

Interactive comment on “The Finokalia Aerosol Measurement Experiment – 2008 (FAME-08): an overview” by M. Pikridas et al.

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1. The authors cite the study by Lee et al. (2010) here and at a number of other places in the text. It is not appropriate for the authors to cite a manuscript that is in preparation. It is suggested that the authors instead outline the details of the CE analysis or cite a reference that is published in the literature.

We have changed the reference to Lee (2010). The Lee et al. (2010) paper has been submitted to ACPD.

2. The authors report aerosol acidity of PM_{10} as the ratio of the AMS measured ammonium to sulfate (in molar equivalents). Have the authors taken into account the recent findings by Farmer et al. (2010, PNAS)? More specifically, Farmer et al. showed

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that organosulfates and organic nitrates need to be accounted for in the ammonium balance and in the evaluations of aerosol acidity. Farmer et al. (2010) showed that organic nitrates appeared as NO_x^+ ions in the HR-ToFAMS, which are typically dominated by inorganic nitrate. Additionally, Farmer et al. (2010) showed that organosulfates fragment similarly to inorganic sulfate. Basically, the AMS nitrate and sulfate from the standard AMS analysis software cannot be considered entirely inorganic species. Likely the presence of these compounds in PM₁ make it difficult to accurately predict a measure of aerosol acidity due to the harsh operating conditions employed in AMS techniques. Thus, I think the authors need to caution readers on the meaning of their reported aerosol acidity. Does this really mean anything now? Should we even report this value using AMS data?

The PM₁ nitrate concentrations during FAME-08 were very low. So even if all the AMS nitrate was organic nitrate the difference in the ionic balance would be less than 1 percent. For sulfate the AMS measurements have been compared to traditional filter-based measurements and to a continuous steam sampler-IC system (Hildebrandt et al., 2010). The correlation was excellent ($R^2=0.95$ for the filters and 0.79 for the steam sampler) and the corresponding slopes were close to unity (1.09 for the comparison to filters and 0.97 for the steam sampler). These comparisons suggest strongly that most if not practically all sulfate measured by the AMS during FAME-08 was inorganic. To avoid over-interpretation of our results we have added a discussion of these issues and a reference to the work of Farmer et al. (2010).

3. *Can the authors really say that HOA was converted to OOA in the 6-36 h of transport from source areas to Crete? It is my understanding of PMF analyses, that HOA and OOA from one location doesn't mean the same thing at another location. Basically, not all HOA and OOA values reported from PMF analysis of AMS data are created equal. Thus, I think the authors may be stretching the meaning of these data. Basically, can the authors really use HOA and OOA values to imply aerosol aging? Is there a better measure that can be used instead of values produced from PMF analyses?*

The reviewer is right, the AMS spectra corresponding to HOA and OOA after the PMF analysis are a little different in different areas. However, they do have also very strong similarities (e.g., the fragment m/z 57 for HOA, the fragment m/z 44 for OOA, etc.). We have analyzed the HOA/OOA behavior during FAME-08 in detail in Hildebrandt et al. (ACP, 2010). Our analysis there shows that the conclusion regarding the lack of HOA in Finokalia during FAME-08 is quite robust and is by no means stretching the meaning of the measurements. The average contribution of the m/z 57 was 0.7 percent of the organic signal (see Figure 5 of Hildebrandt et al., 2010) and this is consistent (even without the use of PMF) with very little or no unreacted primary organic aerosol.

4. *Remove the "." after "Q-AMS"*

Done.

5. *Remove the "s" in the word "organics".*

Done.

6. *Can the authors fix the first column's (i.e., variable) formatting? The words have large spaces between them.*

This will be fixed during the final typesetting of the manuscript.

7. *Figure 3: Please make this bigger as it is hard to read the values in the current size.*

We have increased the font size.

8. *Figure 5: Can the authors make Figure 5 easier to read (i.e., bigger and clearer lines)?*

Done.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6641, 2010.

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