

Changes in the Revision

- (1) The influence of solar zenith angle is discussed in the revision.
- (2) Some related references are cited.
- (3) Some sentences are rewritten.
- (4) The dataset is updated.
- (5) Acknowledgments is updated.

Responses to the Reviewer1's Comments

Thanks for the reviewer to provide very useful comments and suggestions, and please see our responses in the following:

The authors have replied to all my concerns, except the issue of the solar zenith angle. I must insist that this should be included in the study, adding SZA in Table 3, in my opinion. Other studies with GOME-2 (Roman et al. 2015), or MODIS (Vaquero-Martinez et al. 2017) showed important influence of solar zenith angle in the retrieval performance.

Response: Thank you. The influence of solar zenith angle is discussed in the revision (lines 329-334,358-365, tracked manuscript).

Responses to the Reviewer2's Comments

Thanks for the reviewer to provide very useful comments and suggestions, and please see our responses in the following:

Specific Comments:

(1) It seems that all results are essentially based on a cloud-free subset of the data. This should be mentioned in abstract and conclusions.

Response: Thank you. It is based on a cloud-free subset of the data and it is mentioned both in abstract and conclusions.

(2) l. 99: '..., which is from MERSI ...'

This sentence is unclear. You probably mean that the same on-ground calibration as for MERSI has been done for MERSI-II; in addition, on-board (in-flight?) calibration was used. Please clarify / reformulate.

Response: Good suggestion and thank you. A series of comprehensive prelaunch calibrations have been operated to ensure the high quality of the products from MERSI-II (Xu et al., 2018), which is an advanced version of MERSI and has been significantly improved with high-precision on-board calibration and lunar calibration capabilities (Wu et al., 2020). We have rewritten this expression in the revision (lines 101-104).

(3) l. 108: 'For the NIR channels, typically with a small aerosol optical thickness that can be ignored, ...'

Do you assume that aerosol optical thickness is small? Please clarify / justify.

Response: Thank you. The sentence is rewritten in the revision (lines 112-113).

(4) l. 114–115: 'a reflectance between 850 and 1250 nm changes approximately linearly with the wavelength'

This is a very crude approximation, especially when considering absorption. Maybe you refer here to specific bands? Please clarify / reformulate.

Response: Thank you and good suggestion. We have rewritten this expression in the revision (line 119).

(5) The PWV map in Fig. 3 shows very low values in the tropics compared e.g. to MODIS data for the same month. Is there a filter applied to these data, e.g. is this a cloud-free subset, or is there a saturation issue in the measurements preventing to derive high PWV amounts? Please clarify.

Response: Thank you. This is a cloud-free subset and it is mentioned in the revision.

Technical Corrections:

(1) Abstract: Please add explanation of MB in abstract.

Response: Thank you. The explanation is added in the revision.

(2) l. 78: ‘Integrated Global Radiosonde Archive’ → ‘The Integrated Global Radiosonde Archive’

Response: Thank you. It is changed.

(3) l. 185:

‘radiosonde site’ → ‘radiosonde sites’

Response: Thank you. It is changed.

(4) l. 272:

‘the great MRB’ → ‘the large MRB’

Response: Thank you. It is changed.

(5) l. 276:

‘Figure 4c’ → ‘Figure 5c’

Response: Thank you. It is changed.