

***Interactive comment on “Measurement report: Diurnal and temporal variations of sugar compounds in suburban aerosols from the northern vicinity of Beijing, China: An influence of biogenic and anthropogenic sources” by Santosh Kumar Verma et al.***

**Anonymous Referee #2**

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Verma et al. discuss observations of sugars found in the aerosol-phase collected for ~1 month in a forested site north of Beijing. The aerosol were collected onto filters and analyzed for the sugars. The authors then describe the pattern of the various sugars throughout the study period and speculate the sources via differences in day- and night-time mass concentration, wind patterns, and PMF. They discuss 5 potential sources, including biomass burning, vegetation, microbial and soil dust, pollen, and fungal.

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The results presented here may be of interest to the audience and its scope generally fits within a measurement report. However, along with the concerns discussed by Reviewer #1, the authors need to address the comments and concerns presented below prior to consideration for publication in ACP.

Major: (1) Statistics: Throughout the text, the authors state that the results are statistically different. However, conducting the t-test with the mean and standard deviation values listed in the table, majority of the observations are statistically similar at the 95% confidence interval and not statistically different. The lack of statistical difference in the observations makes many of the statements the authors use to differentiate day/night and thus sources less substantiated. Further, the correlations shown by the authors in Fig. 5 have very low R values (as stated throughout the text) and suggest that many of the correlations only explain 50% or less of the mass concentration.

(2) Contextualization of results: I agree with Reviewer #1 that the listing of numbers from prior results makes it difficult to understand the conclusions in each section and the whole paper. Further, as highlighted with point (1) above, the data not being statistically different makes sections 3.1.1 thru 3.1.3 very long and repetitive. Also, the listing of numbers from prior studies to ascribe sources for the sugars makes the source apportionment very uncertain. This is also relevant for Section 3.5, where they found no differences in the levoglucosan/mannosan ratio and spend 1.5 pages on this. If this is important, it could be summarized in one paragraph at most.

(3) Methods: Reviewer #1 highlighted many of the methods that should be discussed in more detail. Further, PMF needs to be described in more detail to understand how the 5 results were determined (e.g., how many solutions were there allowed to be, how did the time series look, were the results compared against and investigated against external variables, etc.). Also, agree with Reviewer #1 in how were WSOC, OC, Ca<sup>2+</sup>, etc determined.

(4) PMF: I think this is the more interesting and compelling part of the paper. I highly

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recommend the authors spend more time expanding on this section while reducing the discussion in the other sections. As highlighted above, there are statistical concerns, thus shortening them while increasing the discussion about PMF, which had lower statistical concern.

(5) Figures: The x-axis/date is very hard to read in all figures. It is unclear what the values are shown in different colors in Fig. 3.

Minor: Please review the grammar throughout the paper, as highlighted by Reviewer #1.

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