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## ***Interactive comment on “Measurement-based direct radiative effect by brown carbon over Indo-Gangetic Plain” by A. Arola et al.***

**Anonymous Referee #2**

Received and published: 1 September 2015

Review for Atmospheric Chemistry and Physics Discussions

Title: Measurement-based direct radiative effect by brown carbon over Indo-Gangetic Plain

Authors: A. Arola, G. L. Schuster, M. R. A. Pitkänen, O. Dubovik, H. Kokkola, A. V. Lindfors, T. Mielonen, T. Raatikainen, S. Romakkaniemi, S. N. Tripathi, and H. Lihavainen

General Comments: This is a well-written and informative paper regarding aerosol Brown Carbon (absorbing Organic Carbon) and computed aerosol forcing effects in a very important aerosol source region (the IGP region of India and Pakistan). I believe this paper clearly meets the standards of ACP and makes a useful contribution to the literature, and should be published with only suggested minor revisions (see below).

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## Specific Comments:

Page 21586, lines 5-6: The AERONET UV filters (340 and 380 nm) have a full width at half maximum (FWHM) of 2 nm as compared to 10 nm for all other channels.

Page 21586, line 17: The AOD is larger than 0.5 at 440 nm (include the wavelength)

Page 21587, lines 18-19: The IGP is bounded to the north by the Himalayan foothills and to the south by lower altitude mountains.

Page 21587, lines 25-27: It would be useful to know if these monthly mean AOD values in Figure 2 are computed from the all of the Level 2 direct sun measurements (most robust method to compute mean climatology of AOD) or from only those direct sun measurements associated with almucantar retrievals.

Page 21587, lines 27-29: Perhaps you could provide the percentage of total retrievals that were L2 retrievals of the entire data set utilized in this study.

Page 21589, lines 8-9: Please clarify, are the number of imaginary indices the number of almucantar retrievals?

Page 21589, line 15: Is the total volume mentioned here for the fine mode only or both fine and coarse modes?

Page 21591, lines 1-2: Please briefly describe how you extended the four wavelengths of the albedo data from AERONET retrieval input data (440, 675, 870 and 1020 nm) to the total SW spectrum.

Page 21595, lines 6-8: Maybe you could mention the advantage here of your approach in the ability to separate dust from BrC absorption.

Page 21595, Conclusions: You might consider mentioning how critical the BrC absorption is for UV radiation and remote sensing from satellite in the UV wavelengths (i.e. OMI, etc.). Alternatively this could be added to the Introduction if you feel it is not too disruptive of the flow of the paper.

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