

## ***Interactive comment on “Aerosol optical properties in the southeastern United States in summer – Part 2: Sensitivity of aerosol optical depth to relative humidity and aerosol parameters” by C. A. Brock et al.***

**C. A. Brock et al.**

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Response to Reviewer 1 Manuscript Number: ACP-2015-821 Manuscript Title: Aerosol optical properties in the southeastern United States in summer – Part 2: Sensitivity of Aerosol Optical Depth to Relative Humidity and Aerosol Parameters

The discussion below includes the complete text from the reviewer, along with our responses and corresponding changes made to the revised manuscript. The authors thank the reviewer for useful comments that have improved the manuscript.

C13297

Comment: The manuscript presents aircraft observations of aerosols and calculated aerosol optical depth. The focus is on the sensitivity of the AOD to relative humidity and aerosol properties. While the research subject and the conclusions are not particularly original, this paper will be a nice addition to the existing literature thanks to the careful analysis (e.g. on the UHSAS response, the kappa/gamma parameterizations) and discussion (e.g. on the transition layer, the need for more systematic investigation, the co-variance of parameters, the mixed-layer height). The manuscript refers to Brock et al. (2015) in an important manner. Provided that that discussion paper is accepted, I recommend publication of the present manuscript. My suggestions are as follows.

Page 31480, line 16, “were calculated” should be either replaced with “we calculated” or moved to the end of the sentence.

Response: Corrected.

Comment: Also, a brief explanation would be nice for the choice of 10th and 90th percentile values instead of, say, a one standard deviation range (68%).

Response: We now add the following sentence in Section 3.1, “Because the distribution of most parameters was not Gaussian, percentile values are used to represent the range of observed variability.”

Comment: Page 31481, line 10, state how the surface ambient extinction was determined. One way to do so is to move here the two full sentences in line 16-19 of page 31482.

Response: We have moved the sentences and changed them to read, “The extinction within the well-mixed layer was extrapolated to the surface for each individual profile. Wagner et al. (2015) show that measurements of extinction at the Centreville, Alabama surface site during the SENEX time period agreed with values measured at the lowest altitude of the aircraft, supporting such extrapolation.”

Comment: Page 31493, bring Rissler et al. above Saide et al.

C13298

Response: Corrected.

In addition to the changes noted above, in the Introduction we have added mention of two relevant papers, one of which recently appeared in ACPD.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 31471, 2015.

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