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Comment

## ***Interactive comment on “Inverse modeling and mapping US air quality influences of inorganic PM<sub>2.5</sub> precursor emissions using the adjoint of GEOS-Chem” by D. K. Henze et al.***

**D. K. Henze et al.**

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We appreciate the comments from the Editor.

1. *Line 715: The potential for enhancement of PM<sub>2.5</sub> through organosulfates is one of many modes of SOA formation by their interaction with the inorganic (deliquesced) phase, and it might be nice to mention a few more. An example related to NO<sub>x</sub> is presented by Hennigan et al. (2008, 2009) who show that water-soluble SOA formed during the deliquescence of inorganic nitrates in urban environments remain in the aerosol long after nitrates evaporate back into*

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*the gas phase.*

We have added the following material concerning the interaction of the inorganic and organic aerosols in section 5.1:

“While the present work considers only the contribution of inorganic species to PM<sub>2.5</sub>, it is important to keep in mind the role of additional species... . Observed dependence of secondary organic aerosol on aerosol water content (Hennigan et al., 2008, 2009; Volkamer et al., 2009) suggest additional pathways by which deliquesced inorganic aerosol could affect total particulate mass.”

- 2. I would recommend stressing even further the power of the adjoint method and its ability to constrain uncertain parameters beyond the emission source function.*

We thank the Editor for the suggestion. To the Conclusions we have added:

“An additional benefit is that the adjoint model affords simultaneous analysis of additional model parameters, such as chemical reaction rates.”

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

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