

## ***Interactive comment on “Evaluation of satellite-based aerosol datasets and the CAMS reanalysis over ocean utilizing shipborne reference observations” by Jonas Witthuhn et al.***

### **Anonymous Referee #3**

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This paper aims to evaluate the satellite (MODIS, SEVIRI) and reanalysis (CAM5) retrievals of AOD and Angstrom exponent over ocean by comparing them with moving ship-borne observations using Microtops sunphotometers and multi-spectral shadow-band radiometer GUVIS-3511 during several cruises in the Atlantic Ocean. The results are re-evaluated for defined aerosol types, mostly maritime and desert dust. Overall, the manuscript is well written and organized, although some improvements may be attained in the discussion of the results. However, the manuscript is rather long enough and some parts may be significantly shortened without any effect in the general discussion and importance of the results, since there are several repetitions throughout the manuscript. There is a rather long discussion of aerosol direct and indirect effects

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in the beginning of the Introduction that is beyond the scope of the current research. I understand that authors initially discuss the role of aerosols on global climate and the necessity of accurate measurements of them, in a way to reduce the uncertainty in their climate response, but this part may be shortened in one paragraph (for example the first three paragraphs could be shortened and merged into one). Although a very analytic description is provided for satellite products, GUVIS measurements, collocation procedures and so on, there is lack of information about uncertainties in the Microtops-II AOD retrievals, which may be high if the instrument is not exactly oriented to the sun's disk. Usually, 3-5 sets of measurements are taken from Microtops in order to select the best one via techniques described in previous papers (e.g. Sharma et al., 2014, Aerosol Air Quality Research; Tiwari et al. 2018, Environ. Science Pollution Res.). In addition, during the W-ICARB cruise campaign over the Bay of Bengal, there was a comparison between Microtops-II and MODIS AODs revealing a very good agreement between them, which may be mentioned in the paper and discussed against the current findings (Kharol et al., 2011; Annales Geophysicae). Section 4.2 is composed of numerous relatively short paragraphs, whose meanings are not so distinguishable. This creates some difficulties in reading and understanding exactly the major issue (spirit) of each paragraph. Taking also into account the several repetitions, this becomes more problematic. What I recommend is to merge the paragraphs into longer ones discussing a define issue, for example results of the presented figures and tables and/or discussion on these results. Special care should be taken throughout the manuscript on avoiding several repetitions. Some of these are emphasized below. Minor comments/corrections Line 51: Levy et al. (2013) estimated . . . Line 73: Double use of “system” at the end of this sentence does not make good sense and should be revised. Lines 205-206. I recommend to remove this sentence from this part of the manuscript. In case the reader would expect a better accuracy from MODIS, what's the reason to read the results of this study? Lines 362-364 and lines 380-381. These sentences are just a repetition and one should be removed. Line 447. . . is presented here. Line 476-480. Since the data . . . MIC data. Such statements have been repeated

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several times in the manuscript and may be removed or significantly shortened. Line 487. This sentence, even rephrased has been stated several times in the manuscript. 493-494. Since the MODIS . . . accurately. Similarly, this has been stated several times in the manuscript. Line 541. This emphasizes. . . Line 562. A slight increase. . . Line 589. This is a similar statement as in line 571.

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