

Interactive comment on “Spatiotemporal distribution of light-absorbing carbon and its relationship to other atmospheric pollutants in Stockholm” by P. Krecl et al.

Anonymous Referee #2

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This manuscript presents results of a study in Stockholm where the distribution of particulate light absorbing carbon across the city (three sites) is investigated. A rural site provided background concentration data. MLAC was shown to decrease with distance from the road in the urban locations and correlations with other species (NO_x) suggested the source of the MLAC was motor vehicle emissions.

The authors use a series of simple statistical tests to understand the relationships between sites displayed by MLAC concentrations and the relationships between MLAC and other species to understand the source of MLAC.

Specific suggestions Page 13280 Line 15 “Hourly mean and standard deviation MLAC

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concentrations ranged from 0.36 (rural) to 5.39 μgm^{-3} (street canyon) and from 0.50 to 3.60 μgm^{-3} , respectively” This is a confusing way to express the mean and standard deviation. It would be clearer to write Hourly mean ($\pm$ standard deviation) MLAC concentrations ranged from 0.36 $\pm$ 0.5 at rural sites to 5.39 $\pm$ 3.60 μgm^{-3} at the street canyon sites.

13282 Line 21 Specify the EU Standard levels

Page 13288 The authors have included in the introduction four reasons for the need to carry out simultaneous and continuous time-resolved LAC measurements in different parts of a city. A discussion later in the paper that specifically describes how this work addresses these reasons would enhance the outcomes of the paper.

Page 13288 Line 21 A description of the method used to handle missing data is required. Specifically since this work focuses on spatial distributions of MLAC it would make sense to only compare times when no data are missing (i.e. if one site has missing data for a particular hour then the data for the other sites for that hour are removed). The number of samples specified in Table 1 suggests this is not the case. An explanation for including all the data is required.

Page 13292 Line 9 We would expect there to be a relationship between PM_{2.5}. Please comment on the reasons for the lack of a linear relationship between PM_{2.5} and MLAC. Is this a data quality issue, a measurement issue or is there a physical reason?

Page 13293 Does the data display a normal distribution? This is a requirement for the application of an unpaired t test. Line 26 “explained by the growth of the mixing layer depth and strong turbulent mixing during the afternoon”. This statement implies that you have data on the mixing layer depth and turbulent mixing. It may be more correct to write “partially explained by the well-documented growth of the mixing layer depth and strong turbulent mixing during the afternoon commonly observed in urban locations”.

Page 13299 Lines 14 and 23 It is not clear what the value of including the statement

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(not shown) contributes to the paper. Why did the authors choose not to show these correlations in Table 5 if they are worthy of specific comment in the text Table 1 and 4 could be combined and the percentile information in Table 1 could be shown graphically

Tables 2 and 3 could be combined

Figure 7 trend lines should be differentiated

Figure 8. Is this the best way to show the information? For example if the concentrations are relative to background concentrations then all the green bars should span 100%, In the diagram MLAC is approx 80% and PM2.5 approx 5%.

General ensure all acronyms are defined e.g. IMT, bap

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 13279, 2011.