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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Estimating cloud optical thickness and associated surface UV irradiance from SEVIRI by implementing a semi-analytical cloud retrieval algorithm" *by* P. Pandey et al.

Anonymous Referee #2

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Review of Pandey et al. Estimating cloud optical thickness and associated surface UV irradiance from SEVIRI by implementing a semi-analytical cloud retrieval algorithm

In the present paper a semi analytical cloud retrieval algorithm is used to obtain scaled cloud optical thickness. Data from the SEVIRI instrument are used for this purpose. The obtained cloud optical thickness is compared with cloud optical depth from CloudSat. A good agreement is obtained. Then an empirical algorithm is used to determine ground UV, which is compared with ground UV measurements. The comparison is carried out for one month, good agreement is obtained. One innovative aspect of this manuscript mentioned by the authors is that "it is the first application of SACURA to

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imagery obtained from a geostationary satellite platform to retrieve scaled cloud optical thickness (SCOT). “ and concerning the empirical approach for the determination of ground UV: “ the conclusion that the proposed approach is competent in estimating the surface UV irradiance by capturing the impact of clouds characterised by remotely sensed scaled cloud optical thickness fields.”

My opinion is in general that studies dealing with the determination of cloud characteristics are relevant for the scientific community since it is an actual topic of research. This work however suffers from important shortcomings.

1) concerning the methods: the validation of SCOT should be made with ground based measurements. It should be validated by comparing it to the cloud modification factor.

2) Still concerning the methods: the empirical algorithm (eq. 8) to determine ground UVB and UVA is simply not acceptable since one important quantity is missing in the equation: ozone. The validation with ground UV is performed for one month. It is however well known that ozone shows strong seasonal cycle with minimum values around Autumn and maximum values around Spring. The best way would be to calculate ground UV with a radiative transfer model using satellite or ground measurements of column ozone.

3) Comparisons of satellite retrieved UV with ground UV have been performed for more than 10 years. This is not even mentioned in this manuscript. Well known are the UV retrieval algorithms of TOMS and OMI. The authors should compare their results with the results obtained within the scope of other investigations (see reference list below and see also (http://eospso.gsfc.nasa.gov/eos_homepage/for_scientists/atbd/docs/OMI/ATBD-OMI-03.pdf)). This should allow to better judge the quality of the results presented in this paper.

4) What is with aerosols? You made a comparison of our UV algorithm with the TUV model using always the same aerosol input parameters. What is the uncertainty due

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to fluctuations of the aerosol optical depth?

5) How does your method compares with methods that use the lambert equivalent reflectivity?

I think that this work may only be considered for publication if these remarks are taken into account.

Other remarks

P. 698 line 16. “In each case, the corresponding . . .is used to interpolate R0(μ,μ0,f) from. From what?

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