**Atmospheric
Chemistry
and Physics**
Discussions

Interactive comment on "Influences of emission sources and meteorology on aerosol chemistry in a polluted urban environment: results from DISCOVER-AQ California" *by* D. E. Young et al.

Anonymous Referee #2

Received and published: 5 January 2016

General comments

This is an extremely well written, appropriately cited manuscript that focuses on the analysis of particulate matter data from the San Joaquin Valley during the DISCOVER-AQ campaign in January/February 2013. It is very thorough with regard to the information included and with regard to the analyses performed. The figures show an incredible amount of information, and as a result can be difficult to read as too much is crammed into individual figures. All that being said, I would say that the analyses performed are now considered somewhat standard for the AMS community. In no way do I mean to minimize the work; it is difficult and time consuming to perform analyses

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

at this level. I only state this because the generalizable insight gained is limited. I have had manuscripts criticized and rejected for similar reasons. I personally would err on the side of publication (assuming specific comments below are addressed) as it is important to have such high quality data in print, but I would defer to the editor.

Technical/significant comments

Page 35063, line 6. "cold" and "relatively dry" are generic. Please provide specific information (data).

Page 35065, line 7. Was measured CO_2 used to do this? Source of that data? Also, does the isotope ratio vary from location to location for N_2 in the atmosphere?

Page 35066. I would recommend considering a reorganization of the text to discuss PMF prior to the elemental analysis. When I referred to Table S1 (line 3), it brought in the PMF factors even though they had not been defined or discussed yet. This suggestion would help improve the flow of the paper for those that might be less familiar with AMS terminology. Note that on line 3, Table S2 does not actually contain the information stated at this point (its reference later in the manuscript is correct).

Page 35067. This is a lot of detail for non-AMS users. It is fine to leave it in, but if that is done, I would recommend defining some of the parameters - for example fpeak, Q, etc.

Page 35067, line 21. What is the basis for saying that "Factor 2 appears to be a combination of the other two factors." Visual inspection?

Page 35068, line 10. What is the validity of assuming the spectral profile of each factor is constant within each size bin? I can imagine, for example, that that of biomass burning aerosol varies depending on the type of particle (larger more ashlike versus smaller formed from condensation of gases upon cooling).

Section 2.3.4 Are there NH_3 and HNO_3 data available to help analyze/understand the KAN calculations performed and shown later in the manuscript?

Page 35069, line 18. If statements are made about exceedances of the NAAQS, I think it is important that the basis for those statements are included. For example, use the 25% factor to estimate PM2.5 and take a 24-hour average. Compare those numbers to the standard. This can also be done on Figure 1 (the NAAQS is shown, but estimated 24-hour average PM2.5 data are not, which can be misleading).

Page 35070, line 10 (as well as on pages 35085 and 35086). In this and other locations in the manuscript, the importance of boundary layer dynamics is discussed. This is suppositional and based on temporal profiles of pollutants. However, some effort should be made to consider what the BL heights are, as well as their temporal dynamics. Were any soundings made? LIDAR?

Page 35072, line 1. The authors state that N appears to be associated with SOA. Are sufficient data available to also perform the Fry/Farmer analyses that apportion AMS nitrate to inorganic and organic forms?

Page 35078. Were any filters collected at this site during this time, as is often done during such large campaigns? Speciation of organic matter, specifically regarding levoglucosan, its isomers, and other tracers of biomass burning, would be incredibly helpful in the discussion of the differences between the biomass burning factors.

Page 35078, line 18. There is so much in the SI that it would be appropriate to include an example of the thermodenuder data to which the paper refers.

Page 35080, line 7. Based on recent work from the SOAS campaign as well as from Carlton et al., RH is potentially not the best metric to evaluate the likelihood of aqueous-phase processing. Methods using ISORROPIA (corrected using a kappa for organics) can estimate aerosol liquid water content. It is suggested to perform such calculations.

Section 3.4.2 I find the comparison between the two winters relatively less interesting. The meteorology is clearly different, so one would expect the PM to be as well. That being said, are there other aspects of the data set that can be used to explore? For

example, the estimated size distributions of the factors; these are not often discussed in the AMS community. Can more information be gleaned from this?

Page 35085, line 21. The potential influence of N2O5 on nitrate is mentioned, but no effort is made to quantify it. Is this possible, even to first order?

Figure 10. Is the estimate of BC in 2010 relative to PM1 valid? Would a ratio to POA be better? This might not make a significant difference in the data, but it would be more defensible, I believe.

Figure 13c. "Morning increases" are inadequately described.

Minor comments

Table 1. Would be appropriate to include standard deviations in last column as well. Same with first two rows of Table 3.

Figure 1. Are CRD-PAS, PEX, and APS even used here? If not, could remove for simplicity.

Figure 9. The x axis label needs to be corrected (ug/m3, not C)

Table S2. Does the reference to Ge et al. refer to a, b, or both?

Figure S5. Are the data presented average values? Or for a specific subset of the data? Please specify in the caption.

Figure S11. The caption should refer to being colored by date, not time of day.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 35057, 2015.