

Interactive comment on “Evaluation of a Sequential Spot Sampler (S3) for time-resolved measurement of PM_{2.5} sulfate and nitrate through lab and field measurements” by A. Hecobian et al.

Anonymous Referee #1

Received and published: 17 November 2015

This paper presents an evaluation of a recently developed instrument (S3) which allows for time-resolved collection of aerosols. The process is designed for minimal manual sample preparation which can reduce the possibility of contamination. Overall, the paper is well written and provides needed evaluation of a potentially useful instrument for aerosol monitoring. The experiments were well designed to determine possible contamination, extraction efficiency, and a comparison versus current state-of-the-art instrumentation. However, the conclusions may be enhanced by the inclusion of some missing information and analysis as noted below:

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Revisions:

1) The statistical analysis of the comparison to PILS measurements (figure 6) are too simplistic. The good correlation and slope is driven by the values above 4 ug/m³ for sulfate and 5 ug/m³ for nitrate. Above these thresholds the comparison is great. Below them, the comparison falls apart. A residual plot should be made - (S3 Sulfate Minus PILS Sulfate) versus (PILS or S3 Sulfate) – and the uncertainty found as a function of the concentration. Reasons for the discrepancy at low concentration should be discussed including the possibility of the PILS being off (maybe compare PILS values to URG).

2) The paper is focused on sulfate and nitrate which are two major constituents of ambient aerosol but does not mention other constituents. Were other ions measured (chloride, sodium, ammonium, magnesium, calcium...) or the possibility of organics? If they were, please include. If not, please include a sentence or paragraph on the possibility of S3 analysis for other ions and organics. This would likely include the need to make 2 injections per well (anions and cations).

3) p10619, line 7: Please discuss if 1.5 L/min is the maximum air flow allowed for the instrument. Can this be increased for sampling cleaner air? What effects would this have besides messing up the size cut of the cyclone? It should also be noted somewhere that even though this is a fairly low air flow compared to filter sampling, it is made up for by the low amount of water needed for extraction (0.1 mL in comparison to 5-10 mL for filters) resulting in more concentrated (L air / mL extract) solutions for IC analysis.

Technical Notes:

1) p10612, line 3: “time resolved” should be “time-resolved”

2) p10616, line 16: explain acronym or provide manufacturer for the PAL CTC

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



- 3) p10616, line 11: “time resolved” should be “time-resolved”
- 4) p10617, line 23: why was LiBr used? If it was used to determine any sample dilution, please explain
- 5) p10617, line 15-27: this section is very repetitious with p10621, lines 12-21. I suggest moving it to section 3.1
- 6) p10618, line 28: I believe the tubing you are referring to is made of silicon. If so, please state this
- 7) p10619, line 18: These LODs should be included in the abstract as this is an important finding for a new instrument
- 8) p10619, line 22-23: Please include the reason for the operator intervention
- 9) p10621, line 3: replace “LT” with “local time”
- 10) p10621, line 12: is there a reason to use IC eluent instead of ultrapure water for the extraction?
- 11) p10621, line 16: I believe that 20 should be 15. You state 15 minutes on p10617, line 25 and in Figure 2.
- 12) p10622, line 2 5-15: This paragraph is better suited in section 2.2, likely after the paragraph ending on p10618, line 8
- 13) p10622, line 22-23: This sentence is repetitious with the first sentence of the paragraph and should be removed. Start the next sentence with Figure 4.
- 14) P10622, line 23-26: For completeness you should state that there were also periods of high sulfate/nitrate measured by the higher time-resolution of the PILS but not by the S3 (ie on 6/27 for sulfate and on 7/1 for nitrate)
- 15) P10623, line 21: define RSD
- 16) P10633, Figure 6 caption: there is undue capitalization including: Top, Sulfate, and

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Nitrate.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 10611, 2015.

AMTD

8, C3922–C3925, 2015

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

C3925

