

***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.***

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

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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.

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.

Editorial suggestions (suggested minor wording changes in abstract):

In the abstract, line 4, delete "regional", and line 7 delete "the" preceding "Environment Canada's..."

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

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