Atmos. Chem. Phys. Discuss., 8, S12324–S12325, 2009
www.atmos-chem-phys-discuss.net/8/S12324/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Inverse modeling and mapping US air quality influences of inorganic $PM_{2.5}$ precursor emissions using the adjoint of GEOS-Chem" *by* D. K. Henze et al.

Anonymous Referee #3

Received and published: 20 July 2009

In this study, the authors present a study on the influences of inorganic PM2.5 sources on U.S. aerosol concentrations, using a novel combination of inverse modeling and sensitivity analysis. This is an important and very interesting study, and I recommend publication provided that the following issues are addressed:

1. I would have liked to see a robustness analysis of the converged solution; this can be done by repeating the inversion with different initial conditions.

2. The representational error is assumed to be 30%, and is used to characterize the spatial (subgrid) heterogeneity in each grid cell. How was this value selected? Does it (and should it) also account for temporal variability as well?

3. The authors use a fairly simple inorganic PM model in their simulations; it is well known that other inorganic species (such as chloride, sodium and crustals such as magnesium, calcium and potassium) can have an important impact on the aerosol thermodynamics. Could the authors comment the conditions (and perhaps locations) for which the neglected species will have an important impact on the adjoint sensitivity calculations?

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 15031, 2008.

ACPD

8, S12324–S12325, 2009

Interactive Comment