

## ***Interactive comment on “MM5 v3.6.1 and WRF v3.2.1 model comparison of standard and surface energy variables in the development of the planetary boundary layer” by C.-S. M. Wilmot et al.***

### **Anonymous Referee #2**

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The authors compare simulation results of MM5 and WRF for a grid cell of Houston (Texas, USA). They focus on temperature and wind as well as surface energy fluxes and planetary boundary layer height.

In general, the discussed topic to study and review model development is useful to the community. However, the present paper shows several fundamental issues which require new simulations. Thus, I recommend a rejection of the paper in the current form.

Issues:

1) The model versions of both the MM5 and WRF are old. Since the development C606

of MM5 has been discontinued, why has the newest version of MM5 from 2006 not been used? Also the used WRF version is from 2010 and several newer versions are published!

Furthermore, the authors state that there is no cumulus parametrization in WRF. This is not true: [http://www2.mmm.ucar.edu/wrf/users/wrfv3.5/phys\\_references.html#CU](http://www2.mmm.ucar.edu/wrf/users/wrfv3.5/phys_references.html#CU) In particular, the Grell and Devenyi Scheme used in MM5 is available.

2) Only one grid cell is used for the evaluation. The effective resolution of RCMs is several grid cells (Grasso 2000). Please justify that only one grid cell is used. Furthermore, how do the surface parameters in the model and in reality fit together? Which area is seen by the sensors and how does this correlate to the model parameters.

3) SI or SI-derived units have to be used (e.g. acres)

4) While the definition of bias should be known to a wider audience, a short explanation of the  $r^2$  would be appropriate. Furthermore, the  $r^2$  only describes how large unsystematic errors are. Systematic errors are not visible due to the linear model. Thus, I propose to evaluate the model in terms of RMSE as well as systematic and unsystematic RMSE (Willmott 1981).

5) Is the output precision of the water vapour of MM5 really so low that other values of WRF and measurements have to be rounded?

6) Even if outgoing longwave radiation is not available as output, it can be calculate either from incoming longwave radiation, surface emissivity and temperature or from the energy balance at the surface of all other analysed fluxes!

7) What do you mean with page 2718 line 16–18? What are other sources of shortwave radiation? The following description about the "NaN" is technical and does not belong in such a scientific paper.

In particular the first two issues have to be clarified before a more detailed analysis is useful.

Grasso, L. D. The differentiation between grid spacing and resolution and their application to numerical modeling *Bulletin of the American Meteorological Society*, American Meteorological Society, 2000, 81, 579-580

Willmott, C. J. On the validation of models *Physical Geography*, 1981, 2, 184-194

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Interactive comment on *Geosci. Model Dev. Discuss.*, 7, 2705, 2014.