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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evaluation of very high-resolution simulations with thenon-hydrostatic numerical weather prediction model Lokalmodell for urban airpollution episodes in Helsinki, Oslo and Valencia" *by* B. Fay and L. Neunhäuserer

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The paper reports on the use of the LM model to predict meteorological conditions affecting episodes in Helsinki, Oslo and Valencia. The analyses of urban episodes has been possible as a result of increasing the spatial resolution of the LM model down to nearly 1kmx1km. Analysis and interpretation of winter time episodes is presented.

Cases of suspended dust and summer time photochemical episodes have also been analysed. The performance of the model has been discussed in terms of its underlying schemes and the predictions of a range of meteorological parameters have been compared to available data. The paper attempts at identifying the main reasons for the disagreement observed between predictions and measurements.

1) Does the paper address relevant scientific questions within the scope of ACP? Yes, with emphasis on improvement of NWP models

2) Does the paper present novel concepts, ideas, tools, or data? The paper employs an existing model but in a challenging area of urban simulations. It is now well recognised that NWP offer more detailed description of urban meteorology than previously used simpler models but require significant modification to account for urban features.

3) Are substantial conclusions reached? The paper mainly identifies the areas where the LM needs urbanising and improvement to simulate meteorology during stable conditions. The authors should also briefly indicate (perhaps in the conclusions) what approach they will use to undertake such improvements to LM.

4) Are the scientific methods and assumptions valid and clearly outlined? The methodology is clearly explained as are the settings and configurations of the model runs.

5) Are the results sufficient to support the interpretations and conclusions? The paper compares the model predictions for a range of parameters (temperature, wind speed, vertical profiles of temp and u) with measured data. The data seems sufficient on which to base the stated conclusions.

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Most of the model settings are given however it will be out of scope to state all details.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? This is the main weak point of the paper. Much of the

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references are based on FUMAPEX work or European papers - the paper could be strengthened from a wider literature review. It will enable the authors to indicate their contribution in a more international context. The authors also do not adequately compare their approach with other similar models. Only a brief reference is made to MM5 and RAMS - it would help if they discussed such models in this context and if similar applications had been reported in the literature. For example several studies are reporting on urbanising MM5. Would such an approach be suitable for LM?

8) Does the title clearly reflect the contents of the paper? Yes, but I am not sure if the word 'very' is needed in the title.

9) Does the abstract provide a concise and complete summary? The abstract is adequate and captures the main points of the work.

10) Is the overall presentation well structured and clear? The paper is well structured but a little long.

11) Is the language fluent and precise? Yes

12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? On the whole yes (There are no equations).

13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? The axis labels for Figures 12 and 13 are not clear. Also Figure 13 is not clear.

14) Are the number and quality of references appropriate? - see point 7. The paper would benefit from a wider literature review to cover work outside the FUMAPEX project and outside Europe (eg USA).

15) Is the amount and quality of supplementary material appropriate? Yes.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 8233, 2005.