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Atmospheric Chemistry and Physics Discussions

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

Anonymous Referee #2

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General comment

This paper focuses on the analysis of the differences between ground-based UV erythemal measurements and satellite data derived from OMI instrument at 13 northern ground stations. Although the method of the analysis is not new and the comparison between OMI and ground-based instruments is already present in literature, this paper is a relevant contribution to satellite validation field because of the authors focus their work on the analysis of surface albedo effect. This reviewer finds very promising the proposal given by the authors to use the inconsistency of "Case 1"to improve the OMI albedo climatology. Overall, it is a good and useful paper. Nevertheless, the next points must be carefully revised before publication:

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Discussion Paper

Major comments:

1. When the OMI albedo climatology exceeds the actual surface albedo a strong bias between ground-based and satellite data is observed due to two effects that go in the same direction. It would be very interesting to quantify the relative contribution of each effect over the bias in those stations with complementary ground-based data. For instance, could the authors select cloud-free cases as seen by the ground-based instruments as from the satellite?. Thus, this bias could be exclusively related to the overestimation of the clear sky irradiance. The average of the bias for these selected cases would give an idea of the relative contribution of that effect. The bias for the remaining cases would be due to the sum of the two effects, so the determination of the contribution of the effect associated with the underestimation of attenuation by clouds could be easily derived from the subtraction of the other contribution.

2. When the surface albedo is correctly specified by the OMI albedo climatology, the results reported in the manuscript show that OMI data tend to exceed ground-based data up to 11 %. The authors should indicate that this bias is in accordance with previous inter-comparison papers using ground-based stations with snow-free conditions throughout the year. Please reference at least the following articles:

— Buntoung, S. and A. R. Webb (2010), Comparison of erythemal UV irradiances from Ozone Monitoring Instrument (OMI) and ground-based data at four Thai stations, J. Geophys. Res. 115, D18215, doi:10.1029/2009JD013567.

— Anton, M., V. E. Cachorro, J. M. Vilaplana, C. Toledano, N. A. Krotkov, A. Arola, A. Serrano, and B. de la Morena (2010), Comparison of UV irradiances from Aura/Ozone Monitoring Instrument (OMI) with Brewer measurements at El Arenosillo (Spain) – Part 1: Analysis of parameter influence, Atmos. Chem. Phys., 10, 5979 – 5989, doi:10.5194/acp-10-5979-2010.

— Mateos, D., J. Bilbao, A.I. Kudish, A.V. Parisi, G. Carbajal, A. di Sarra, R. Román, A. de Miguel (2013), Validation of OMI satellite erythemal daily dose retrievals using

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ground-based measurements from fourteen stations, Remote Sensing of Environment, 128, 1 - 10, ISSN 0034-4257, http://dx.doi.org/10.1016/j.rse.2012.09.015.

Minor remark:

P. 8939, L. 5: “throughput” by “throughout”.

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