

Interactive comment on “Molecular characterization of organic aerosols in the Kathmandu Valley, Nepal: insights into primary and secondary sources” by Xin Wan et al.

Anonymous Referee #2

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This manuscript presents measurement results from a year-long campaign at a site in the Himalayan-Tibetan Plateau. Ambient aerosol samples were subjected to chemical speciation, including molecular source tracers. Various methods were applied to identify emission sources and estimate the contributions from the individual sources. Primary and secondary organic aerosol components were assessed in the ambient aerosol, and the single largest source contribution was determined to be from biomass burning activities.

The results presented here are important for better understanding the properties and emission sources of organic aerosols at such critical sites as the Himalayan-Tibetan

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Plateau, which have a profound influence on regional and even global climate. The paper, therefore, fits well within the scope of the journal, and is based on an extensive data set with adequate interpretation and discussions of the findings. Thus, I recommend publication of the manuscript in ACP, upon consideration of the comments and suggestions listed below.

Specific comments:

1. Lines 112-120: In the site description there is no mention of the airport (from which the met data were obtained, as stated in line 178) that is apparently in close proximity to the sampling site, and thus could have specific source influence on the collected samples. Please, add a brief statement regarding this potential impact, including the predominant wind patterns, i.e., during which periods the site is upwind and downwind of the airport.
2. Lines 264-166: The data plotted in this figure are apparently annual average values. It may be interesting to see the seasonal average numbers as well.
3. Lines 447-450: Do the authors have a possible explanation for the association of biomass burning emissions with SOA formation from monoterpenes? Is there a predominance of coniferous trees in the area which might have been subject to burning?
4. Lines 467-488: This statement should be made with caution, as a good correlation may also be due to other dominant source emissions which coincided with the biomass burning emissions.
5. Lines 471-473: An additional source of the uncertainties is the lack of representative source profiles for the given study location.
6. Line 504: Why would PBAP have a large contribution to the ambient PM at the sampling site?
7. Lines 514-517: It would be interesting to see a comparison here with measurements from other sites, reported in the literature.

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8. Lines 549-551: If the authors mention dicarboxylic acids (DCAs) as an additional OC fraction, this implies that they are not associated with any of the sources for which estimates were made. What other sources would the DCAs be derived from?

Technical corrections:

1. Line 60: Omit "badly" before "poor".
2. Line 66: Delete the indefinite article "a" before "concern".
3. Lines 103 and 109: Delete the definite article "the" before "Kathmandu".
4. Lines 108 and 109: Add the definite article "the" before "central-eastern", "Nagarkot", and "Bode".
5. Line 117: Add "of" before "a mix"
6. Line 147: The sentence should start with "A trace gas chromatograph", and the name of the manufacturer is "Thermo Scientific".
7. Line 153: The first part of the sentence is not complete and therefore needs to be reworded; especially the word "While" is not fitting here.
8. Lines 160, 181, and 188: Add the definite article "the" before "current", "wet", and "Bode".
9. Line 162: Delete the definite article "the" before "artifacts"
10. Line 188: Change "are" to "is".
11. Line 190: Add "tracers" or "products" at the end of the sentence.
12. Line 202: Add "were observed" at the end of the sentence.
13. Lines 224-227: Revise the sentence as follows: "This is consistent with the seasonal variation of the precursors NO_x, NO₂ and SO₂, which are mainly caused by automobile exhaust, household cooking, and operation of the typical biomass co-fired

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brick kilns ..."

14. Line 228: Change the sentence to "... run on the Kathmandu Valley roads ..."
15. Lines 229-231: Revise the sentence as follows: "Diesel- or gasoline-powered generators (producing higher NO_x emissions) and garbage burning are other major sources ..."
16. Lines 256, 270 and 272: Change "ranged" to "ranging".
17. Lines 270 and 271: Add "an" before "average".
18. Line 281: Add a comma after "pollen".
19. Lines 295, 398, and 559: Add "being" after "while".
20. Line 304: Change "complicated" to "complex".
21. Lines 326-327: Revise the sentence as follows: "In addition, the higher temperatures (Fig. S1a) were conducive for more active microbial activities."
22. Line 357: Use consistent terms for anhydrosugars, i.e., change "dehydrated sugars" to "anhydrosugars".
23. Line 376: Change "are" to "occurs".
24. Line 455: Delete "in".
25. Line 463: Change "the" to "a".
26. Lines 545-548: These sentences need to be polished.
27. Line 574: Change "show" to "shows".

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