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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The impact of dust on sulfate aerosol, CN and CCN during an East Asian dust storm" *by* P. T. Manktelow et al.

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1. The uptake coefficients were determined using the BET surface area of the dust particles. The BET surface area accounts for the fact that dust particles have internal pores and surface sites upon which gas particles will adsorb, and so is the most appropriate way to represent the total surface area of the dust particle for surface chemical reactions.

2. The referee is right that monthly mean low cloud cover will influence the extent of cloud processing, but we agree the effect is likely to be small in the dry conditions we mostly analyse. We note however that the wet removal of aerosol is calculated in frontal and convective precipitation, which are diagnosed every 6 hours using ECMWF fields, so the monthly means are not used for these processes.

3. We have made the correction of L to LAI

4. Equation 5 taken is from:

   Grini, A., Zender C. S., and Colarco P. R.: Saltation Sandblasting be- havior during mineral dust aerosol production, Geophys. Res. Lett., 29 (1868) doi:10.1029/2002GL015,248, 2002.

   This is now cited.

5. Sentence now finished after uptake coefficient.

6. Flight 5 has been removed from Figure 1.

7. A box has been added to show the region of the flights

8. Correction made to dN(Dp)

9. This is a very good point. We have added a sentence to the text: "A further uncertainty that we do not attempt to evaluate here is the effect of errors in the deposition rate between dust emission and interception. If modeled dust deposition rates were in error then the dust could have a larger or smaller impact on sulfate than we estimate here."

10. Table 5/Figure 2: 40% of fine SO4 values measured in flight 8 are less than 1 and so not visible in plot. The statistical results are valid. We also note in Table 5: Flight 7 P2 should be 80 (87) and P100 should be 100 (100).

11. We have double checked the skill score values and no errors were found in calculation for flight 7.

12. We have added the references. They are now:

ACPD

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Tang, Y., Carmichael, G. R., Kurata, G., Uno, I., and Weber, R.J: Impacts of dust on regional tropospheric chemistry during the ACE-Asia experiment: A model study with observations, J. Geophys. Res., 109, D19S21, doi:10.1029/2003JD003,806, 2004a.

Tang, Y., Carmichael, G. R., Seinfeld, J. H., Dabdub, D., and Weber, R. J.: Three dimensional simulations of inorganic aerosol distributions in east Asia during spring 2001, J. Geophys. Res., 109, D19S23, doi:10.1029/2003JD004201, 2004b.

Page 14774, Line 17: Should be Tang (2004b) Page 14775, Line 21: Should be Tang (2004b) Page 14783, Line 14: Should be Tang (2004a)

13. Added on line 8 '(assuming no sulfate deposition)' after 'coarse particle sulfate'.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14771, 2009.