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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observations of nitrated phenols in four sites in North China: Concentrations, source apportionment, and secondary formation" *by* Liwei Wang et al.

Anonymous Referee #2

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The authors measured several species of nitrated phenols in PM2.5 filter samples at several sites in North China. A positive matrix factorization (PMF) receptor model was applied to investigate the sources of nitrated phenols, which were found to be traffic, coal combustion, biomass burning, secondary formation, and aged coal combustion. Discussion of the secondary sources of various nitrated phenols was included.

I find that this manuscript includes a nice analysis of diurnal, seasonal, and spatial differences in the measured compounds, which are important constituents of organic aerosol. The strength of the manuscript could be greatly improved by including more detail about nitrated phenol species identification, as well as more detail about how

the PMF model was run and how the solutions were chosen. I would recommend this paper for publication after considering the following comments:

General comments:

Title: For clarity, you may want to specify in the title that you measured "particulate nitrated phenols" instead of just "nitrated phenols", as you have done in the abstract and other places.

Pg. 3 Ln. 3: Please add citations to support this sentence.

Pg. 3 Ln. 27-Pg. 4 Ln. 2: These last two sentences in the introduction are actually statements of your results, which should not be included in the introduction. Please consider revising these sentences so that they simply state what you did and are about to present, and not what you found.

Pg. 6 Ln 1-2: Why did you multiply by 1.8 and 2.0?

Pg. 6 Ln. 23: I suggest that you show evidence for how you identified these nitrated phenol species. For example, you could show chromatograms of the standards compared with the filter measurements. Otherwise, the reader has to simply trust your identification, which is not good procedure.

Pg. 8 Ln 16-20: It is not clear how you used the PMF receptor model and how you arrived at the solution shown in Fig. 3. Please give more details about the model, including citations for model development. Did you investigate solutions with more/fewer factors? How well does this model capture the trends given the fact that you have only two data points per day?

Sect. 3.2.1: Typically, PMF factors are identified by, e.g., showing a correlation between factor loading and some external tracer. You seem to have assigned factor identifications based on mostly assumptions, rather than by showing evidence. Can you provide more evidence for the identifications? Particularly, can you provide more evidence for the identification of the coal combustion factor, since this was presented

as a ‘surprising’ result? Otherwise, perhaps you could modify the language to reflect that the identifications that you’ve given are hypotheses and have some uncertainty.

Pg. 11 Ln. 23: Could it be the case that nitrated phenols and NO2 are simply emitted by the same sources, rather than higher NO2 causing higher nitrated phenol concentrations? I have the same question for the comparisons of NO2 with NSAs and NPs later in this section.

Technical details:

Pg. 3 Ln. 4: Please change “secondary formations” to “secondary formation”, here and throughout the manuscript.

Pg. 3 Ln. 14-15: Remove the text “from time to time”.

Pg. 4 Ln. 14: Please specify what “TEC” stands for, here and elsewhere.

Pg. 4 Ln. 22: From this line until the end of Sect. 2.1, you should change from present to past tense in order to be consistent with the rest of the text. E.g., change “is” to “was” in this line.

Pg. 5 Ln. 10: “Less frequently” than what? Do you mean “infrequently”?

Pg. 5 Ln. 22: Instead of “restored under”, I think you mean “stored at”.

Pg. 6 Ln. 20: Change “kinds” to “species”, here and elsewhere.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2017-952, 2017.