

Interactive comment on “Light absorbing carbon in Europe – measurement and modelling, with a focus on residential wood combustion emissions” by J. Genberg et al.

Anonymous Referee #1

Received and published: 30 May 2013

In the manuscript, the authors simulated the concentration of elemental carbon (EC) in Europe with EMEP MSC-W model, which applied a new emission inventory for carbonaceous aerosol from residential wood combustion than previous estimates. The modeled results were compared with measured EC concentration in eight sites, and the model bias was within 20 percent at most examined site. The model results suggested that fossil fuel combustion is the dominant source of EC in most Europe, and there are important contributions from residential wood burning and open biomass burning as well. The authors also compared EC with measured black carbon (BC) concentration in these sampling sites but found that it was difficult to compare results

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due to measurement artifacts. Finally, the authors evaluated the model sensitivity to EC aging, and suggested that the aging scheme may lead to too rapid aging of EC in rural parts of Europe.

The manuscript is generally well written and clearly organized. The results are presented with sufficient figures and tables, as well as supplemental information. The research demonstrates the model to estimate EC concentration in Europe and can be fit in the scope of ACP very well. Overall, I recommend the publication of this manuscript in ACP after consideration of the specific comments as listed below.

- Page 9061, the last paragraph, the authors pointed out the two different meteorological drivers lead to difference for PM_{2.5} and worse model results can be expected for the latter one. Can the authors explain more why they didn't use the same meteorological driver over all the years?

- Page 9066, Line 26, references are needed to demonstrate that emission and deposition are better known for NO_x.

- Page 9069, Line 28, I suggest the authors provide one sentence to briefly summarize the results of EC due to vegetation fires in Birkenes instead of only referring to Section 3.5.

- Page 9070, Line 10, references are need to explain the irregular behavior of the Aethalometer due to high amounts of sea salt and high humidity.

- Page 9072, Line 10 – 14, could the authors provide for details about the Norwegian and Swedish measurement protocols, such as some references if possible? I understand that cooling would results in more condensable organics to be captured. However, dilution can cause the evaporation of semi-volatile organic carbon, which

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leads to less condensable organics to be captured.

- Supplemental Information, Figure S2- S8, line plots may better show the time variation of modeled and observed data than scatter plot, just as what the authors did for Figure S1.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 9051, 2013.