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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Inter-comparison of source apportionment models for the estimation of wood burning aerosols during wintertime in an Alpine city (Grenoble, France)" *by* O. Favez et al.

Anonymous Referee #3

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General comment: This paper interestingly assesses the differences in wood burning contribution to carbonaceous aerosol estimated from various source apportionment techniques. It also addresses quite seriously the question of uncertainties in source apportionment studies. However, it does not tell how uncertainties in measurements and coefficients (e.g. OC to OM conversion factor) found in the literature affect the final source apportionment results when using CMB? Also, only the central value of the estimates is often considered, which somehow minimizes the impact of the uncertainty assessment, which is not always justified. For instance, a conclusion of this work could be that fossil fuel and wood combustion could equally contribute to EC concentrations in Grenoble during wintertime, taking into account the range of estimates.

Also, observed diurnal cycles are explains in terms of changes in source strength. Is this explanation consistent with the aerosol lifetime? Could observations be in turn explained by gas/particulate portioning shifts ? A last point which could be mentioned in the manuscript, is that such a source apportionment study tells about contribution to the OC species collected on filters, and not necessarily to atmospheric particulate organic carbon, since sampling artifacts are known to be significant for theses species.

Specific Comments:

Section 4.1: The whole discussion of wood emission profiles could be shortened, as actually two profiles only seem realistic. p 574, lines 23-24: should be discussed in scientific rather than technical terms. E.g. are the 4 wood profile combustions equally probable ? Do they all lead to a same wood burning source contribution to OC ? p. 575, line 1: this statement is again too technical, and perhaps confusing. Readers would need to know if the BBECO profile is consistent with measurements or not, when the same analytical protocol is used for both ambient and emission EC/OC ratio measurement, of course. p. 576, lines 4-6: could the larger contribution of wood burning to OC during night be attributed to the fact that wood burning produces a lot of semi-volatile species, which condense during night ? p. 576, line 9-10: could the diurnal cycles in traffic and "other source" contributions to OC be explained by the diurnal cycle in wood burning emission only ? p. 579, line 24: one OF the most... p. 583, line 5: how were the values for possible overestimation and underestimation of BC(wb) and OC(wb) obtained? p. 586, line 2: such A satifactory... p. 589, line 15: "globally" is not the proper word.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 559, 2010.