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

Anonymous Referee #1

Received and published: 27 March 2015

The manuscript updates an earlier inter-comparison of UV irradiances from ground-based instruments compared with the OMI satellite based instrument. It focusses on Northern high latitudes and includes a much longer inter-comparison period. The data are used to investigate biases in satellite data due to unresolved effects associated with reflections from clouds and from snow- or ice- covered surfaces. Errors in satellite data can be large and in either sense. The authors also investigate differences related to the under-sampling of the satellite data (typically only one or two overpasses per day), by investigating discrepancies in noon time data, overpass time data, and inferred daily totals. They show that the bias errors discussed above are much larger than those due to the under-sampling.

The main focus for the second part of the manuscript is comparing satellite retrievals

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with ground-based data from the NSF network at Summit (Greenland) and Barrow (Alaska) that are maintained by Biospherical Instruments. The authors show that, because of the homogeneous and continuous snow cover at the Greenland site, those measurements are potentially useful for detecting systematic drifts in satellite data. More details would be useful in that section (P23, para 1) that regard, perhaps it would be prudent to mention that possible changes in albedo due to changing organic aerosol depositions could affect that in future. They also make useful suggestions for improving the albedo climatology to reduce these errors in future.

The paper is well-written and authoritative, and makes a useful contribution to the literature. In my opinion it should be published after addressing the issues raised in this review.

Minor Points. P4, line 2. Should that be “older” rather than “newer” norm. Please clarify the sentence.

P4, line 19. Puzzling that the correction was not applied. I presume that's because the calibration difference is small compared with the errors related to albedo. If so, this should be stated.

P7, line 2. Please specify the typical and maximum time differences between ground-based and satellite overpass measurements.

P7, line 18-19. Can this assumption be explored a little, and perhaps justifying the assumption? For example, you could add a new figure showing a multi-year time series of monthly or annual differences (and means). This would be best done for the Greenland site, to back up the statement made in the last sentence of the abstract.

Tables 2 and 3 contain rather a lot of detailed information. The authors should consider moving them to the appendix, or to supplementary material. Similarly for Figure 13? Figure 5 could be omitted, and simply replaced by a simple summarising sentence that compares the agreement for overpass data, and daily dose data (similar systematic

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differences, but smaller error bars in the daily doses).

P42, line 4. Specify the wavelength region that applies for this CMF.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 8933, 2015.

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