

General Comments:

The manuscript by Dai et al. characterized seasonal variability of aerosol particles in Houston, Texas using an HR-ToF-AMS. The effects of aqueous-phase and photochemical processing on SOA were investigated. They found that the NR-PM₁ mass was driven mostly by secondary aerosol formation regardless of the season. One of the major concerns of this study is the short-period measurements during wintertime which was not statistically significant to explore the effects of aqueous-phase and photochemical processing. Before its publication, the following comments need to be addressed.

Specific Comments:

1. My major concern is that the authors claimed seasonal differences between winter and summer, but the measurements were only made for 2-week period during wintertime with high frequencies of RH>60% (~70% in Fig.1). As a result, there might be a significant uncertainty when comparing the summer and winter data. The authors need to address such uncertainties in the revised manuscript.
2. The uncertainties for the quantification of S/C and N/C AMS was operated in V-mode ($m/\Delta m \sim 2000$) in this study, separation of N-containing and S-containing are challenging. What are the uncertainties in quantification of S/C and N/C.
3. what the values of CE and RIE used for MSA quantification? Please elaborate.
4. What's the basis of LWC bin division (Fig.8)? Why didn't you use the uniformly-spaced LWC bin as Fig. 10 (Ox binned in 10 ppb).
5. Are there any specific reasons that you used two different versions of software to do data analysis (PIKA1.16 for time series (line 176) and PIKA 1.19D to do PMF analysis (line 235))?
6. How the density of organics was calculated? Was it the I-A method (you mentioned in line 183?) or A-A methods?
7. Line 199-200, $NO_2^+/NO^+=0.1-2.0$, that is to say, the $NO^+/NO_2^+=0.5-10$, which is contradictory with the cited study (5-10) (Xu et al., 2015). What is the ON with $R_{ON}=0.5$? Please mention it here.
8. Line 417, What is the correlation coefficient between LO-OOA/MO-OOA vs. aq-OOA in summer? Are there any further support other than the mass spectra? In fact, the correlation between LO-OOA/MO-OOA vs. SO₄ is moderate in Fig. 7.
9. Line 448, the authors attributed the decreased MO-OOA concentration at $LWC > 40 \mu\text{g}/\text{m}^3$ to wet removal. How about other species? Besides, in Fig.8 (I), the continuous increase of MO-OOA under $LWC < 40 \mu\text{g}/\text{m}^3$ appeared not very clear.