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Atmospheric Measurement Techniques Discussions

Interactive comment on "Measurement techniques of identifying and quantifying sulfur compounds in fog and cloud water" *by* Eleni Dovrou et al.

Anonymous Referee #1

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In this manuscript, two common sulfate measurement methods, ion chromatography and aerosol mass spectrometry, are evaluated for their ability to measure HMS (hydroxymethanesulfonate) in the presence of sulfate and other organic sulfur particles in atmospheric samples. It also describes an improved IC method that can allow for better chromatographic separation and quantification of HMS. The topic and quality of this works are suitable for publication on AMT. It is recommended for acceptance after the authors respond to the comments outlined below.

First of all, the title of the paper needs to be revised to better represent the main contents of the manuscript. For example, this work focuses exclusively on the AMS and IC methods, although there are other techniques available for HMS quantification. Also, the current title reads as if the method targets a range of sulfur containing compounds,

but in reality it is primarily for HMS.

Secondary, more analytical details on the IC method are necessary. Information such as eluent composition, flow rate, column length, column temperature etc should be reported. For the quotation of detection limit in uM (e.g. page 7, line 14), the injection volume also matters. As this paper intends to present an improved IC method for HMS quantification, general aspects for evaluating and QA/QC an analytical method, such as calibrations curve, method precision (through repetitive analysis) and accuracy (through e.g. recovery analysis), and method robustness are important to be presented and discussed. It is also necessary to discuss the limitations and potential artifacts with the improved IC methods more thoroughly. For example, the stability of HMS is pH dependent. Loss of HMS is more severe at higher pH. The pH of the IC mobile phase is basic for eluent using sodium carbonate. The effect of HMS destruction during IC separating should be evaluated. Other issues such as the stability of the standard solution and potential loss of HMS in samples during storage are also important to discuss.

Minor comments:

Page 2, line 2, HSO3- can dissociate at pH < 6.

Page 3 , line 12, define RSMS and ATOFMS.

Page 7, line 6, what is 4x200nm corresponding to?

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