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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source apportionment of the summer time carbonaceous aerosol at Nordic rural background sites" *by* K. E. Yttri et al.

Anonymous Referee #1

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This work presents a source apportionment analysis of carbonaceous aerosols in 4 Nordic rural background sites. The dataset is interesting, as it includes resuls on organosulphates and nitrooxyorganosulphates, which are rare in the literature. The approach used by the authors is not highly novel given that it has also been applied at Norwegian monitoring stations in a piece of work which is currently under review in this same journal. The introduction and methodology sections are very thorough, which is positive as the work may be used as reference for a review on organic aerosol sources.

Specific comments: - page 2, line 4: "accounting for 4-12% of TCp", this sentence is misleading, it may seem to the reader that FF=4-12% of EC,which is incorrect. Please rephrase to avoid this. - page 2, ine 1: "3-7% was explained by combustion of biomass":what would the authors expect to obtain in winter? How would this pic-

ture change? - Page 6, line 13: what is the vehicle flow/day at the A6? - section 2.2: there are two limitations which should be discussed: (1) the authors state they use Whatman filters, which are known to have high Na-contents and therefore tend to frost the combustion oven in the Sunset analyser, reducing the laser signal transission. How do the authors detect this degradation of the laser signal, and correct for it? (2) QBQ setup:the authors should mention the limitations of this approach, whereby gas phase organics may not have time enough to reach equilibrium and condense/adsorb onto the backup filter, therefore underestimating the positive artefact. - section 2.11: how much do the authors estimate that negative artefacts accounted for? With 1-week exposure their influence should be considerable. Can the authors estimate the contribution from negative artefacts? - section 4: line 25, "assumed emission ratios": please provide the ratios used for reference for the reader,even if they are also in Yttri et al 2011. How variable are these ratios? OC/EC may vary lagely from diesel to gasoline. - line 28: TCbb: please add that it also includes primary and secondary particles, as in the case of TCff. - It seems that the SOA tracers (isoprene, etc) were not used in this analysis. Is this correct? - Were potential interactions between C species on the filter accounted for? With such long sampling periods this kind of interaction is rather likely, and it would result in mixed aerosol sources. - Plaease add the detection limits for OC and EC analyses. - line 2 on page 17: "the current study covers one of the longest periods..." this might be true, but it is still a rather short measurement period. - It would be useful to see ratios levoglucosan/OC, levoglucosan/(mannosan+galactosan) and levl/mannosan, for comparison with the literature and aiming to characterise the type of wood. - figure 3: "aricultural use category": please define, how is this quantified? does the land use change with time? This is unlikely. Figure 3 is rather unclear and would require clarification in the text. Same for "evergreen surface category " in section 6.3, how is this quantified? - reference Winiwarter 1999 is missing from the reference list. - section 6.5, page 22, line 7: "PBAP sources otherwise introduce uncertainty": some words seem to be missing in this sentence, please revise. - section 6.6, title: please add "aerosol" as "Biogenic aerosol oxidation products" - Table 2: please add

units for F14C TC - Table 3 header: please add "b.d:below detection"

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16369, 2011.