

Interactive comment on “Simulating aerosol microphysics with the ECHAM/MADE GCM – Part II: Results from a first multiannual integration” by A. Lauer and J. Hendricks

Anonymous Referee #1

Received and published: 5 October 2006

This paper presents comprehensive results of multiple year global simulations from ECHAM4/MADE where the submicron aerosol size and number concentration are prognostic variables. This is a significant advance compared to most global climate model representation of aerosols. The paper is clearly written and should be published after the authors address the following issues.

1. The paper is too long because it presents detailed results that are not really new. Much of the paper's results on the aerosol mass distribution agree with many previous works and should be substantially shortened. The paper reads more like a technical report rather than a concise journal article that shows something novel. This is mainly

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

an editorial decision for ACPD, but I would hope that this electronic journal does not want to encourage papers that are too verbose and take too long to get to the scientific point. This paper should have focused on the size and number concentration effects and results alone.

2. I would insist that the word “submicrometer” or “submicron” be inserted in the title in between the words “Simulating” and “aerosol”. It would then correctly characterize what this paper is focusing on.

3. Page 7521, Line 7. The statement that “the European Council now obliges limit values” is rather vague and poorly written. Are the guidelines voluntary or mandatory? Please reword this sentence.

4. Page 7521, Line 8. Remove “solely” and insert “alone” after “measurements”.

5. Page 7523, Line 16. Feedbacks are neglected from MADE to the model dynamics. Although discussion is referred to Part 1, I believe this is such a major concern that an additional sentence is needed here explaining why we should believe a model that will not allow radiative and cloud feedbacks via the aerosol size and number concentration effects. Does this mean that the improved aerosol size and numbers will have no effect on improving the cloud activation and cloud droplet concentrations? This would be a serious omission.

6. Page 7524, Line 13. Delete “also”.

7. Page 7524, Line 17. “expenses” should be “expense”.

8. Page 7525, Line 4. Replace “kind of” with “a”.

9. Page 7526, Line 7. Replace “as” with “than”.

10. Page 7528, Line 28. Insert “us” between “allows” and “to omit”.

11. Page 7538, Line 22. Insert “The” before “first steps”.

12. Page 7539, Line 14. Shouldn't the PBL be mentioned of the most important source of Aitken particles near the surface?

13. Page 7543, Line 6. Please justify why you restricted the analysis to only sulfate.

14. Page 7543, Line 16. This statement is the reason for my point 12 above.

15. Page 7543. Are both the stratiform and convectively parameterized clouds removing aerosol number in a consistent way? Many models do not do a proper evaluation of aerosol interacts in deep convection. What is the situation here?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7519, 2006.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper