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Atmospheric Chemistry and Physics
Discussions

Interactive comment on “Source apportionment of carbonaceous chemical species to fossil fuel combustion, biomass burning and biogenic emissions by a coupled radiocarbon-levoglucosan marker method” *by* Imre Salma et al.

Anonymous Referee #2

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The paper describes two weeks measurement aiming to characterisation of carbonaceous aerosol in Budapest using combined approach that utilizes both organic tracers and radiocarbon data for determination of biomass, fossil fuel, and biological origin particulate matter shares. Besides basic statistics of obtained data, the authors present a new updated scheme how to apportion elemental and organic fractions to their source categories without their separation before radiocarbon analysis. Although their approach can be useful in cases when pre-separation of EC and OC before radiocarbon analysis is not available it of course increases uncertainty of the apportionment of these fractions. Main added uncertainty to the classical method of radiocarbon analysis with the split of EC and OC before the analysis is included in predefined value of ECBB to OCBB ratio. Nevertheless, the authors do not comment uncertainty connected with this value at all. Moreover, although they found that one of the samples was probably contaminated by artificial 14C release, they omitted to discuss a possibility of such influence on the other samples. Finally, although the authors say that their OCBIO is in line with Simpson et al. (2007) the opposite is true due to different definition of fractions. The observed result was 0.17 μg/m3 of OCBIO in K-puszta for winter (primary biogenic particles), which was roughly 0.2% of TC in PM10 and ca 20% of TC was attributed to non-fossil SOA. Therefore the reviewer suggests to call the last OC fraction same way (non-fossil SOA), also with regard to the text on page 12, line 44. The authors also spend quite a lot of space describing aethalometer and other online instrumentation results but they did not use an opportunity to test their method with aethalometer source apportionment method. Besides these major issues, several other specific comments are summarized below. Therefore major revisions are needed before publishing the paper in ACP.

Page 4, lines 33-34: No blank uncertainty is given for mass on Nuclepore and quartz filters

Page 6, line 1-2: It seems unusual to combine online PM2.5 mass with offline filters (PM10-2.5) to construct PM10, especially when PM2.5 mass from filters is available even from the same filter pack. Moreover, fine fraction from Ghent SFU is rather PM2 than PM2.5 (Hopke et. al 1997) and therefore coarse fraction will be probably PM10-2 instead of PM10-2.5.

Page 6, line 7 and elsewhere: The term “data lines” should be probably “data points”

Page 12, Fig 3.: The scheme is quite unclear, needs improvement.

Page 14, line 5: The term “tendentious” seems not properly used in the text several times (three times on this page), please check.

Reference: Hopke, P. K., Xie, Y., Raunemaa, T., Biegalski, S., Landsberger, S., Maenhaut, W., Artaxo, P. and Cohen, D. 1997. Characterization of the Gent stacked filter unit PM10 sampler. Aerosol Sci. Technol., 27 726-000000–735

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