

Interactive comment on “Molecular characteristics and diurnal variations of organic aerosols at a rural site in the North China Plain with implications for the influence of regional biomass burning” by Jianjun Li et al.

Anonymous Referee #3

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This manuscript presents measurement results from a field study conducted in the North-China Plain, which is notorious for high aerosol pollution. While suffering slightly from a relatively short measurement period, this study presents an impressive suite of organic aerosol component concentrations at a rather high time resolution. Two specific periods were singled out, including one episode with high biomass smoke impact. The results presented in this paper are helpful for a better understanding of the sources and characteristics of organic aerosols in this highly polluted part of China. Prior to publication of the manuscript in ACP, the authors should address the comments and

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suggestions below.

Specific comments:

1. Line 136: The total sampling period is rather short, especially when dividing it into 2 special periods, requiring caution in the discussion of the measurement results. The authors may want to add a statement regarding how representative the data are.
2. Lines 161-163: The authors corrected the data for the field blanks, although the blank values were relatively low, in contrast to the recoveries which introduced larger errors for certain species. Why were the recoveries not taken into account as well?
3. Lines 220-223: Do the authors have a possible explanation for the rather low OC/EC ratios measured during the biomass burning period? Previous studies, especially those investigating burns which were dominated by smoldering combustion, were characterized by emissions with significantly higher OC/EC ratios. Is it possible that the wheat straw combustion during the study period occurred to some extent in the flaming phase?
4. Lines 241-245: Indeed, the regional biomass burning activities contributed to the elevated WSOC/OC fractions, but it may also be worthwhile mentioning here (as the authors do later on in the paper) that SOA was likely produced in the biomass burning plumes (especially considering the transport distance/time to the sampling site), and thus contributed to the higher degree of oxygenation of the organic aerosol as well.
5. Lines 287-288: It would be helpful for the readers who are not familiar with these diagnostic ratios to at least briefly explain how the high L/M ratios indicate straw burning.
6. Lines 288-289: How are the anhydrosugar emission ratios of lignites relevant to this study? Wouldn't it be more useful to mention results from some of the previous studies which specifically investigated anhydrosugar emissions from burning of straw or similar types of biomass?
7. Lines 290-294: It would be helpful if the authors showed more quantitative results,

e.g., state what is considered "higher". And how specifically do these results confirm the contribution of wheat straw burning?

8. Lines 503-505: Why do the authors mention measurements from this area, as there seems to be no relation to this study region? Why not show data from other areas in Asia?

Technical corrections:

1. Lines 61, 199, 491: A better expression for "access" might be "estimate".
2. Lines 106, 107, 295, 296: Use correct singular vs. plural forms of words throughout the manuscript, such as "straw" instead of "straws", "amounts" instead of "amount", "composition" instead of "compositions" and "concentration" instead of "concentrations", respectively.
3. Lines 137: Please specify if a size-selective inlet was used on the Hi-vol or if total suspended particles (TSP) were collected.
4. Lines 190 and 196: The definite article "the" before "North China" and "wheat" is not needed.
5. Lines 239-240: Shouldn't the favorable conditions for photo-chemical oxidation result in higher WSOC/OC values?
6. Line 265: Change "ranged" to "ranging".
7. Lines 333-337: This sentence is not easy to understand and therefore needs to be reworded.
8. Lines 350-352: Another study by Yang et al (STOTEN, 2012) specifically addresses this phenomenon.
9. Lines 385-386: These correlations are not weak but there is no correlation.
10. Lines 392-395: Revise the sentence as follows: "..., consistent with the favorable

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dispersion conditions caused by high temperatures and planetary boundary layer (PBL) height.

11. Line 451: Change "aerosol" to "particle".

12. Lines 503-505: Are these % values?

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