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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 #3

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Review of "Validation of TROPOMI Surface UV Radiation Product" This is a well written review of the TROPOMI UV product with two notable omissions. 1) is a more thorough outline review of the algorithm used, and 2) comparison with the OMI product. Of these, the second is the most important, since a reader mat want to combine the two time series to gain a longterm view of the changes in UV reaching the surface. The description of the algorithm on page 4 may be adequate through references but leaves out a lot of key features. It would be useful to know more about the implementation of cloud transmission through cloud optical depth and how partial cloud coverage within a pixel is handled. The same is true of aerosol absorption calculations. The authors state that the aerosol index is used but give no indication of how the height problem inherent in the aerosol index is resolved or what the algorithm entails. Given the length of this

paper, these are crucial details that could be summarized in an appendix or in the supplement. The comparison with ground-based instruments is very well described. There are problems with comparisons with broad-band instruments Table 4 that are not discussed in this paper. Broad-band instruments do not have a spectral response that matches the erythemal action spectrum used. Figure 5 suggests the difficulty of using broad-band instruments. Instead of scatter plots that clearly indicate problems, time series would be much more revealing of the deficiencies of broad-band analysis, especially the seasonal differences. In contrast, the comparisons with spectrometer type instruments are quite good. While this is not a paper on the quality of ground-based instruments, since the authors included the broad-band results, additional discussions of the problems should be included, or the broad-band comparisons removed. It would be preferable to have additional discussion of broad-band problems. The descriptions of the spectrometer measurements are excellent and form the strongest validation of the TROPOMI estimates. Problems with snow covered conditions are to be expected and are not indicative of problems with TROPOMI. However, the O2 A-band information from TROPOMI can detect clouds over snow and ice and perhaps improve the results. This paper should be published as a valuable reference paper for TROPOMI. Adding comparisons with OMI UV estimates are essential before publication.

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