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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Radiative forcing by aerosols as derived from the AeroCom present-day and pre-industrial simulations" *by* M. Schulz et al.

Anonymous Referee #2

Received and published: 2 August 2006

This paper compares model predictions of the direct radiative forcing of aerosols from models that were run with the same emissions. It was found that the differences between these models and models that use their own emissions are not that different. Thus, emissions don't seem to matter too much for inter-model differences. Instead differences in forcing efficiencies dominate. This topic is highly relevant and the paper is generally well written. Thus I recommend publication after the following minor items have been addressed.

1. Abstract: Please change -0.2 W m-2 to -0.18 W m-2 and +/- 0.2 to +/- 0.16 because otherwise the TOA, atmospheric and surface forcings do not add up.

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2. P. 5099, line 3: In addition to non-linear aerosol dynamics, also aerosol impacts on the large-scale circulation add to the aerosol effect that you diagnose as the difference between 1750 and 2000.

3. P. 5099, line 26: What does “usual” mean? Their own emissions or emissions for 2000?

4. P. 5100, line 6: Why regrid everything to a higher resolution than any single model has? This suggests a higher degree of spatial information than you have from the models. I suggest to use either an average horizontal resolution or to take the coarsest one.

5. P. 5102, line 9: Why does the aerosol component RF calculation methodology differ for individual components?

6. P. 5102, line 21: Could you cite a few relevant papers for the impact of non-linear effects of aerosol mixing on RF?

7. P. 5104, line 12: What do you mean by “from individual model results”, from different versions of the same model?

8. P. 5105, lines 6/7: What is the implication of the higher uncertainty related to forcing efficiency per AOD? Does it mean that optical properties differ more between models? If so, please add that.

9. P. 5106, line 22: Is it realistic for models to predict a shorter BC lifetime than POM lifetime? In any case, please comment on that.

10. P. 5106, line 28: Replace “suggested by” with “suggested that BCPOM in”

11. P. 5108, lines 9/10: Why does a high positive BCPOM imply a relatively large negative POM and positive BC, couldn’t both be small as well?

12. P. 5109, line 18: Add “all-sky” before RF

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6, S2205–S2207, 2006

Interactive Comment

13. P. 5110, line 10: Why do you single out model LOA?

14. P. 5112, first para: Please explain what causes the differences between LSCE and LOA instead of just describing them.

15. P. 5113, line 5: I don't understand why the GISS model has a negative all-sky forcing if the sulfate forcing is small and the cloudy-sky forcing is positive. Please explain.

16. P. 5115: Are you sure that the compensation between small sulfate production rates and high aerosol extinction coefficients results from differences in transport and thus hygroscopic growth and not from tuning?

17. P. 5115: This paragraph should be restructured so that the sulfate aspects is discussed first and then POM or vice versa but presently it switches back and forth between these different species and makes it hard to read.

18. P. 5115: Where the question marks behind MPI_HAM and GISS intended or are you going to answer them?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 5095, 2006.