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Interactive comment on "A new method for estimating aerosol mass flux in the urban surface layer by LAS" *by* R. M. Yuan et al.

Anonymous Referee #1

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Comments:

The manuscript presents a novel method for estimating aerosol vertical transport flux in the urban surface layer by LAS. This subject is interesting to the air quality modeling and light propagation communities. The theoretical analysis and experimental observation demonstrate the rationale of this new method. However, some technical details are confused.

Technical issues:

1. About the Eq.(8) for the relationship of aerosol absorption and the imaginary part n(Im). The application of this formula in this study is confused because the visibility-derived aerosol extinction can not be related to the aerosol imaginary part n(Im) in this way. In other words, the visibility-derived aerosol extinction is much different from

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Discussion paper

the aerosol absorption due to the aerosol scattering contribution. In this study, for the visibility-derived aerosol extinction in the open atmosphere, the aerosol scattering coefficient is often dominated in comparison to the aerosol absorption. On the other hand, for the filter-based techniques or integrated plate measured aerosol absorption (Moosmüller, et al., 2009), it can be referred to or equal to the aerosol extinction because the aerosol scattering might be small enough to be ignored.

In addition, the citations or the reference for this formula should be given with the page number.

2. Page 10, Line 10. What is the means of parameter "z/L"? Why it represents the atmospheric stability? How to get it?

3. Is it possible to make the vertical wind velocity measurement in the meteorological tower? It may help explain the vertical transport of aerosol mass.

Minors:

1. Page-12, Line 2-3 "which is similar to the main aerosol source in Hefei City". Please delete it. The air pollution mechanism and process in Hefei might be more complex and much heavier.

2. Some citations or the references from the books should be given with the page number.

References: H. Moosmüller, R.K. Chakrabarty, W.P. Arnott, Aerosol light absorption and its measurement: A review, Journal of Quantitative Spectroscopy and Radiative Transfer, Volume 110, Issue 11, July 2009, Pages 844-878, ISSN 0022-4073, http://dx.doi.org/10.1016/j.jqsrt.2009.02.035. (http://www.sciencedirect.com/science/article/pii/S0022407309000879)

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