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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Contributions of vehicular carbonaceous aerosols to $PM_{2.5}$ in a roadside environment in Hong Kong" *by* X. H. Hilda Huang et al.

Anonymous Referee #3

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Huang et al. reported seasonal observations of carbonaceous observations using the Sunset OCEC monitor in Hong Kong. The modified NIOSH method protocol was used for particle analysis and the EC tracer method was used to decipher the contribution of vehicular carbon contributions. The authors demonstrated a thorough effort to find the suitable determination of the OC/ECpri using the EC tracer method. These discussions are of interest to the general audience with interest in air quality and atmospheric processes. A list of revision suggestions is provided for the authors to strengthen the paper before publication.

Specific comments 1. p58, abstract, line 27, PM was used not PM2.5. Need to be

consistent in the paper. Suggest spell out particular matter or aerosol, as PM2.5 could not represent PM10 or ultrafine particles.

2. p59, line 13, "Since EC undergoes little chemical transformation. . .", not sure I agree with this statement, as more and more observational evidence has suggested that black carbon is not as simple as what we had thought. Would suggest the authors modify this by saying "EC has been considered to undergo little chemical transformation, and thus it has been used as an indicator for primary combustion emissions."

3. p59, second paragraph, & p60 2nd paragraph, mixed usage of PM and PM2.5.

4. p59, line 26, with respect to not in respect to

5. p60, line 14, please add ". . . processes that happen at a faster time scale". One could argue that the semi-continuous OCEC measurements could not capture fast chemical transformation as well. I would suggest the authors comment on this.

6. p60, line 23, could you describe how high the time-resolution is? Generally, Sunset OCEC measurements provide hourly measurements. It is faster than daily, but not really that high compared to other techniques. Also see my previous comment.

7. p60, line 3, instead of "one set of" just use "A"

8. p60, line 7, the flow rate for Sunset instrument is normally 8 lpm, could you comment on why you chose 8.2 lpm? Did you do any corrections of your data considering the flow rate may affect the sample mass calculation?

9. p64, line 10-14, could you explain more clearly the rationale to compare two different protocols? What new insights are you trying to bring? Also, for Fig. 1 on p86, it will be easier to see the plots by putting them into two rows, i.e., the first row for RT vs. Partisol comparisons and the second row fort vs. HV comparisons.

10. p64, line 15, why do you decide to use zero-intercept linear regression analysis?

11. p64 line 17 to p65 line4, these equations are very simple, they should not be taken

the main content of the paper. They belong to supplemental materials.

12. p65, line5-28, suggest the author refer to Fig. 1 when discussing the results here. Also suggest the authors bring out the key points of these comparisons. Why are you doing these measurement comparisons? What new insights are we getting from this exercise?

13. p66, line 7, the number of significant numbers for reporting OC and EC concentrations. Considering the detection limit of Sunset OCEC is on the order of 0.1 =0.2 mg/m3 (See Bauer et al., 2009 and refs therein), it is pointless to report more than 1 digit after the decimal point. I suggest the authors revise these throughout the manuscript.

Ref: Characterization of the Sunset Semi-Continuous Carbon Aerosol Analyzer, J Air & Waste Management, 2009, 59(7), DOI:10.3155/1047-3289.59.7.826, Jace J. Bauer, Xiao-Ying Yu, Robert Cary, Nels Laulainen & Carl Berkowitz.

14. p66, no previous description of trace gas measurements, i.e., NOx, O3, etc., please add.

15. p68-69, the EC tracer method discussions, suggest the author consider adding additional references of more recent results using the EC tracer method and how to arrive the OC/EC pri and enrich the discussions. Additional references may include the following:

Refs: Primary and secondary organic carbon downwind of Mexico City, ACP, 2009, 9, 6793-6814. doi: 10.5194/acp-9-6793-2009, X.-Y. Yu, R.A. Cary, and N. S. Laulainen

Linear regression techniques for use in the EC tracer method of secondary organic aerosol estimation, Atm. Env., 2006, 7546-7556, R.D. Saylor, ES Edgerton, BE Hartsell, doi: http://dx.doi.org/10.1016/j.atmosenv.2006.07.018

16. p70, paragraph 1, since wind seems to play a role in the OC/EC min, it is useful to show representative wind speed and wind direction data in the paper. For example, wind roses of the seasonal pattern could be useful in elucidating your points.

17. p77, lines 6-11, the conclusion is somewhat unsupported by the data presented in the paper. No POC or SOC data were presented after the determination of OC/EC pri. Maybe this will go to a second paper? These should be moved to discussions or implications of your results or deleted, although the words all sound good.

I also would like to ask the authors to think about the most important take-home message after the rigorous exercise to determine OC/EC pri and compare with different methods. How would the community utilize your results in analyzing the Sunset observations in the future?

I recommend revisions in the conclusion section.

Confidential comments to editor Please phrase these comments so that they can be communicated directly to the author(s). Avoid comments which might be considered unnecessarily harsh or offensive. Your identity will not be disclosed to the author(s) either directly or by implication. 1. Is the paper scientifically sound? If "no", please give reason. Yes/No: Yes 2. Is it of sufficient originality and interest to merit publication after attention to matters raised under 3-9? If "no", please give reason. Yes/No: Yes. 5 3. Are there any errors? Yes/No: No. 4. Are there any omissions? Yes/No: Yes. The authors could give a bit more analysis of the source-receptor relationship; for example, provide some wind data to support the conclusions that the main source of EC is from local traffic. 5. Are any sections obscure and what additions or alternations would remove the obscurity? Yes/No: No. 6. Could any sections be omitted or shortened? Please be specific. Yes/No: Yes. Please see my comments on equations 1-5.

7. Are all the illustrations/tables necessary, clear and suitably captioned? Yes/No: Yes and No. Figure 1 needs improvement.

8. Is the abstract adequate? Yes/No: Yes

9. Are the title and key words appropriate? If not, please suggest alternatives. Yes/No: Yes. I do not see key words.

10. Additional comments can be entered in the "Reviewer Blind Comments to Author" field above. Please see above. Please note that your recommendation and reviewer report are expected to cover the Highlights and Graphical Abstract if submitted with the manuscript.

If you wish to make comments which you do not wish the author(s) to see, please write them here:

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 57, 2014.