

## ***Interactive comment on “Comparison of OMI UV observations with ground-based measurements at high northern latitudes” by G. Bernhard et al.***

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Here are some additional comments on the manuscript: Comparison of OMI UV observations with ground-based measurements at high northern latitudes

This is a very interesting paper analyzing the snow albedo effect on solar UV irradiance retrieval from the OMI related algorithm. The analysis have been presented in a very detailed and justified way and it is a step forward in satellite based UV-retrieval improvement.

some minor comments

Page 8943 Line 27 to 8944 line 18 Since DP4 is calculated directly from DP1 it has to

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be more clear that better results shown for DP4 are actually a result of averaging the daily irradiance variability due to clouds.

Page 8946 Case 2 comments. There is a question about the enhancement of measured UV due to the presence of snow and clouds. Which can be a third factor for the negative bias. case 1 comments. Here there is a question on how the OMI model works using high surface albedo and in the presence of clouds. Does it take into account the above mentioned effect ?

Sodankyla and Jokioinen case Sodankyla: Since  $CL_{Opt}=0$  ratios of DP1,2 and 4 are in the order of 1.04 to 1.09 this theoretically means that also ratios of DP3 and 5 are similar for these cases. Here there is a systematic overestimation and since Jokioinen and Sodankyla instruments are regularly intercalibrated i can not see any obvious reason to see this only in one of the two instruments. So since you are talking about a cloudless sky, summertime solar elevation, very low aerosol site this deviation can be either a result an ozone difference between OMI and the Sodankyla Brewer or an overestimation linked with the clear sky radiation OMI code. It would be interesting to discuss this too.

OMI grid vs measurement In general and in the case of few or scatter or broken cloud situation within an OMI grid there are two cases: a. the sun is visible during the spectroradiometer measurement b. it is not Assuming these two cases within an OMI grid where for both the cloud cover (or measured OMI  $CL_{Opt}$ ) is equal; in the first case there will be an OMI underestimation and in the second an overestimation. In my opinion the magnitude of the two differences is not equal as without the direct component the overestimation will be larger. So there is a case that statistically and when averaging for a number of observations especially in the presence of clouds, to have a systematic positive bias on the results. Would you agree on the above ? Should it be mentioned on the results discussion?