile to perform the study and draw conclusions. 4. The authors do not refer on other cloud conditions that may substantially affect direct radiation forcing and interfere the shown results. 5. The results of the

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study indicating positive forcing in the lower atmosphere during daylight contradict to recent research of e.g. Perez et al (2006), Miller et al (2004a), Miller et al (2004b) listed bellow. Limitations of the study mentioned above and the fact that dust aerosol does not interact with the atmosphere on-line during the atmospheric model integration (as done in the listed references) may impose some doubts on the validity results shown in the study. The process of dust-radiation interaction has spatial and temporal variability and this is the question if a single point lidar profile data could lead to reliable results. This interaction is also highly dependent on particle size structure of the aerosol what was not taken into account in the study. 6. The title of the paper refers on urban ABL. However, from the study it is not obvious if the urban or non-urban environments should differ. The aerosol considered in the paper is dust, not e.g. urban pollution. 7.

Perez, C., S. Nickovic, G. Pejanovic, J. M. Baldasano, and E. O zsoy (2006), Interactive dust-radiation modeling: A step to improve weather forecasts, J. Geophys. Res., 111, D16206, doi:10.1029/2005JD006717. Miller, R. L., J. Perlwitz, and I. Tegen (2004a), Feedback upon dust emission by dust radiative forcing through the planetary boundary layer, J. Geophys. Res., 109, D24209, doi:10.1029/2004JD004912. Miller, R. L., I. Tegen, and J. Perlwitz (2004b), Surface radiative forcing by soil dust aerosols and the hydrologic cycle, J. Geophys. Res., 109, D04203, doi:10.1029/2003JD004085.

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