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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Molecular characterization of aerosol-derived water soluble organic carbon using ultrahigh resolution electrospray ionization Fourier transform ion cyclotron resonance mass spectrometry" *by* A. S. Wozniak et al.

Anonymous Referee #1

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Overall Comment

This paper is generally well written, with appropriate citations, figures, and tables. The abstract also is adequate. My major concerns (detailed subsequently) are that the paper is probably better suited for a journal focused on analytical chemistry and that the limited conclusions are based on mostly qualitative analysis of one sample in each of the two locations.

General Comment

I am very concerned about the use of one sample from each location to garner any conclusions at all about the utility of this technique and its output. In my opinion, the authors should focus this paper more on technique development (specifically on extraction efficiencies and an increased number of calibration samples). That would make it more suitable for publication in an analytical chemistry journal. Sample analysis from the ambient atmosphere could then be addressed more quantitatively in a future manuscript. With unknown extraction efficiencies and such, it is not clear how much this manuscript as it now stands really tells us about the nature of WSOC in ambient particulate organic matter.

Specific Comments

1. Page 6541, do aerosols not also affect the radiative balance of the Earth by absorbing outgoing planetary longwave radiation?

2. Page 6543, have any comparisons been done comparing the BC measured using this technique and other techniques (such as an aethalometer or measuring EC using a thermal-optical technique)? That would certainly lend credence to their characterization of some of the WSOC as being BC. It would also allow for a comparison of total BC to that which is water soluble (as is done with WSOC vs. OC).

3. Page 6545, are there any effects of the acidification and subsequent neutralization of the sample as described in the experimental/analytical section?

4. Page 6546, what are the bases for the O/C, H/C, etc. ratios used for elimination of calculated molecular formulae?

5. Page 6547, by ignoring the m/z less than 223, are the authors asserting that compounds at these m/z are not present? Or just that they are unable to see them due to extraction efficiencies? This m/z cut-off, for example, would eliminate pinic acid as a WSOC constituent. This harkens back to my general point about the need for more

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quantitation to support the conclusions.

6. Page 6550, in the Van Krevelen plots there is certainly a good deal of overlap between the characteristic aerosol types (the ovals in Figure 3). Given that, how much does this analysis really tell us about the WSOC that made it through the extraction procedure?

7. Page 6552, the radiocarbon analysis seems out of place. Either expand it (techniques, analysis, implications) or get rid of it.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 6539, 2008.