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Comment

***Interactive comment on* “Laboratory investigation
of photochemical oxidation of organic aerosol
from wood fires – Part 2:
Analysis of aerosol mass spectrometer data” by
A. P. Grieshop et al.**

Anonymous Referee #2

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This paper provides a rather comprehensive qualitative coverage of the evolution of AMS spectral properties during photochemical aging of biomass smoke. It is certainly an important development compared to oversimplified early interpretations of AMS data. The approach taken by the authors (and also by many others in the AMS community) tacitly considers individual fragments as if they were tracers of individual compounds with given physical and chemical properties, and discuss their evolution as such in the course of the experiments. In particular, the use of the terms "tracer"; and "marker" for mass fragment peaks (from page 17101 onwards) can be misleading

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(these terms are reserved for specific individual compounds in source apportionment studies). However, AMS is clearly not a technique for speciation and quantification of individual organic compounds. Several mass fragments may result from any single compound in the ionization process with highly variable ionization efficiencies. Therefore the conclusions regarding the evolution of single mass peaks must be treated with great care. The AMS data in general imply the evolution of the chemical functionalities rather than that of individual compounds with assumed volatilities and chemical characters. This is vaguely implied by the authors when they discuss the high degree of similarity between AMS spectra of wood smoke aerosols and aged Diesel emissions, in spite of their obviously distinct chemistry on the molecular level (page 17114 lines 10-15). The approach taken by the authors may also be used within this concept: a functionality can still be regarded as a measure of primary emission or secondary formation, and its evolution can be discussed accordingly. The main conclusions presented by the authors are still important and valid; however, putting them in a different context may help bridge the gap between organic aerosol speciation and AMS studies which would be highly desirable.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17095, 2008.

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