

I still have two comments that could potentially improve the manuscript based on this last versions

Frist issue:

"Such estimate looks probable, as the Warsaw observing site is located in the most polluted part of the city because of high vehicle emissions from the nearby main city road." This suggestion is very tricky as Warsaw and Belsk have similar AOD. So heavy pollution in Warsaw would have an effect on AOD too and not only on SSA.

So I would suggest: Thus, we assume that the surface albedo in Warsaw can be in the range of 0.03 up to 0.12 and 0.03 at Belsk. If we also assume, that SSA at Belsk is 0.92, which is a mean value measured by CIMEL photometer at 440 nm, using RTM we calculate an SSA down to 0.86 and 0.85, (for SZA=60 and 30, respectively), for the maximum albedo difference. Such hypothesis could be only backed up with additional aerosol absorption measurements at the two sites.

Answer:

The proposed change will be made.

second issue: In my comment:

“Our study proves that the UV level in Warsaw is slightly lower than that found in cleaner suburbs of the city. The differences that were attributed due to AOD differences are in the order of the accuracy of the instruments used. Based on the Brewer measurements, urban aerosols and clouds over Warsaw only partially act as an effective shield against excessive UVR. In addition, it would be interesting to try to justify this conclusion.

By justifying this conclusion I did not mean presenting the impact of such an effect (UV Index analysis). I mean are there any suggestions for having similar AOD at Belsk and Warsaw ? for example any additional information or assumptions about possible outflow of aerosols from Warsaw ro Belsk ? any other aerosol source that could affect both locations ? any aerosol removal mechanisms present in Warsaw ? or something else ?

Answer:

We would like to remove UV Index analysis and change the last paragraph to:

„Our study proves that the UV level in Warsaw is slightly lower than that found in cleaner suburbs of the city. The differences that were attributed due to AOD differences are in the order of the accuracy of the instruments used. In Warsaw the dominant wind direction was from west, south-west (all-sky conditions) and east, south-east (clear-sky) in the period 2013-2015, so Warsaw did not have an impact on AOD at Belsk. Furthermore, Pietruczuk (2013) found that the advection of air masses to Belsk is mostly from the westerly direction. However, despite the fact that Warsaw is one of the most air-polluted city in Poland, AOD in Warsaw could be lowered by existing city ventilations paths (City of Warsaw, 2006). Most of this paths seem to generate micro-advection from nearby forests and parks. Based on the Brewer measurements, urban aerosols and clouds over Warsaw only partially act as an effective shield against excessive UVR.”

Additional references:

City of Warsaw: Ecophysiological Study for Purposes of the Study of Conditions and Directions of Spatial Management (http://architektura.um.warszawa.pl/ekofizjografia#do_pobrania), 2006 [In Polish].

Pietruczuk, A.: Short term variability of aerosol optical thickness at Belsk for the period 2002–

2010, Atmospheric Environment, Volume 79, Pages 744-750, ISSN 1352-2310,
<http://dx.doi.org/10.1016/j.atmosenv.2013.07.054>, 2013.