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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Spatial variation of modelled and measured NO, NO_2 and O_3 concentrations in the polluted urban landscape – relation to meteorology during the Göte-2005 campaign" *by* J. Klingberg et al.

Anonymous Referee #1

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Review of Spatial variation of modeled and measured NO, NO2 and O3 concentrations in the polluted urban landscape; relation to meteorology during the Gote-2005 campaign; by Klingberg et al for Atmos. Chem. Phys. Discuss.

This manuscript discusses NO, NO2 and O3 measurements from an urban network of 8 to 10 stations during a one month sampling campaign. Comparison is made to an Eulerian model. Unfortunately, I do not believe the subject matter is suitable for ACP nor are the measurements and calculations up to current research standards. Perhaps this manuscript is more relevant within the air pollution monitoring community for the

specific things it says about Gothenberg.

General comments

Four objectives are stated on pages 2085-2086.

1. Describe the general air pollutant and meteorological situation in Gothenburg. Manuscript provides a sense of average O3, NO, NO2, temperature and RH. In the absence of a more detailed data set with many more species this is not likely to be of general interest.

2. Evaluate how the NO, NO2, and O3 concentrations varied in the urban atmosphere. The finding that there are large variations with higher concentrations of NOx and more O3 titration near roads is an obvious result.

3. Investigate how NO2 concentrations varied with wind speed. The finding that dilution and mixing effect NO2 is not quantified in a way that would make it useful in understanding mechanisms or predicting what would happen somewhere else. For example, what are the relevant time scales for boundary layer mixing, establishment of a photostationary state, and for advection of cleaner air from outside the region? An explanation is given for the results but no real analysis to substantiate conclusions.

4. Compare the observations with results from the TAPM model. There is virtually no information provided on the chemical mechanism. Some of the references are not readily available. The most relevant chemistry are the photostationary state reactions NO+O3 = NO2 and NO2 + hv = O3 so I am assuming that they are included. Hydrocarbon emissions are ignored because of short time scales. Background hydrocarbons are included as smog reactivity, a quantity that is not explained and will be unknown to many readers. This does not make sense to me as background hydrocarbon reactivity will be orders of magnitude lower than the near road values.

The instrumentation used for this study is not adequate. It is also not described in enough detail. I do not know if NO and NO2 are true measurements or, as is the case

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with many monitoring instruments, the NO2 measurement is related to NOy. Time resolution is not mentioned. Graphs have hourly values of NO and NO2. I was taken back when I read on page 2095 that 'the measurements only had a time resolution of five days'. Five day measurements agree with the number of points in Fig. 5 but Fig. 4 shows hourly NO and NO2 for 3 sites which I now realize must be the sites not using passive diffusion samplers. j(NO2) is needed. There is no mention of how this is determined.

One cannot look for meaningful trends or correlations in the NO, NO2, O3 system relying on five day average samples.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 2081, 2009.