

***Interactive comment on “The effect of  
meteorological and chemical factors on the  
agreement between observations and predictions  
of fine aerosol composition in Southwestern  
Ontario during BAQS-Met” by M. Z. Markovic et al.***

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Anonymous Referee 1 Received and published: 10 November 2010

The authors present field measurements and modeling of inorganic aerosol composition. The paper is well-presented and unusually comprehensive in scope, covering both field study data at a ground site and aloft, as well as a thorough assessment and diagnosis of air quality model predictions and testing of underlying model assumptions

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and chemical regimes. This manuscript should be published, subject only to a few minor revisions as outlined below.

In section 3.1.3, the authors consider the possibility of power plant plume impacts and decide that inaccurate plume placement is not the main reason for disagreement between the air quality model and measurements. While I agree with the underlying premise that power plants are the dominant source for SO<sub>2</sub>, this is not true for NO<sub>x</sub>. S.-W. Kim et al (GRL 2007) have shown that large reductions in US power plant NO<sub>x</sub> emissions have been achieved during summer months. Mobile sources, not power plants, are the dominant NO<sub>x</sub> source, and the potential for plume effects could be more related to nearby highway or urban area rather than point source impacts. The authors should reword the text at line 19 on page 24793, and elsewhere in this section as necessary.

**The authors have revised the text in Sec. 3.1.3 to emphasize the importance of mobile sources of NO<sub>x</sub>. Roadways represent line sources and so the logic of our argument that was applied to power plant plumes, or any source that creates strong spatial gradients of pollutants, still holds.**

In Table 1, that shows statistical evaluations of model performance for various aerosol constituents, it would be helpful to include normalized mean bias and root mean square error statistics in addition to what is already presented. It may be necessary to define a cutoff concentration below which observations are not included in the calculation of normalized statistical measures of model performance. The normalized statistics may be more readily generalized and understandable than the absolute concentrations and related statistics which tend to be more site- and timeframe- specific.

**The authors updated Tables 1 and 2 to include the following statistical parameters: mean error (ME), normalized mean error (NME), and normalized mean bias (NMB). Root mean square error (RMSE) was already included in the original version of the manuscript. Because nearly all the measurements were above**

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**the instrument detection limits, trials using cutoffs for the normalized statistical measures didn't show significant differences to the entire dataset. Therefore no cutoffs were applied to the values reported in Tables 1 and 2.**

Editorial suggestions (suggested minor wording changes in abstract): In the abstract, line 4, delete "regional", and line 7 delete "the" preceding "Environment Canada's..."

**The authors made suggested changes (deleted both words)**

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24781, 2010.

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