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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water soluble aerosols and gases at a UK background site – Part 1: Controls of $PM_{2.5}$ and PM_{10} aerosol composition" *by* M. M. Twigg et al.

Anonymous Referee #2

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This article presents long-term measurements of aerosol composition at a background site in Scotland. Such long-term data sets of speciated chemistry are extremely valuable for understanding aerosol processes, pollution source apportionment, and model development and evaluation. The authors do a very good job at analyzing and presenting the data and the manuscript is well written. The only shortcoming of the article is the lack of detail regarding instrument performance and data quality control. In that regard, I have outlined several comments below which I believe the authors should be able to address.

The authors note that the use of preconcentration columns sets this instrument apart

from other descriptions of the MARGA instrument. For this reason, some detail regarding the basic characteristics of the analytical system is warranted. What are the detection limits for each analyte and how were they determined? How often were analytical blanks determined and did they vary over time? How often were external liquid standards analyzed? Were multi-point liquid standards periodically evaluated? How were the LiBr standards prepared and were they independently checked on another analytical system?

How were potential biases between the two sample boxes evaluated?

How often was the sample flow rate measured independently of the mass flow control system (i.e., at the inlet with a calibrated flow meter)? To what extent were the independently measured flows consistent with the flow reported by the mass flow controller? How often were the mass flow controllers calibrated? How often were the inlets cleaned?

What was the process for reducing the raw hourly data? That is, how were blanks, external standards, and flow rate audits incorporated into the data reduction process? How were concentrations below detection limit treated? Was there a need to reprocess any of the raw chromatograms?

Additional comments:

Page 3705, line 26: Change "the exceeding the" to "exceeding the"

Page 3714, line 1: Why was 2012 chosen for the ion balance analysis?

Page 3715, line 21: Change "that however," to "however,"

Page 3717, line 9: "Aerosol components not resolved by the MARGA include inorganic aerosols," Was this the intended statement?

Page 3717, lines 17-18: "Mass closure improved in 2012, probably in response to the improved flow control implemented in November 2011 on the MARGA (see above)."

Can the authors give more detail on the flow control changes and how this improved mass closure?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 3703, 2015.