Atmos. Chem. Phys. Discuss., 8, S867–S869, 2008
www.atmos-chem-phys-discuss.net/8/S867/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simulation of aerosol optical properties over Europe with a 3-Dsize-resolved aerosol model: comparisons with AERONET data" *by* M. Tombette et al.

Anonymous Referee #2

Received and published: 19 March 2008

This type of work, where modeled and measured AOT and SSA are compared, using the recently developed Polyphemus air quality modeling system is one (but only one) essential part of any CTM/aerosol code validation excercise. Thus I find it frustrating that the validation excercise is not presented all in one paper.

The CTM Polair 3D, together with the aerosol module SIREAM have been already presented in earlier papers and technical notes. If I understand correctly, in this manuscript the authors analyse (but now for AOT and SSA) the same simulations already done in their technical note in ACP 7, 5479-5487 by Mallet et al. and in their paper in Atm. Env. 41, 6116-6131 by Sartelet et al.

Now these papers with different aspects of code validation and analysis are appearing almost simultaneously, and in various journals. Thus it is very hard to judge the value of this manuscript without a lot of research into the details of the other papers.

As such, I cannot support publication in ACP. The main finding of the manuscript seems to be that the model predicts fairly well the AODs from different AERONET-stations. Many similar papers have been presented, using quite similar CTM-studies - and thus it is hard to find much use of the results (in addition to having one more 'validation paper' for the code itself).

However, since the work itself seems to be development towards a pretty nice air quality modeling system, I suggest choosing between two options: 1. Condense this manuscript to another shorter technical note, a 'part 2' of the Mallet et al. - paper in ACP. In the present form, the section 2 is much too detailed, including basic 'text book' definitions of basic optical quantities. Please list only novelties of your method and the rest can be left out and replaced with suitable references. 2. Expand the analysis significantly to find out sensitivity of predicted AOD and SSA to the many assumptions in and the specific properties of the model. Now, the sensitivity study on AOT, SSA and extinction coefficients is done only for varying the assumptions regarding particle structure and mixing state. The analysis would become much more valuable if e.g. sensitivities caused by the size distribution representation would be estimated. With this I mean, for example, how changing the number of bins, or, switching to a modal model (e.g. MAM, which the authors present in another paper) would affect the results. At present, using only 5 bins probably brings a lot of uncertainty to the analysis? Furthermore, some additional work on the sensitivities of the studied optical properties on the desriptions of the phyical processes would be interesting, e.g., does neglecting nucleation have any effect. Also, combining the findings of the proposed comparisons with Lidar-measurements would be a good idea. Since AOT is a column integrated quantity, the current comparisons are not a very thorough quality check of the CTM-model performance.

ACPD

8, S867–S869, 2008

Interactive Comment

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1321, 2008.

ACPD

8, S867–S869, 2008

Interactive Comment