Atmospheric
Chemistry
and Physics
Discussions

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Interactive comment on "Sources and contributions of wood smoke during winter in London: assessing local and regional influences" *by* L. R. Crilley et al.

Anonymous Referee #2

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General comments

The paper assesses the influence of wood burning on the aerosol load in the London area as well as the contribution of other sources such as traffic. The analysis is based on an extensive dataset combined several independent approaches to the topic. The data are presented in great detail and the discussion of the data is very thorough, however, the manuscript would benefit from tightening some sections and making it overall more concise.

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Specific comments

- – The abstract is fairly long and already contains a wealth of details. Think about shortening it.

- – The text uses a lot of acronyms and abbreviations, which makes some paragraphs hard to read. I suggest to carefully check if all of them are needed, even though they may be commonly used in the literature. Some of them are not used throughout the full text but only once or twice in one paragraph, those could be omitted.

- – Harmonize the spelling of 2/7 wavelength, 7-wavelength, two/seven wavelength, Aethalometer/aethalometer.

- – The presentation of the measurement sites and the descriptions which measurement took place when and where are very difficult to follow. In the abstract three sites are mentioned, but section 2.1. lists four sites, whereas figure 1 shows six locations without further explanation in the caption, e.g. which ones are lidar sites and that the lidar had been moved. Not being familiar with the sites I found it difficult to follow the discussion, especially since they are rather different regarding the measurement setup.

Introduction

- – p 27463 L20 and L 21: replace "2" with "two"
- – p 27464 L6: a reference to Wagener et al 2011 and/or 2012 should be included here for the measurements in Berlin
- – p 27464 L9: matching closing bracket is missing
- – p 27464 L13: . is missing

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Method

- p 27464 L2: why "METHOD" is capitalized?
- p 27471 L23: wrong numbering
- p 27472 L10: What was the time resolution of the meteorological data? 1hour averages?
- p 27473 L4 ff: what do you mean by "the ratio of levoglucosan to OC for biomass burning"? an emission factor? same for "OC/EC ratio for biomass burning / for vehicle emissions" – which values were used?
- would there be a significant influence of ethanol in the fuel on the fossil/non-fossil partitioning?
- p 27474 L20: change "suffers" to "suffer"

Results

- p 27477 L1–2: term "references therein" is doubled
- p 27477 L15/16: The wording here implies "regional" to refer to mainland Europe, however, later in text regional seems to refer to the closer surroundings of London. Please clarify.
- p 27480: I suggest to include a graphical represention of the values in table 4 with the supplementary material
- p 27480 L24: What do you mean by "diurnal trends"? An evolution of the diurnal cycle with time? My reading is that you talk about the average diurnal cycles, using of the word "trend" in that context is misleading as it is commonly used for interpretation of time series (applies to other parts of the text as well, in particular the conclusions section).

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– p 27481 L24: I do not agree that there is noticeable morning peak at HAR, the feature is rather weak.

– p 27481: could you comment on the difference in the cycles calculated from the 2waveand the 7wave aethalometer? what is the cause of the higher values for column A and the wider confidence interval?

– p 27481 L21: "07.00" should read "7:00"

– p 27482 L18: missing "than"

– p 27483 L17 and L20: comma missing following "However"

– p 27484 L2–3: wording unclear

– p 27484 L6: missing "a"

– p 27487 L4–22: This paragraphs refers in detail to figures from the supplement. In my opinion the supplement should only contain material which is not discussed in detail in the text but should be a collection of additional graphs or tables with the main text being self-consistent.

Long-term Measurements

– p 27488: Although it was mentioned before, it would be worthwhile to remind the reader of the location altitude and the tower height in the first paragraph.

– p 27488 L13–18: Is there an explanation for the evening peak being lower relative to the mean at BT while the morning peak is at almost the same level for both sites?

Figures

In several graphs axes are labelled "concentration" only. Understanding what is plotted would be facilitated by specifying the compound in the axis labels. Same e. g. with

"normalised level" in figures S9 and S10.

Labels and annotation in many figures use a too small font size.

- – Figure 1: differentiate in the figure caption and by symbol which sites hosted the lidar and a note about the move of the lidar
- – Figure 6: brackets in figure caption do not match
- – Figure 14: enhance figure size
- – Figures S1, S2, S3: label "$\mathrm{m\,s^{-1}}$" did not come out properly
- – Figures S1, S12, S13: annotation is cut off
- – Fig S18 – S22: "NOx concentration (ppb)" – Quantities given in ppb are not concentrations but mixing ratios.