

Interactive comment on “Large contribution of fossil-fuel derived secondary organic carbon to water-soluble organic aerosols in winter haze of China” by Yan-Lin Zhang et al.

Anonymous Referee #2

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The manuscript “Large contribution of fossil-fuel derived secondary organic carbon to water-soluble organic aerosols in winter haze of China” deals with the source apportionment of water-soluble organic carbon (WSOC). The sources of this carbon fraction are not well known and few studies exist that focus on the source apportionment of WSOC. Therefore this study is of interest and the combination with aerosol mass spectrometer measurements adds very interesting information of primary vs. secondary organic carbon. Overall, I find the manuscript clearly written and the measurements and calculations thorough and accurate.

In my opinion it can be published after relatively minor revisions.

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1) Somewhat major comment: The only point that I don't find very clearly described is section 2.3. This section could maybe be shortened on explaining how the PMF works (e.g. Eq 1 could be omitted), but it should contain more detail on the results of the PMF that are relevant for this work.

1a) Are the PMF results from Huang et al. (2014) directly used, or after some modification?

1b) Explain in more detail how the scaling of the factors works in your case. Eg, in line 135 I do not know what you mean by "here only WSOC PMF is present ...". I suggest not to mention how Huang et al. (2014) scale their factors, because this is only confusing and not relevant for this work.

1c) line 158 – 161, give a bit more detail on these factors (preferably in supporting material)

1c) Eq. 1: you mention s_{ij} , but it is not in the equation?

1d) line 161 – 162: "The contribution of the water soluble organic aerosol related to these different factors are extracted ..." How are they extracted?

1e) line 162 ff: Please provide more detail: What are "the respective OM/OC_k ratios" for each factor? Please provide values for each factor and more detail on how they were derived. I think the values should be included in the main text, the rest could be in the supporting material.

Minor comments: 2) Line 191ff: Please give a bit more detail on how you estimate the factor 1.08.

3) Line 236-254: You start the result section with a summary of previous findings of other papers. This would fit better in the introduction

4) line 252: "(three with the highest three with average PM mass)" At first I was confused by this, but I believe that there is just a comma missing?

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5) Table 1: Since you have relatively few data points from PM_{2.5} samples in Europe, I suggest to take a look at a recent publication that also had data related to fossil and non-fossil WSOC. Maybe some useful information can be found in that. Dusek, U., et al., Sources and formation mechanisms of carbonaceous aerosol at a regional background site in the Netherlands: Insights from a year-long radiocarbon study, Atmos. Chem. Phys., 17, 1-19, 2017.

6) Please correct minor grammatical errors throughout the manuscript ... e.g. the example from above: "The contribution of the water soluble organic aerosol related to these different factors are extracted ...", should either read "The contribution ... IS extracted" or "the contributionS ... are extracted" I noticed several similar instances throughout the manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1130>, 2017.

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