

Interactive comment on “Evaluating Secondary Inorganic Aerosols in 3-Dimensions” by K. Mezuman et al.

Anonymous Referee #2

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General Comments:

In “Evaluating Secondary Inorganic Aerosols 1 in 3-Dimensions”, the authors compare surface and aircraft measurements to model predictions for the regional and vertical distribution of secondary inorganic aerosols. The NASA GISS ModelE2 model predictions used a combination of two aerosol microphysics configurations and two computationally efficient thermodynamic models (EQSAM and ISORROPIA II). The paper is somewhat similar to Bauer et al. 2007 for nitrate aerosols, extending that work to include the more aerosol configurations, and the additional inorganic aerosol measurements. The results, including a systematic underestimation of ammonium and nitrate for all configurations, likely due to the simplified treatment of ammonium – ammonia partitioning, are of importance to the atmospheric science community. Overall, it is a valuable study, and publication is recommended after addressing the points below.

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Specific Comments:

Line 81 – how has the nitrate scheme been corrected? Please add more information here.

Line 379-382 – please elaborate. Why would temperature and RH not be a dominant factor?

Lie 397 – why was the pH examination not presented? It is important to this work, and should be included, at least in the supplement material.

Technical Corrections:

Consider use of different symbols, in addition to different colors, for Figure 4. Likewise, please use different line types, in addition to different colors, for Figures 5, 6, etc.

Finally, there are some minor errors in the references and the in-text citations that should be addressed.

References:

Bauer, S. E., Koch, D., Unger, N., Metzger, S. M., Shindell, D. T. and Streets, D. G.: Nitrate aerosols today and in 2030: a global simulation including aerosols and tropospheric ozone, *Atmos. Chem. Phys.*, 7, 5043–5059 (2007)

Interactive comment on *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2016-199, 2016.

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