

## ***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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Dear Andrew, Thank you very much for the short comment regarding the data version used in the article. Please find below a response to your comments.

MISR: Indeed, we are aware of version 23 (V23) MISR data released on February 12, 2018, however few known issues with the new product are still under formal validation. Some of these known issues are related to data reliability over bright surfaces compared to dark water, which is significant for our study. Moreover, we have found that changes in the new product has no significant impact on the results presented in our article as explained below in major and minor differences between V23 and V22 MISR product. To ensure data reliability based on known issues and insignificant impact of

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the new product on our results, we preferred to use the most recent V22 in our analysis.

Major differences between V23 and V22 MISR products

- 1- Initial assessments of the results from the 4.4 km resolution V23 retrieval algorithm show that V22 AOD retrievals perform similar to V23 relative to AERONET. V23, however perform significantly better than V22 only relative to high spatial density AERONET Distributed Regional Aerosol Gridded Observation Network (DRAGON) deployments which is out of the scope of our study.
- 2- V22 has similar performance as V23 in reporting non-spherical aerosols in places where they are climatologically expected, particularly when the AOD is large. Both versions effectively discriminates small, medium, and large particles in exactly similar pattern.
- 3- Although V23 added AOD grid points below 0.025, which eliminates gap at low AODs, observed relative to AERONET, this update should not affect the results in our article, as we are not dealing with such low AOD values.
- 4- V23 changes in the snow-ice mask source by applying a more conservative cloud screening logic. This should have no effect on the results presented in our paper as we have performed our comparative analysis mostly over an arid/semi-arid region.
- 5- V23 change in near-surface wind speed source has no significant effect on our results as only the total wind speed is used in the dark water aerosol retrievals; this change does not affect the Aerosol Product.
- 6- V23 added a correction factor to take into consideration the effect of chlorophyll (“underlight”) on MISR red and NIR bands over Dark Water. This reduces AODs retrieved over dark water; however, its significantly affect low AODs values only.

Minor differences between V23 and V22 MISR products

- 1- Significant field name and content changes in V23 relative to V22, which makes the product significantly more accessible. This however has no effect on the results discussed in our article.
- 2- Switch from HDF4, stacked-block format to NetCDF-4 conventional format. This however has no effect on the results discussed in our article.
- 3- Provide per-retrieval geolocation and time information to make product easier to use. This also has no effect on the results presented. If you still believe that the new data product could significantly change the results taking into consideration possible AOD range at the study region, please let me know and we can definitely check the results

against the new version. AERONET: We have used Level 2.0 Version 3 available at <https://aeronet.gsfc.nasa.gov>. We will highlight this in the article. MODIS: We have used Collection 6.1. Both dark target and deep blue algorithms have been used. Dark target retrievals were used over water regions while deep blue data were used over land. Data are available at <https://giovanni.gsfc.nasa.gov/giovanni>. We will highlight this in the article.

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