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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of TROPOMI Surface UV Radiation Product" *by* Kaisa Lakkala et al.

Anonymous Referee #1

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General

This paper is a very useful validation study of the TROPOMI UV product. Because of its unprecedented high spatial resolution of only about 3-5 km, TROPOMI provides a very useful addition to the already existing UV products from satellite instruments like OMI and GOME-2. The quality assessment of UV products at this high resolution is very important for its use.

The validation work performed in this paper is very robust. The used data set is extensive, using 20 months of TROPOMI data and 25 sites at a large range of latitudes. The paper is clearly written and has a straightforward structure. Very good referencing.

Main comments

1. The question naturally arises whether the validation results improve for such a high-resolution satellite instrument like TROPOMI as compared to those of coarser resolution instruments like OMI or GOME-2. At high resolution the specific site conditions are more representatively measured from space: the homogeneity should improve. On the other hand, the cloudiness conditions for larger pixels may be more representative. A comparison of the TROPOMI validation results with OMI and GOME-2 UV validation would be useful. This topic would deserve more attention in discussion and conclusions.

2. Which TROPOMI UV algorithm improvements are needed? Clearly the surface albedo of TROPOMI should be improved and should have a time-component because of the snow variability. Are there more improvements needed as follow from this validation study?

Detailed comments

Abstract, l. 1-5: Those instrument details on TROPOMI do not belong in the abstract.

Abstract: Please mention which UV retrieval algorithm was used.

Abstract l. 13: Please clarify: TROPOMI UV is too low?

l. 72: On the surface albedo data base: which spatial resolution? based on which satellite instrument?

l. 81: Is there a manual (PUM) to explain all the 36 parameters?

l. 372: please clarify on the topic how the UV processor deals with clouds

Caption Figure 5: "Red diamonds. . .": but such conditions are not all exclusive: sites can be both clear-sky and snow-free. How to indicate that?

l. 425: in function of > as a function of

l. 485: check spelling: homogeneous