

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

Anonymous Referee #2

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The current manuscript adds to a list of recent publications on source apportionment of carbonaceous aerosols combining molecular and isotopic tracers with Monte-Carlo-like solution of complex equation systems. Here, results from Scandinavian rural sites during summer are presented indicating primary and secondary biogenic sources to be dominant, which should be accepted for publication in ACP.

General comment:

I realized that this work applies techniques from Yttri et al. (2011), which is in turn under revision in ACPD at the moment. I expect that acceptance of the present work depends on the decision upon Yttri et al. (2011) and that requested revisions of the technique will be adapted here as well.

C6395

Specific comments:

The QBQ approach is a nice idea to correct for the positive sampling artifact. I wonder, however, whether it was used in an appropriate way in this work. In Genberg et al. (ACPD 11, 13575-13616, 2011), a correction factor of 2.16 was found for Vavihill using teflon-quartz-quartz stacks in similar sampling systems. This means that the SVOC concentration of the back filter has to be multiplied by this factor to account for the positive artifact on the front filter. As nothing is documented in this work, I assume that such a correction factor has not been applied (although site, season, and contributing authors are identical at least in part). This suggests that the TC_p and OC_p numbers given in Table 2 are substantially overestimated affecting all source apportionment results of the manuscript, as TC_p is their basis. This should be improved.

Sections 2.5-2.10 show limits of detection and/or quantification for the different components in an inconsistent way. Only one term should be used (lod or loq) and levels should be given as ng/cm² and corresponding ng/m³. All components should be considered (at the moment, such levels are missing in sections 2.7 and 2.9).

In section 7.4, the use of indicative and subjunctive does not reflect to me the stages of known facts and speculation. It should be adjusted to assured and hypothetical statements, respectively, e.g. as follows: “could be” instead of “was” in line 2, “suggest” instead of “show” in line 6, “shows there are” instead of “could suggest there may be” in line 14.

Technical comments:

PM₁₀ should be defined at first usage on page 16371, line 4.

The abbreviation LRT should already be introduced on page 16374, line 16 (instead of page 16375).

Page 16374, line 26: of anthropogenic

How is it possible to extract 20cm² from a 47mm filter, which probably has an active

C6396

sampling diameter of 35mm (page 16377, line 17)?

In order to omit ambiguities, "Elemental carbon was" should be substituted by "Solid graphite targets were" or a similar description on page 16377, line 20.

The cellulose concentrations on page 16388, line 7 don't fit with the results of Table 2.

Table 2: Dividing EC by TCp concentrations does not equal given EC/TCp ratios; the unit of F14C is not %; the term "(MW=264)" is written twice for this organo-sulphate; the value for organo-sulphate (MW=280) for Hyytiälä should read 0.10 ± 0.13 .

Figure 2: The unit in the annotation of the y-axis should read $\mu\text{gC}/\text{m}^3$.

Figure 4: The caption should read "...and Vavihill filter samples (PM10) from LHS analysis".

Supplementary tables: The captions should read "Calculated contributions to TCp...".

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