Atmos. Chem. Phys. Discuss., 14, C4624–C4626, 2014
www.atmos-chem-phys-discuss.net/14/C4624/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Kerb and urban increment of highly time-resolved trace elements in PM_{10}, $PM_{2.5}$ and $PM_{1.0}$ winter aerosol in London during ClearfLo 2012" *by* S. Visser et al.

Anonymous Referee #2

Received and published: 9 July 2014

The manuscript contains results obtained in an extensive study at urban and rural areas in London, UK. The analysis is focused (but no limited) to elemental contents in several fractions of atmospheric particulate matter. Although the general quality of the paper is good, it is necessary to discuss and improve several aspects, which I explain below. 1. I am concerned about the agreement of the measurements using RDI and PM10 filters, in particular for some elements. The question here is: what are the truly accurate values to be considered in the paper? This problem would not exist if certified reference materials had also been analyzed. Please, do not confuse this accuracy determination with the calibration process, which is thoroughly described in section

2.2.1. The main drawback is that the forthcoming discussions in the manuscript may not have a strong basis. 2. Some of the elements affected by the above situation are very important for studies related to elemental concentrations in aerosols. For example, S and K, which are valuable for tracing human activities and/or biomass burning, in page 15907, present doubtful values. Regarding those of Na and Mg, it is not clear to me which values should be taken as more accurate (XRF or ICP). 3. Although the authors made the evaluation of the concentrations using the DE data as a reference, there may be other procedures that provide information about the origin of the elements. A simple method is the use of the Enrichment Factor (EF). Using the figures given in Table 2, I calculated the EF for the elements Fe and K, usually associated to particles with a geological (soil) origin, using Si as reference element and average Earth crust composition. It is possible to find that in the three sites, the EF for Fe in the coarse fraction is very high (of the order of 10), which may agree with the hypothesis given by the authors relating Fe to brake wear. Moreover, I would expect the contribution of brake wear in the rural site to be very low, approximating EF to unity and suggest a soil origin. Instead, the EF is higher at the DE site than the urban one. The authors should try to explain this. EF for Fe in the finest fraction is closer to 1, associating it to a crustal origin. As for K, for the coarse fractions the EF is almost equal to 1. However, for the finest fraction in the three sites it is higher than unity, in particular for DE, where the value is almost 20, showing it has a different origin than soil. I am including a table with the EF (with the last three columns giving the average EF for each site). It may be advisable to calculate the EF for the other elements, not necessarily to include in the manuscript, but as a guide to better understand the origin of each element. 4. In the conclusions, Fe is initially associated to traffic, then it is excluded from the list of brake wear related elements. In the text, however, it was suggested to be produced by brake wear and even a reference is given. Please clarify this point. 5. In several cases, the association among the elements does not look strongly justified. For example, why V and Ni are related to traffic? In many studies they are related to industrial sources (fuel oil burning and

they are strongly correlated to S). Also, Zr is often linked to soil-derived particles in other papers. 6. The paper is very long, and maybe some parts may be reduced, as the comparison with other techniques. 7. Finally, a major problem in the entire manuscript is that there is no mention to experimental uncertainties, except for a few elements (Na, Mg or Mo), but there is not a careful explanation on how they were estimated. It is mandatory to present uncertainties in every experimental/laboratory work.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/14/C4624/2014/acpd-14-C4624-2014-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 15895, 2014.