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# ***Interactive comment on “The role of urban boundary layer investigated by high resolution models and ground based observations in Rome area: a step for understanding parameterizations potentialities” by E. Pichelli et al.***

## **Anonymous Referee #2**

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The manuscript presents a comparison between observations from SODAR, LIDAR and sonic anemometer of the PBL structure in one point located at the center of Rome city, and the results obtained from numerical simulations using the WRF model. A set of configurations of PBL (YSU and MJY), surface and UCM parameterizations are considered for three different meteorological conditions. In addition, a comparison of the WRF results with observations from standard automatic weather stations located around Rome is performed. Results show that the model in general overestimates the horizontal wind speed in all three meteorological regimes considered, but especially

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when large scale conditions favor a moderate flow. Large discrepancies also exist between WRF results for vertical motions inside the PBL and SODAR measurements over Rome, in particular for descending motions. The overestimation of simulated horizontal winds and maximum temperatures is also evident in the comparison of the model results with the measurements of the suburban area stations. Although the current version of the paper has improved the organization compared to the first version, I think that it needs important improvements before being accepted for publication. Major comments: a) As it has been previously indicated there are important differences between observations and the results obtained with the WRF configurations considered. It seems that the results are not good enough. Some other configurations of the model should be considered. b) I understand that the main aim of the paper is to look for an optimization of the WRF model configuration for operational purposes over the Rome area (pag 5300, lines 5-9). In the conclusions, no reference to what configuration is the best and good enough to be considered for operational purposes. In addition, when a model configuration is selected for operational/automatic use (which normally represents the use of the same configuration for at least an extended period of time and for very different meteorological conditions), it has been normally demonstrated that the configuration produces the smaller errors in all the variables and in many points of the domain. The authors only compare the model results with the observations at one point inside the urban area of Rome. It seems poor. c) The authors indicate that the three considered meteorological situations present weak or moderate advection. My question is: advection of what? Temperature? Momentum? Vorticity? Perhaps it should be interesting to show the large scale situation (charts at surface and 500 hPa) for the most discussed case. It can help to understand the give an explanation about the flux. For the other two situations a clearer description can help to focus the discussion.

Minor comments: a) Pag 5298 line 25: motions  $\longrightarrow$  processes? b) Add some reference to the sentence included in pag 5299 lines 15-17. c) The English is not my mother language but I suggest to start a new paragraph with the sentence of the page

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5300 line 5: “In this study . . . . .”. Also I would write: “ In the present study two PBL parameterizations included in the WRF model. . . . .” d) Pg 5302 line 7: Add reference to the Cassegrain configuration e) Pag 5306 line13: associated to —→ associated with f) Pag 5307 line 4: add resolution of the 3th domain g) Pag 5318 line 18: there is only station -→ there is only one station

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 5297, 2013.

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