

Interactive
Comment

Interactive comment on “Predicting diurnal variability of fine inorganic aerosols and their gas-phase precursors near downtown Mexico City” by M. Moya et al.

Anonymous Referee #2

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General comments

The authors have predicted the diurnal variability of fine inorganic particulate matter and gas-phase species near downtown Mexico City using two equilibrium models SCAPE2 and ISORROPIA II. They report no significant overall difference between the predictions of the two models. Although they do not explicitly state that the bulk equilibrium assumption is adequate for the Mexico City aerosols, this seems to be the basis of the analysis, despite large differences between the predicted and observed concentrations of semi-volatile species in the gas and particulate phases. The conclusions are therefore rather weak and very similar to the ones reported in the study of Four-

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toukis et al (2007) who have applied the same models to aerosols observed at the T1 site. I would recommend publication only if the authors can clearly address the specific concerns listed below:

Specific comments

1. According to the statistics given in Tables 3 through 10, there are rather large differences between the model predictions and observations for gas and particulate phase nitrate and ammonium. Why then are the aerosols still assumed to be in equilibrium with the gas phase? Based on these results, one would conclude that the aerosols are not in equilibrium.
2. Are these large differences in the predicted and observed concentrations due to the use of 4-hour average data? How much variation might be expected over this period, given that the measurement site is located in a highly dynamic source region?
3. Is the bulk equilibrium assumption for PM1 and PM2.5 particles even valid, since large differences are expected in the composition of the particles of different sizes? For instance, particles smaller than 0.1 μm may reach equilibrium in a few minutes, but larger particles, especially greater than 1 μm may take several hours to reach equilibrium.
4. Can ISORROPIA II and/or SCAPE2 reliably simulate the deliquescence and growth of complex aerosols at low and moderate RH? It is well known that these models have significant errors in the equilibrium phase-state, water content, and composition of aerosol particles in the mixed-phase region that is often encountered at moderate relative humidities.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 11257, 2007.

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