

Interactive comment on “Link between local scale BC emissions and large scale atmospheric solar absorption” by P. S. Praveen et al.

Anonymous Referee #2

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This is a very interesting paper tackling the important problem of aerosol pollution and its radiative forcing in the Indo-Gangetic Plains. However, data analysis is quite sloppy and needs to be improved before publication. Some more editing and fact checking would also help. More detailed comments are: 1) Linear regressions are all forced through the origin. This is a very bad habit as the y-offset yields additional information and the slope is not indicative of the data if the y-offset is not obtained from the data but from an assumption 2) Error analysis is virtually absent, especially for the slopes of the linear regressions. How can one decide if two values are in agreement if there is no error margin given. 3) The title needs to reflect the location, i.e., “Indo-Gangetic Plains”. 4) The literature on brown carbon absorption should not be limited to the groundbreaking paper of Kirchstetter et al. (2004) but more recent work should also be taken into account (e.g., Rizzo et al., 2011, Chakrabarty et al., 2010). 5) P. 21321, C11499

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Line 26: Does “BC” refer to “BC mass”? 6) P. 21321, Line 28: Are these percentages mass percentages? 7) P. 21325, Lines 11: “shadowing” is not a valid concept for size parameters much below the geometric limit. 8) P. 21325, Lines 19-23. Mass absorption cross-sections are frequently given as $10\text{m}^2/\text{g}$ but in the green, not at 880 nm. For example, the values given by Schwarz et al. (2008; this is not a single author paper as quoted in this manuscript!) are for 530 nm. 9) P. 21329, Lines 26-27: “RH absorption coefficient”. I have no idea what this is, please explain! 10) P. 21330, Lines 3-4: poor English 11) P. 21330, Lines 16-17: “in the blue and ultraviolet region ($\lambda < 600\text{ nm}$)”. I don’t think that blue starts right below 600 nm. 12) P.21332, Lines 13-14: “CALIOP measures the depolarized aerosol back-scattered light at two wavelengths (532 and 1064 nm).” This is not correct! CALIOP measures polarized and depolarized signal at 532 nm and has no polarization discrimination at 1064 nm. 13) P. 21333, Lines 18-19: “AOD . . . is also measure of the total number of aerosol in the column.” Please explain how particle number (in which size range?) is characterized by AOD, if this is what the authors are trying to say. 14) For all comparisons involving satellites and AERONET please discuss satellite overpass times and how often valid measurements were obtained. 15) P. 21335, Line 3: typo “haave”

References: Chakrabarty, R. K., H. Moosmuller, L.-W. A. Chen, K. Lewis, W. P. Arnott, C. Mazzoleni, M. K. Dubey, C. E. Wold, W. M. Hao, and S. M. Kreidenweis (2010), Brown Carbon in Tar Balls from Smoldering Biomass Combustion, *Atmos. Chem. Phys.*, 10, 6363-6370. Rizzo, L. V., A. L. Correia, P. Artaxo, A. S. Procopio, and M. O. Andreae (2011). Spectral Dependence of Aerosol Light Absorption over the Amazon Basin, *Atmos. Chem. Phys.*, 11, 8899-8912.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 11, 21319, 2011.

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