Atmos. Chem. Phys. Discuss., 11, C10360–C10362, 2011
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Fossil versus contemporary sources of fine elemental and organic carbonaceous particulate matter during the DAURE campaign in Northeast Spain" *by* M. C. Minguillón et al.

Anonymous Referee #3

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This manuscript thoroughly discusses the source apportionment of carbonaceous aerosols at two sites in northwestern Spain. The authors quantified contributions of fossil and nonfossil carbon to both EC and OC using 14C data, AMS, receptor models, and organic tracer measurement. This manuscript is well written, clearly organized and gives useful information for those who are working on field measurement of aerosols as well as on receptor models and air quality models. I recommend for publication after the following modification.

1. The authors introduced highly uncertain parameters (particularly, (1a) and (1b)) for

the source apportionment of EC and OC from literatures (e.g., Hildermann and Hodzic) without discussing uncertainties.

(1a) OC_urb/(OC_f+OC_urb) ratio (0.2, p.23592): This ratio affects OC_bio, and thus, assumption of this value is critical in the conclusion about the OC_bio ratio between summer and winter. (1b) HOC_f/HOC ratio (0.8, p. 23594): This ratio affects OC_f/OC_nf ratio, and assumption of this value is critical in the conclusion about the ratio of primary-to-secondary fossil OC.

As accuracy of these parameters are critical in deriving conclusions of this study, the reviewer recommends the authors to assess uncertainties in these parameters (or at least mention that the conclusions may change when these parameters change).

2. The authors concluded that PMF-OF is less accurate than the other techniques for the source apportionment of biomass burning OC (p. 23596), while the authors did not show the basic information of the PMF-OF. Results of PMF-OF are expected to change depending on species selection, interpretation of factor profiles, number of factors, and other conditions. As Pandolfi et al. is not available at the moment, the authors should briefly explain these points, so that readers can judge the validity of the conclusion of this analysis. In particular, it is highly required to show a factor profile of biomass burning, so that the readers can obtain information of the key species of this source estimate.

3. As 14C measurement uncertainty is important in this analysis, the reviewer requires the authors to clearly show overall uncertainty of 14C measurement and brief description about its derivation. Recently, it was shown that blank 14C may largely affect accuracy of 14C measurement (e.g., Fushimi et al., EST, 45, 6784-6792, 2011). Description about the treatment of blank 14C is also recommended.

4. p. 23590, l. 20: Temperature is not the only key factor of biogenic VOC emissions. How about the differences in vegetation between Spain and Goteborg/Zurich? Are biogenic VOC emissions surely higher in the northeastern Spain than in the southwestern

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Sweden or Switzerland in winter? Figure 5 in Guenther et al. (ACP, 6, 3181–3210, 2006) shows that isoprene emissions are not necessarily higher in the northeastern Spain than in the southwestern Sweden or Switzerland in winter. What about monoterpene?

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 23573, 2011.

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Interactive Comment