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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sources and mixing state of size-resolved elemental carbon particles in a European megacity: Paris" *by* R. M. Healy et al.

G.W Fuller (Referee)

gary.fuller@kcl.ac.uk

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The discussion paper reports and analyses measurements of ambient carbon particles during the MEAGAPOLI campaign in Paris in 2010 using a range of measurement techniques. The paper is clearly written and offers useful conclusions regarding the sources and concentrations of carbon PM in the city. The Paris city network, Airparif has recently completed a year-long PM source apportionment study to provide an evidence basis for the development of PM abatement polices. The results of this paper will make a very valuable contribution to this initiative.

In addition to quantifying PM carbon and its sources in the city the paper also provides

valuable data to help interpret measurements from different techniques adding to the growing body of data on athelometer measurements for instance.

I have a number of questions and observations:

P 30335 line 25: Soil scientists frequently separate carbon particles into soot and char depending on their physical properties, See Y. Han et al. / Chemosphere 69 (2007) 569–574. And Han et al 2010 www.atmos-chem-phys.net/10/595/2010/

P30336 line 1: It would useful to refer to the UNEP 2011 report on short lived climate forcing agents which includes black carbon. The report which is aimed at policy makers provides a very valuable context to this work, see http://www.unep.org/dewa/Portals/67/pdf/BlackCarbon_SDM.pdf

P30336 line 13: Strictly speaking low emission zones focus on PM reduction as their objective rather than BC. I agree that the focus of LEZ measures on tailpipe emissions should lead to decreases in BC.

P30342 Line 5: Would it be useful to explore different assumptions of particle density in a sensitivity analysis?

P30342 Line 28 (and elsewhere, including figures): It may be clearer to refer to the PM2.5 measurements technique as FDMS-TEOM to distinguish from the older style TEOM.

P30344 Line 12 Where is the SITA site relative to LHVP?

P30346 Section 2.4: I think that this needs to be re-written in the past tense.

P30346 Line 23: What is the lowest layer of the model and how does this compare with typical boundary layer heights for February?

P303347 line 9: It may be good to reference a study that has used K+ as a tracer for wood burning EC.

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P30347 line 14, P30348 line 9 and Figure 2: I am concerned that the diurnal profile for EC biomass looks almost identical to ECtraffic, with the sole exception of the morning peak around 8h for ECtraffic which is not reflected in ECbiomass. EC from both sources would be affected by the same urban dispersion processes before arriving at the measurement site but the data in Fig 2 raises questions about the separation of these sources. Could day of week day results be shown also? The weekday/ weekend profiles for ECtraffic and ECbiomas may show greater differences than those shown in Fig 2.

P30349 Line 8: EU fuel quality regulations required the transition to < 10 ppm sulphur in road fuels by the time of the study. With little diurnal variation in ECOCSOx is it safe to assume a road traffic linkage? A small number of studies have found very large changes in particle number emissions with the transition to so-called ultra-low diesel, in the EU and US (I can send these by email if you wish). It would be worthwhile checking the S in road fuel in Mexico (and Tokyo?) before drawing comparison to the Paris measurements. Are there industrial sources in the Paris region that emit large amounts of SO2?

P30354 Line 11. The ATOFMS measurements differ from the Sunset during period IV as shown in Fig 5 and stated in the text. Looking at the supplementary material it appears that the ATOFMS also departs from the MAAP and aethalometer during this time, perhaps adding weight to the suggestion that this is an ATOFMS artefact.

Regarding the figures in general it might be good to increase the font size for some of the index lables. I did have trouble reading them clearly. This is especially the case with Fig 5.

I hope that these comments are useful.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 30333, 2011.

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