

Interactive comment on “Comparative Analysis of MODIS, MISR and AERONET Climatology over the Middle East and North Africa” by Ashraf Farahat

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Response to Anonymous Referee # 2 Dear Referee, Thank you very much for your feedback about our article. We greatly appreciate the comments. We have addressed all your comments and we have revised the manuscript accordingly. For your consideration, we have included a copy of the revised article with track changes. Please find below our response to your comments. Regards, Ashraf Farahat

Comments from Referees The author of this manuscript has done quite interesting work, well analyzed “Comparative Analysis of MODIS, MISR 1 and AERONET Climatology over the Middle East and North Africa”. In general the manuscript is interesting and well written. The results have been presented and discussed well and thoroughly.

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In my opinion, the topic discussed in this paper is suitable for publication. Overall I recommend acceptance of this paper for publication with minor revisions. Please see the specific comments below. Author's response We would like to thank the reviewer very much for his/her comments and for recommending the publication of our article with minor revision. We have addressed all the reviewer comments below. Comments from Referees Line 11: please insert comma after MISR Author's response Done Comments from Referees Line 15: please check the grammar, i.e. MODIS/terra AOD indicates instead of indicate Author's response Done Comments from Referees Line 33: please use like this "that has major effects on human activities in the Arabian" Author's response Done Comments from Referees Line 42-43: please make it clear to the reader Author's response p.2 Lines 42-43 have been modified Aerosol optical depth, AOD, is a parameter to measure the extinction of a beam of light as it passes through a layer of atmosphere that contains aerosols.

Comments from Referees Line 121: please rephrase the sentence. Author's response p. 5 Lines 131-132 (previous 121 – 124) have been rephrased. The MODIS dark-target algorithm derives aerosol characteristics, including AOD, over ocean (dark in visible and longer wavelengths) and dark land surfaces (low values of surface reflectance) (e.g., dark soil and vegetated regions) in parts of the visible (VIS, 0.47 and 0.65 μm) and shortwave infrared (SWIR, 2.1 μm) spectrum (Kaufman et al., 1997).

Comments from Referees Line 136-137: please rephrase the sentence Author's response p. 6 Lines 156-159 (previous 136 -138) have been rephrased The sun photometers used by AERONET include sun collimators to measure spectral direct-beam solar radiation. The collimators are used to determine columnar spectral AOD and water vapour, provided at a temporal resolution of approximately 10–15 min (Sayer et al. 2014).

Comments from Referees Line 142: please mention the name of satellite Author's response The names of the satellites are now mentioned p.6 L157-158 (previous L 142) Seven AERONET sites were selected for MODIS/ Terra, MODIS/ Aqua, and

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MISR/Terra satellites validation in this study (Table 1.).

Comments from Referees Line 147-149: please revise the sentence. Author's response p.7 Lines 174 – 176 have been revised (previous 147-149). Multi-sensors data matching approach requires using only spatial and temporal matching data to reduce uncertainties associated with using different instruments and clouds shadow Liu and Mishchenko (2008) and Mishchenko et al., 2009.

Comments from Referees Line 158: The authors have mentioned that they have used second approach in this study. Why did the authors not use the first approach? Author's response Both approaches have their limitations; however, we used (Mishchenko et al., 2010 approach) as it simultaneously matches location and time between the AERONET station and satellites. This certainly reduces the number of available matched data points; however, it eliminates data uncertainty compared to the other approach.

Comments from Referees Line 176: The authors have used only two statistics parameters to validate the satellite data. It is suggested to use more parameters for the validation. It is also observed that authors have not mention the value of statistical parameters in the figures.

Author's response We totally agree with the referee comments that more statistical parameters would strength the validation process. Indeed, we have tried to use fours statistical parameters namely relative error, correlation coefficient, root mean square deviation, and good fraction. That said, for our specific study we found that the same conclusion can be approached using only two parameters. In order to avoid lengthy tables and redundancy that may confuse readers, we decided to present two parameters only in the tables. We have presented some of the statistical parameters in the figures, the rest are listed in Tables 1-4.

Comments from Referees Line 196: please correct number of equations in the text. Author's response p.8 Lines 223, and 224. (Previous Line 196). Thank you. Equation

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numbers are now corrected.

Comments from Referees Table 2: Caption of table should be precise and general and table value should match according to the caption e.g RMSE is mentioned in the caption but not presented in the table, G-fraction and Gfraction should same in the text. Author's response Table 2 caption has been modified p.28 Lines 843-845 Table 2. Statistics for the calculation of MODIS/Terra, MODIS/Aqua, and MISR with that of AERONET measurements over seven sites in the Middle East and North Africa, including R: correlation coefficient, Gfraction: good fraction; N: number of observations We have also used "Gfraction" all over the text.

Comments from Referees Table 3: Like statistics for biomass and mixed, parameter as in table 2 (but you mentioned parameter as table 3) Author's response Thank you. Typo corrected. P.28 Lines 782

Comments from Referees Second column of each table should be same if they belongs to same category. It will confuse the reader, like in table 2, you used 'sensor' but in table 3 you changed sensor to 'method' but they are the same indeed. It will confuse the reader Author's response Thank you. "Method" has been changed to "Sensor" in Table 3 Column 2

Comments from Referees Table 4: Caption of table 4 is again confusing MISR coverage but in the body of table MODIS, MISR and AERONET are all showing their coverage Author's response Thank you. Table 4 caption has been modified to Table 4. Percentage of AODs retrievals greater than 0.4 recorded by AERONET all data, MISR all data and MODIS matched data over seven AERONET sites in Middle East and North Africa.

Comments from Referees FIGURE 1: Check the grammar of caption of figure1 e.g. "The numbers on the map indicate, not indicates" What is the source of this fig? Please combine figure 2 and 3 because they are the same actually just with different satellite data

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Author's response We have corrected the grammar of figure 1 caption. We have produced the map in figure 1 in house using GIS software. We would like to thank the reviewer for his/her suggestion of combining figure 2 and figure 3 but we respectfully prefer to keep them as separate figures. Combining the two figures will make them not clear.

Please also note the supplement to this comment:

<https://www.ann-geophys-discuss.net/angeo-2018-79/angeo-2018-79-AC3-supplement.pdf>

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2018-79>, 2018.

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