**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "The comprehensive model system COSMO-ART – radiative impact of aerosol on the state of the atmosphere on the regional scale" *by* B. Vogel et al.

Anonymous Referee #1

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1. The abstract should present more clearly the result you found on the 'aerosol feedback' as in W/m2 and/or as temperature change (the difference of the R and the F simulations)

2. Throughout the manuscript, the use of the term 'aerosol density' should be 'aerosol concentration', if in deed you mean concentration

3. For section 2.1, you should add why there are two mode (i and j) for each type (f and c). What is the differences, e.g. mean diameter of the modes?

4. For section 2.1, it is unclear which modes the primary particle emissions, e.g. parimary sulfate, primary organics, would go into – or simply not accounted for.

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5. In equation (14) and (15), please check if the subscript for the coagulation term should be of soot (s), not sulfate.

6. Section 2.5.1, please clarify more about emisisons of PM10, PM2.5, and PM1 – when these are emitted, what compositions do these emissions have, e.g. sulfate, organics.

7. Section 2.5.2, please do subscript for Dp (diameter)

8. Section 3.1 (page 14501 line 3), the point about using clean air at the boundaries of your model seems to weaken the validity of your simulation. Can you substantiate why there is no better alternative, e.g. using more realistic information?

9. Page 14505 LIne 23, the point about emissions being constant from day to day should be stated clearly in the Emissions section.

10. page 14486 Line2, the sentence 'online coupled means that only one grid and identical physical parameterizations are used' – can you put it differently. This is not very clear.

11. page 14488 line 22, please give reference for the parameterisation of the binary nucleation scheme used here.

12. page 14488 line 23, can you give a few words or 1-sentence description rather than reader have to go read Schell 2001?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14483, 2009.