Atmospheric
Chemistry
and Physics
Discussions

Interactive comment on "Sources of PM$_{2.5}$ carbonaceous aerosol in Riyadh, Saudi Arabia" by Qijing Bian et al.

Anonymous Referee #2

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This is mostly an excellent submission, presenting results from a long-term measurement campaign in Saudi Arabia and source apportionment analysis. Questions I had were subsequently answered in the submission, which is usually a sign the authors have done a thorough job with the analysis.

However, one glaring flaw appears to be that in 2012, the weekend in Saudi Arabia was Thu-Fri, not Fri-Sat. The authors should re-analyze their data accordingly.

2013 news article about the weekend switch: http://english.ahram.org.eg/NewsContent/2/8/74 Arabia-changes-working-week-to-SunThurs-Offi.aspx

Specific observations:

1. How often or when was the OC/EC filter changed? Was the OC/EC correction

different at the beginning than at the end? Did the switch coincide with particular days of the week?

2. Lines 450-451 - the authors say the limited sample size means they can't quantify the local and regional contributions to OC and EC. However, this limitation only applies to the 24-hour metals analysis, which also appears to show that SOC, associated with Ca, may be regional. So couldn't the authors use the hourly-resolved OC/EC data to estimate local contributions to OC and EC?

3. Table 1 could be rearranged to list the current study next to the 2007 middle-east study, as that is most relevant to the present analysis. I would have liked to see a more extensive comparison of the two sets of results.

4. Figures 2 and 3 just have EC/OC concentrations as the axis title, but the OC/EC ratios are also shown. Maybe put the ratio on the secondary axis with an appropriate title? Also, OC/EC ratios in the 100s - admittedly outliers - are interesting. Are those associated with low pollution levels?

5. Figure 6(c) - Axis title is wrong. Also, the average ratios appear to be wrong, as almost all of them are higher than 75th percentile of the data. What do the caps represent - 90th or 95th or 99th percentile?

6. Figure 8 - the high correlation between OC and Ca appears driven by a single high-value sample. Is that really good enough to push the OC-Ca connection?

7. Figure 11 - what happened to the samples in August? Also, maybe the Aug 31 sample should be grouped with September?

8. Figure 11 - was there no cement or gas flare or local vehicular contributions in May? That seems inconceivable. The authors should explain a bit more.

9. Figure A.2 shows that all the corrected laser values increase in transmittance at the beginning, which is rather strange - no EC should have left the filter in He1! What is going on - is the correction wrong?

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