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Atmospheric Measurement Techniques Discussions

Interactive comment on "Evaluation and application of a semi-continuous chemical characterization system for water soluble inorganic $PM_{2.5}$ and associated precursor gases" *by* K. J. Godri et al.

Anonymous Referee #1

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This paper reports measurements of gas and particle chemical composition over an extended period of time. The paper essentially has two parts, the first part deals with instrument performance through various comparisons with other measurements, and the second part discusses the ambient results.

Unfortunately, significant instrumentation problems were encountered during the study and many of the instruments compared showed large discrepancies. To account for this, the results from filter samples were taken as a gold standard and the various results scaled. Although the data reported is of some interest, many issues with the

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Interactive Discussion

Discussion Paper

data quality should be addressed.

1) Why is it appropriate to use the filter as the standard; on what basis is this made. For example, can references be cited that show this is reasonable; that this filter sampling/analysis technique compares well with other methods and is free of artifacts, include citations. Some quantitative measure of the filter precision and or accuracy would put this in perspective.

2) Throughout the paper, very little information is supplied regarding measurement uncertainty. Given that much of the paper deals with comparisons between various instruments, discussions of measurement uncertainty are critical. This should include error bars on plots and discussions whether instruments are within or out of combined measurement uncertainties. An estimate should be made of the resulting uncertainty in the data once corrected based on the filter measurements, and uncertainties should be combined and reported in the mass balance analysis.

3) There is considerable discussion on the various limitations of many of the methods but few specific details are provided, such as citations and discussions of results from other investigators. This is especially true for possible TEOM semi volatile losses, e.g., nitrate and OC, see for example (Willson et al., 2006).

4) Either I missed it or there was very little discussion on how the various NAPS filters were used, ie, was the OC mass corrected for OC on the quartz filter behind the nylon filter. Was the mass corrected in any way? This is very important since this data is taken as the gold standard.

5) The discussion in the last section of the paper on caused for various trends are mainly speculation, they need to be highly qualified possibly with phrases like, consistent with the idea that…., or give more details or data to support the assertions.

Specific Comments.

In section 2.2.1 It may be good to discuss the HNO3 inlet tubing losses here. For ex-

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ample, what type of inlet Teflon tubing was used. Cite references and discuss sampling losses of HNO3, eg (Neuman et al., 1999).

Section 2.2.3. Known losses from heated TEOM inlets should be discussed and cited.

Section 2.2.4. The lines 5 and 6 on Applied optical detection … it is unclear what is being discussed.

Last line of section 3.1.2. The regression results have slope of 1, so no correction was applied?

A general question; were the filter holders located out side or inside, were they at ambient temperature?

Last part of section 3.3.1 Be specific on what agricultural activities contributed to the measured pollutants. Also, on page 22 why are there no livestock or agricultural emissions in the winter?

Neuman, J. A., L. G. Huey, T. B. Ryerson, and W. Fahey, 1999, Study of inlet materials for sampling atmospheric nitric acid: Environ. Sci. Tech., v. 33, p. 1133-1136. Willson, E. W., B. D. Grover, R. W. Long, N. L. Eatough, and D. J. Eatough, 2006, The measurement of fine particulate semivolatile material in urban aerosols: J. Air & Waste Manage. Assoc., v. 56, p. 384-397.

Interactive comment on Atmos. Meas. Tech. Discuss., 1, 205, 2008.