

## ***Interactive comment on “Global model simulations of air pollution during the 2003 European heat wave” by C. Ordóñez et al.***

**Anonymous Referee #1**

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Suggestions for corrections/improvements.

This paper deals with modelling of the heat wave in Europe, August 2003. 3 global models are used. As the authors point out there are already several papers already published dealing with modelling of this episode. As such this paper does not bring in many new points regarding this episode. The paper compares the performance of several models, including also some sensitivity studies.

In the conclusions the authors say: "The meteorological and photochemical modelling of such an extreme episode requires higher spatial resolution and finer temporally resolved emission data." Based on the sensitivity runs the authors conclude that removing emissions outside Europe has little effects on concentrations in the European boundary layer. Based on these conclusions in the paper it seems likely that a set

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of (fine scale) regional models would be more suited for this study. The authors should give a motivation for using global models in this study. I believe that within GEMS/MACC there is a publication in preparation looking at the 2003 heat wave with regional models? If so, this could be mentioned.

An improved representation of the Portuguese wildfires from GFED are also available from <http://www.ess.uci.edu/~jranders/> with 8 days emissions. It is a pity that this has not been used instead of the monthly data.

Some of the figure panels are very small (as an example Figure 9, first page). The Figures should be enlarged. Given that some white space is removed they should still fit into one page.

More detailed comments:

Page 16857 lines 7 - 10: Reference also to AIRBASE?

Page 16857 lines 15 - 21: Some more explanation is needed here. Are you describing two different airmasses here? Is it so that you get high global radiation in Switzerland because you are not affected by forest fires, whereas further west the optical thickness is affected by these fires? If so the reason for the ozone events in Switzerland and further west must be somewhat different. Under certain conditions the increase in optical depth will give higher actinic flux, and thereby affect ozone production, but I could only find two (relatively old) reference for this from Science and JGR.

@ARTICLE{Dickerson1997, AUTHOR = "R. R. Dickerson and S. Kondragunta and G. Stenchikov and K. L. Civerolo and B. G. Doddridge and B. N. Holben", TITLE = "{The impact of aerosols on solar ultraviolet radiation and photochemical smog}", JOURNAL = Science, VOLUME = "278", YEAR = "1997", PAGES = "827–830"}

Citation: Jacobson, M. Z. (1998), Studying the effects of aerosols on vertical photolysis rate coefficient and temperature profiles over an urban airshed, J. Geophys. Res., 103(D9), 10,593-10,604.

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Page 16875 Lines 5 - 9: Ozone above Paris most likely affected by ozone titration effects due to large emissions from larger Paris.

Page 16876, Effects of horizontal resolution and Figure 9: The authors give the impression that the increase in resolution results in an increase in pollutant levels everywhere. I would expect that there will also be areas where concentrations decrease. To illustrate this the panels on the right hand side could be exchanged with difference plots. If these figures become hard to read, this effect should be mentioned in the text.

Pages 16877 and 16878 Emissions: For the TM5-HWEE and in particular the TM5-HWEN model runs there are no information on what sort of spin-up times are used.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 16853, 2009.

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