

## ***Interactive comment on “Assessment of wood burning versus fossil fuel contribution to wintertime black carbon and carbon monoxide concentrations in Athens, Greece” by Athina-Cerise Kalogridis et al.***

**Anonymous Referee #1**

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This manuscript addresses up-to-date scientific questions within the scope of the journal, and may indeed be considered as relevant for the special issue dedicated to ChArMEx. Its overall presentation (including the title, the abstract and the figures) is appropriate, clear and globally well structured.

It presents results of wintertime BC and CO source apportionment results obtained for Athens, Greece. To do so, authors claim they are using two different and independent methodologies. However, the “CO/NO<sub>x</sub> ratio” approach appears to be irrelevant in the present case, so that outputs are not used for the purpose of the study. My only major

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comment is related to this latter issue, and I would recommend presenting the use of the “CO/NO<sub>x</sub> ratio” approach in another way (or to simply skip it).

More specific comments are listed below: - Abstract, line 21: occasional significant impacts of long-range transport are not really discussed/demonstrated in the manuscript. - Page 2, lines 16-23: it is not clear within which periods the discussed increases/decreases were observed (e.g., lines 16-18: a constant increase of 30% every year since 2012 ? or an increase of 30% for the period 2012-201x, compared to which period ? ...). - Page 3, line 9: how much “relatively far” from major roads? - Page 3, lines 18-26: it may be worthy to indicate more clearly this data correction procedure was applied to AE42 (and AE31) datasets only. Also, what could be the uncertainties related to the use of  $f_{\lambda}$  values that weren't estimated for this individual instrument / site? Finally, what could be the impact of the PM10 cut-off, compared to the PM2.5 used at the other site ? - Page 4, line 6-7: please indicate whether this value was also obtained using the 1.64 “ACTRIS correction factor” (as used by Zanatta et al., 2016) ? - Page 4-5, BC and CO source apportionment: please discuss here possible interference from coal combustion emissions. - Page 5, BC source apportionment: please justify/discuss a bit more the choice of  $\alpha_{wb} = 2$  by comparison with value recently proposed by Zotter et al., 2017. - Page 6, line 36 - Page 7, line 7: the expected diurnal cycle of the intensity of emissions could be discussed more deeply here. - Page 8, line 25 (% CO<sub>wb</sub>): please discuss these percentage regarding previous studies/results. - Page 9, line 25-26: here, it sounds like wind speed is controlling the diurnal patterns. Please consider rephrasing this sentence. - Figure axes: please homogenize the use of “BC” / “eBC”. - Figure 7, right panel: legend of the y-axis seems inaccurate.

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