

## ***Interactive comment on “Evaluation of equivalent black carbon (EBC) source apportionment using observations from Switzerland between 2008 and 2018” by Stuart K. Grange et al.***

### **Anonymous Referee #2**

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This manuscript reports trends in equivalent black carbon (EBC) at several sites in Switzerland. Using aethalometer data, the authors apply a model to apportion EBC to traffic and wood burning sources that requires using Angstrom exponents and the assumed spectral dependence of wood smoke and traffic emissions. The data were interpreted in the context of these sources, including seasonality and diurnal patterns. The authors also report analysis of long-term trends in both the traffic and wood burning fractions. Results corresponding to periods when the aethalometer model failed provided additional feedback for when it is unable to successfully apportion sources, in this case in situations with freshly emitted wood smoke. The paper is clearly written and organized and the methods are well described and sound. The results are help-

C1

ful in understanding the role of emission mitigation strategies for traffic and biomass burning sources. I recommend publication after addressing comments below.

P1, Line 7: Given the issues the model had with what appeared to be fresh smoke, would it be fair to refer to this fraction as aged?

P1, Line 12: This goes back to the previous comment. To clarify, calling the smoke fraction “aged woodburning” would help distinguish these sources.

P1, Line 15: Change “deceases” to “decreases”

P1, Line 16: What does “This” refer to at the beginning of the sentence?

P1, Line 17: If the site is a likely representative location and EBCWB has not decreased, but the other sites have, how is it representative of ineffective controls on wood burning? Are the same management controls applied everywhere?

P2, Line 6: Change “fuelled” to “fueled”

P7, Line 2: Change “consistently” to “consistent”

P7, Line 8: What period was considered a daily sample? Midnight-midnight?

P7, Line 10: How were EC data applied with this frequency since BC and EC would overlap only on certain days? Was the EC sampling schedule the same at all sites?

P7, Line 11: How was PM<sub>2.5</sub> measured at all of the sites? What sampling frequency?

Page 7, Line 16: Change “measures” to “data”

Page 8, Line 4: Were any trend analyses performed on the EC data to test whether EC trends generally followed the overall BC trends?

Page 8, Line 16: Where was this seasonal pattern observed? At all sites? A range of 3 m<sup>2</sup>/g is very large, can the authors comment on the physical reasons why the MAC would vary this much on a seasonal basis? They also vary considerably from site to site. Were EC data examined on a site by site and seasonal basis? Do they show this

C2

much variability?

Page 9, Line 6: Can the authors provide a brief explanation on how Angstrom exponents were calculated? Are they ratio of two wavelengths or a fit of all wavelengths?

Page 10, Line 2, Figure 4 caption. Can the authors add the wavelength range for the Angstrom exponents?

Page 12, Line 4: What about wood burning as local emissions?

Page 12, Line 9: Why would this feature be stronger for traffic than wood burning sources?

Page 14: Line 23: It appears from the figures that a couple of sites do not have data before 2013. Trend analyses performed over this short of period can be misleading when compared to sites with longer periods.

Page 14: Line 26: The Payerne site appears to have a break around 2014, after which the data are relatively flat. A similar pattern may occur at Magadin-Cadenazzo and Zurich sites. Is this an instrument artifact?

Page 15: Line 12-13: But the time period is much shorter and during this period, other sites had flat trends (Payerne and Magadino), so it may not be fully reflective of what is happening over the longer time period.

Page 16, Line 5: Over the same years?

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