Atmospheric
Measurement
Techniques

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comment

Interactive comment on "Two decades observing smoke above clouds in the south-eastern Atlantic Ocean: Deep Blue algorithm updates and validation with ORACLES field campaign data" *by* Andrew M. Sayer et al.

Anonymous Referee #1

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Main comments

(1) This paper presents a unique 20-year time series of AOD of aerosols-above-clouds in Southern Africa, with an extensive validation. A number of different satellite instruments are used to create a long time series of AAC AOD, which is useful for climate analysis. Especially the validation has been performed extensively and carefully. Figure 7 shows comprehensively the validation of the results. This interesting and important paper deserves publication. The paper is a pleasure to read: it is well written and has a clear structure. The figures are clear and informative. There is a good intro-

duction with good referencing. The methods that are used are sound. The discussion includes the important aspect of calibration, which is different for each instrument used.

(2) In the optimal estimation retrieval scheme which is used, also the error on the AOD is retrieved. It would be informative to give with the AOD map also the AOD retrieval error map, e.g. in Figure 15.

(3) Several satellites are used with different overpass times. Is there an effect of the satellite overpass time, because of diurnal variation of the AAC AOD?

Specific and textual comments

- Caption Figure 2: To which period do the data refer? Please correct: \unit nm.

- p. 6, l. 26: E_lambda should be defined perpendicular to the solar direction, and at 1 AU. In principle, E_lambda should hold at exactly the same time as the radiance measurement.

- Eqs. 7-8 on p. 11, and text below the equations: For these brightness tests, the reflectance becomes a sun-normalized radiance. Does this translation from reflectance to radiance only hold for specific SZA range? Please give the angular range.

- p. 13, l. 10: superfluous bracket after 10 m.

- p. 13, l. 14: do you also correct for NO2, which absorbs in the blue range ?

- p. 16, l. 8: then > than

- Figure 4: at which wavelength does this AOD hold?

- p. 22, l. 2: Please give a reference for these main metrics.

- p. 22, l. 18: please give an equation for f, in which it is related to S in Eq. 2.

- p. 37, l. 11: featured > feature

- Figure 15: Multiannual is too vague. Please give the time period for which these data

hold. You could give this information in a table, together with the overpass times of the various satellites.

- p. 39, l. 30: incorporation

- p. 40, l. 8-9: could these differences be due to different periods used, or different time of day?

- p. 40, l. 13-14: on board calibration using the sun and lamps is used for GOME type sensors, OMI, etc.