

Interactive comment on “Capturing vertical profiles of aerosols and black carbon over the Indian Ocean using autonomous unmanned aerial vehicles” by C. E. Corrigan et al.

C. E. Corrigan et al.

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Response to FIRST referee for Capturing Vertical Profiles of Aerosols and Black Carbon over the Indian Ocean using Autonomous Unmanned Aerial Vehicles by CE Corrigan et al. (Submitted to Atmospheric Chemistry and Physics)

Page 11435, lines 23-25 I would suggest calling the converted absorption measurements ‘equivalent black carbon’; as opposed to just ‘black carbon’. The phrase ‘equivalent BC’; at least implies there is some sort of conversion taking place. As you note and as the instrument name suggests, aerosol absorption is what is actually measured by absorption photometers/aethalometers. It should be noted that doing such a conversion from absorption to

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BC can lead to strange effects like having BC concentrations that vary as a function of wavelength if an appropriate spectral absorption cross section is not used.

Response: We have changed the text to say “equivalent black carbon” and clarified that the utilized wavelength was 880nm. Validation of this approach performed at the Maldives ground site is clearly presented in the cited reference Corrigan et al, 2006.

Page 11436, - state how many missions were flown total

Response: Added to text

Page 11437, line 10 state whether data are corrected to STP or at ambient

Response: Stated that data was at ambient.

Page 11441, lines 20-23 give total number of flights for which aerosol absorption profiles could be obtained.

Response: Added to text that 6 missions profiled black carbon.

Page 11443, lines 11-21 you discuss possible issues with your in-situ measurements to explain the differences between the AERONET and in-situ absorption AOD measurements. You may want to mention that there could be issues with the algorithm used to derive the AERONET measurement, e.g., what assumptions do they need to make to obtain absorption AOD?

Response: added comment to text

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Figure 6 would present more information as a scatter plot than as a time series; could even compare all 3 wavelengths on same plot and give fit equations.

Response: The data does not have much dynamic range since it is an ambient sample. As a result, the density of data in the center of a scatter plot makes the use of this type of plot less than ideal and fails to illustrate the extended matching of trends. If we secure a controllable source of black carbon in the future, we may perform a more thorough laboratory calibration that covers the concentration range of the instrument.

Only one wavelength of data was presented to a.) prevent a messy figure and more importantly b.) to show a validation for derived black carbon concentration since this is the parameter used in the paper. Black carbon is only derived from the 880 nm channel due to interferences at shorter wavelengths and the lack of validation at these wavelengths.

All technical corrections were addressed

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 11429, 2007.

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