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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Scattering and absorption properties of near-surface aerosol over Gangetic–Himalayan region: the role of boundary layer dynamics and long-range transport" *by* U. C. Dumka et al.

U. C. Dumka et al.

ucdumka@gmail.com

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There are many critical errors with use of the data. It doesn't seem as though the authors used the most recent edited, corrected data from the ARM archive. The data during this campaign were compromised and require substantial corrections. Even with these corrections I have reservations about the data quality. A few comments on the paper In the "Measurements and Techniques" section there are several errors which led me to believe that the authors didn't use corrected data from the ARM data archive.

Authors: We thank the anonymous referee for his/her comments and suggestions that helped us to improve the quality of the manuscript and to remove some errors made by disregard in the “Measurements and Techniques” section. A point-by-point response to all the comments follows. We have noticed that there are several versions of the data from the Aerosol Observing System (AOS) in the ARM archive and we have double checked the datasets before its use in the current manuscript by discarding the contaminated data and by applying correction factors. The data have 1-min time resolution and mentor-QC applied already. These datasets are included in the final netcdf files of the GVAX campaign and are considered of acceptable accuracy for atmospheric research community. Of course, certain uncertainties in the experimental procedure cannot be avoided and they are clearly stated in the manuscript along with the appropriate references from similar measurements performed worldwide. It should be noted that the corrections that were made in the text do not affect the measurements and analysis in the whole paper.

1. The inlet pipe was not "Stainless steel" but powder-coated aluminum pipe with an 8.0 inch or 20.32 cm ID. This is standard sewer pipe for the US. I don’t know where they obtained the other descriptions.

Authors: According to the AOS handbook (Jefferson, 2011), in Page 10, section 7.2 “System Configuration and Measurements Methods” it is noted “The sample air flows through a 2" diameter stainless steel pipe in the center of this larger flow.” The same (stainless steel) is justified by Titos et al. (2014) for measurements in Cape Cod, where the AOS system was transferred after the GVAX campaign. We changed the diameter of the pipe to 20.3 cm, sorry for our previous typographical mistake.

2. There was no metal screen on the inlet as stated by the authors for this deployment.

Authors: We are extremely sorry, again, for this mistake by oversight. This sentence has been deleted in the revised version.

3. The data alternate ever y 30 minutes between sub10 and sub 1 um aerosol and not

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every 5 minutes as stated in the paper. This leads me to believe that they didn't correctly parse the data along the aerosol cut size. As there was a substantial difference in the signal in these two size modes, I question the accuracy of the data.

Authors: We are grateful to the reviewer for this notice. The sentence has been rewritten according to the AOS handbook, with 30-min alternate between D1 and D10 particles. The datasets that were obtained are in 1-min time interval clearly differentiated for D1 and D10 particle groups, i.e. in the netcdf file when a measurement is given for the D1 there is -9999 for the D10 and vice versa. This shows that the dataset for the two groups has been clearly separated and we used it correctly. In the current analysis, the hourly-averaged data for D1 and D10 were used.

4. The PSAP was operated at a flow rate of 0.7 to 0.8 lpm and not 1.5 lpm as stated in the paper. The flow rate is in the PSAP data file which makes me question if the data was accurately flow-corrected.

Authors: We corrected the flow rate in the revised manuscript as per the comment. Thanks. However, we have used the flow-corrected data as given in the netcdf file of the campaign.

5. The authors didn't use the Bond et al. correction to subtract the effect of aerosol scattering in the filter medium. They state that this is an "additional bias". This is substantial bias and will affect calculation of the wavelength dependence or absorption angstrom, AAE.

Authors: We agree with the reviewer that this is a substantial bias. However, the Bond et al.'s correction has been applied, as stated in the very next sentence "The total uncertainty of the PSAP measurements after the transmission and scattering correction is ∼20-30% (Bond et al., 1999)". Maybe the sentence started with "Additional biases" confused the issue, so now, we modified it.

6. The CO2 provided at the site for the Nephelometer calibration was either mixed with

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another gas or was of too low quality to provide a good calibration. As access to the data was denied during the field deployment this error wasn't discovered until the end of the field campaign and the data had to be corrected. This is problem is reported in a data quality report that accompanies data downloaded from the ARM archive. Data that doesn't use this correction has a 10-15 percent error.

Authors: We are grateful to the reviewer for this observation. As stated in the manuscript, the instrument's calibration with CO2 has been applied, maybe without the expected accuracy. We noted this in the revised paper and the overall uncertainty in the Nephelometer measurements increases to 10-15%, which is within the acceptable error for ground-based aerosol measurements.

7. In the "Extensive Properties" section the authors report on "absorption efficiency" for the aerosol. This parameter requires measurement of the aerosol black carbon. Such measurements were not available during that field campaign

Authors: In that sentence we cite the results of Manoharan et al. (2014). The term "efficiency" was now replaced with "coefficient". Thanks for the comment.

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