

***Interactive comment on* “The effect of harmonized emissions on aerosol properties in global models – an AeroCom experiment” by C. Textor et al.**

Anonymous Referee #2

Received and published: 30 March 2007

This paper is one of the AEROCOM model intercomparison exercise analysis papers. It goes a step forward compared to the earlier paper by Textor et al. (2006) and compares results with “unified” emissions (expB). It is a nicely written paper - easy to read. As part of the AEROCOM papers, this one is worth publication in ACP. It requires, however, some improvements in particular adding numbers to the conclusions (differences and impacts).

1. Some sources of diversities between models are listed in section 3.4 (page 1707, lines 14-16) which is the most important?
2. What do the authors mean with ‘small impact’ (page 1701, line 6)? How much %?
3. Be more precise in “ambiguities in the implementation” (page 1701, line 14)

4. Why there is no significant improvement from expA to expB? Can the authors identify the main reason /critical process of discrepancies and provide relative contribution to the total diversity of the models?

5. How the 20% model diversity in the load to dry aerosol (figure 1) is translated to optical properties, aerosol optical depth?

6. There is a number of choices in measures for the model intercomparison that have been discussed in the earlier paper, like the use of LoadAltF and LoadPolF (given in Tables 1-6 but never defined in the present paper) that need to be justified briefly in the present paper (end of section 3.3), in particular when taking into account that they refer to less than 50% of the aerosol mass. The captions of the tables have to be improved to define the quantities given in the tables.

7. In Section 2 (last sentence), the authors need to provide some basic information on how the simulations of the 4 models providing 5-year averages are done, in terms of emissions and meteorological data. This has to be given in the present paper to allow evaluation of the results.

8. Page 1710, lines 23-25: What has been improved from ExpA to expB? Figure 1 shows some improvements that can be quantified and certainly Figure's 3 data can provide additional input to this question.

9. Also in Figures 2 and 3b I miss the AER of the models: How the residence time of the total aerosol changes from one experiment to the other? And what agreement do models have for expB?

10. There is also a small number of typos that can be corrected with careful re-reading like those, page 1705, line 5; page1706, line 26; page 1708, line 5; page 1709, line 14 and line18.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 1699, 2007.

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