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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol modelling in Europe with a focus on Switzerland during summer and winter episodes" *by* S. Aksoyoglu et al.

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Thank you for the comments. Our replies are given below.

1-We would like to further explain the meteorological fields used in this study because it was probably not very clear. The sensitivity studies with decreased and increased air temperatures were carried out to determine how much they would affect the model results (mainly aerosols) in order to have some idea about the possible causes for discrepancies when comparing the final results with measurements. These studies showed that the change in temperature mainly affects particulate nitrate. We didn't change the temperature fields for our air quality simulations. The MM5 temperature

fields were given directly as input to the CAMx model.

2-We are aware that wind speeds are related to other variables. However, comparison of meteorological variables with measurements indicated that in general the performance of MM5 for humidity, solar irradiance, temperature, wind direction and precipitation was satisfactory. On the other hand, wind speeds were overestimated during the low-wind conditions. Since our focus is on the photochemical model, we would like to give realistic input data to CAMx in order to get a reasonable model performance. Too high wind speeds would change the location and concentrations of pollutants in the model domain significantly. Therefore we calibrated the MM5 wind speeds with measurements -only during the low-wind periods. In all simulations, the original MM5 fields were used as input for CAMx model except wind speeds -which were modified only in the low-wind periods. Only horizontal wind fields were transferred to CAMx where the vertical component is calculated internally, the mass conservation is fulfilled. We tried to clarify it in the revised manuscript.

3-The reason we compared model results with measurements in Switzerland was the higher resolution of the Swiss domain (3km x 3km) as well as the availability of detailed aerosol measurements. However, we agreed with the referee's comment and added three supplementary figures showing comparison of PM2.5 measurements at Harwell (UK) with the modelled PM2.5 in the European domain for each period and inserted a paragraph in section 3.1. One has to keep in mind that the European domain has a resolution of 27km x 27km.

Page 10801, line 4.

There is probably a misunderstanding about the exceedances of PM10. It is true that the air quality standard for annual average is 20 microg/m3 in Switzerland. However, the modelled PM2.5 concentrations shown in Figures 10-12 are monthly averages (for January and June). The highest concentrations predicted in Switzerland are in January 2006 and they approach 30 microg/m3 (monthly average) (Figure 10). In

June, the highest average concentration is 13 microg/m3 (Figure 12). Annual averages are much lower than averages in winter. On the other hand, time series shown in Figure 14, are hourly values for PM10 measurements. The highest PM10 levels were measured in January 2006 and air quality standard for daily average that is 50 microg/m3 is exceeded on some days.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/11/C5810/2011/acpd-11-C5810-2011-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 10799, 2011.

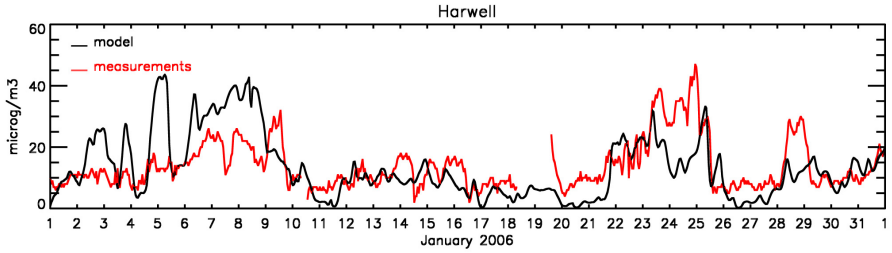

Fig. 1. Comparison of modelled PM2.5 (27 km resolution) with measurements at Harwell (UK) in January 2006.

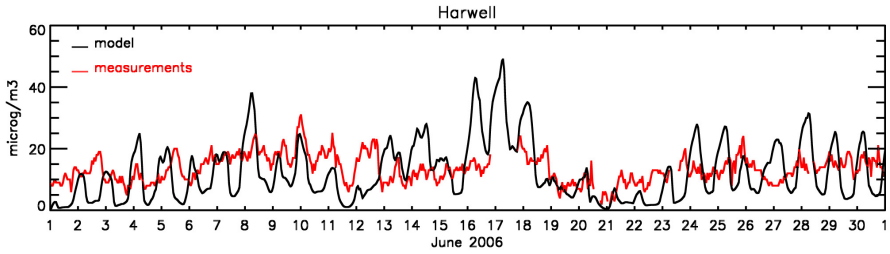

Fig. 2. Comparison of modelled PM2.5 (27 km resolution) with measurements at Harwell (UK) in June 2006.

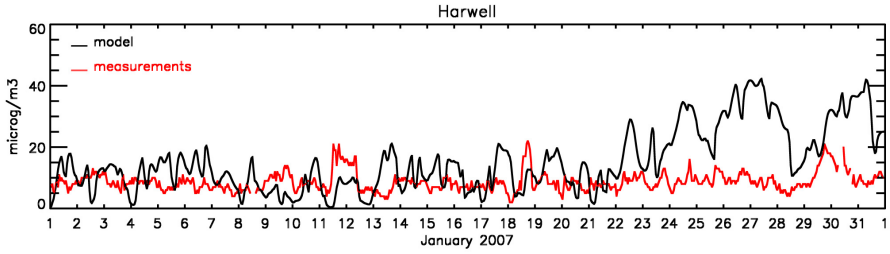

Fig. 3. Comparison of modelled PM2.5 (27 km resolution) with measurements at Harwell (UK) in January 2007.