

## ***Interactive comment on “Spatio-temporal aerosol optical characteristics over the Arabian Sea during the pre monsoon season” by D. G. Kaskaoutis et al.***

**Anonymous Referee #1**

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The paper presents an extremely thorough review of AOD derived from Microtops measurements made during a cruise in the Arabian Sea during April and May of 2006. An exhaustive summary of the errors and uncertainties in different methods for retrieving Angstrom Exponents is provided. The paper is a useful contribution to the understanding of aerosol sources and resulting optical properties over the Arabian Sea. Given the sparse global data set of marine AOD values, it should be published. However, a thorough editing for English grammar is required before it is suitable for publication in ACT. In addition, the issues listed below should be adequately addressed.

1) abstract, lines 4 – 5: Explain what exactly the influence is of the surrounding arid

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region on the Angstrom exponent. Also, the dates of the measurements should be given in the abstract.

2) abstract, line 5: omit “typically”

3) abstract, lines 6 – 7: Explain the significance of a more accurate polynomial fit.

4) abstract, lines 11 – 12: The uncertainty of AOD derived from a microtops sunphotometer is +/- 0.01 at best. These values should not be reported to 3 significant figures.

5) p. 22225, lines 8 – 12: Should be re-stated as “The aerosol load and spatial distribution in the AS region are highly variable due to air mass origin, local and regional meteorology, El Niño – La Niña patterns, and location of the ITCZ.”

6) p. 22229, line 14: Does 1  $\mu\text{m}$  here refer to particle diameter?

7) p. 22229, line 14: Omit “contains information about the nature of the aerosol particles present in the atmosphere and”.

8) p. 22231, line 26: define  $\text{err}_1$  and  $\text{err}_2$ . Three significant figures here is unwarranted. Also, please provide information on how the magnitude of these errors translates into uncertainty in calculated Angstrom Exponents.

9) p. 22232, line 9: With  $r^2$  values around 0.3, describing the correlations as “strongly positive” is an overstatement.

10) p. 22232, lines 19 – 20: It is stated that “this fact also indicates the great effort and attention spent on the accuracy of the AOD<sub>1020</sub>.” This statement contradicts the earlier statement on p. 22227 that water vapor absorption effects at 1020 nm were not considered in this study. Is this statement referring only to keeping the Microtops in the shade after each observation?

11) p. 22236, lines 10 – 12: It is stated that “on the first days of the cruise... the spectral AOD variation is larger due to the proximity to the urbanized coast.” The spectral variation is larger several days into the cruise (April 25) than in the beginning (April

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- 19). Use dates here for clarification.
- 12) p. 22236, lines 13 – 14: Condensation growth and coagulation are more efficient at producing accumulation mode aerosols than what?
- 13) p. 22237, 2nd paragraph: Angstrom exponent values should not be reported to 2 significant figures.
- 14) Figure 11: It would be helpful to put 24 hour markers on the back trajectory lines.
- 15) p. 22242, lines 15 – 16: What is meant by the statement that “transport patterns can be quite different for pollutants and aerosols that penetrate the boundary layer to the free troposphere”? That transport is different to the BL vs. the FT?
- 16) p. 22243, line 28: What is meant by “they also extinct over oceanic areas. . .”?
- 17) p. 22244, lines 7 – 8: Indicate the location of the Maldives and KCO in Figure 12 or, at the very least, give their latitude and longitude in the text.
- 18) p. 22244, line 20: What is meant by “measurements obtained?” Is this referring to the location of the measurements?
- 19) p. 22247, line 11: What is meant by “small regions”?

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 22223, 2009.