

Reply to Referee #2

First, we appreciate the positive review and, in particular, the detailed comments to improve the manuscript. The replies to the specific comments:

Page 2, line 4. This a valid point, isotropic reflection is indeed only used as a good approximation. The corresponding sentence has been modified “*Typically, as a simple approximation, land reflectance is assumed diffuse...*”.

Page 3, line 14. The zenith radiance measured with a 60° FOV is of course a very crude approximation to the “real” zenith radiance and errors in absolute values will be significant, depending on SZA, aerosol loading etc. However, for the reason outlined in the revision below, the 60° FOV is not really used as an approximation and the difference in the ratios due to the FOV is negligible, page9, line 7pp:

“This effect concerns a wider range of angles around the zenith, which allows the use of 60° FOV zenith measurements (DA1 and DA2) for the ratios investigated below.”

This is also confirmed in the comparison between the 2.5° FOV zenith radiance of PAN and the 60° FOV zenith radiance of DA1 shown in Fig 6 and stated on page 9, line 7.

Page 3, line 23. That is correct, the aerosol product of the Pandora-2s is still under development. AOD retrievals from the Pandora have been attempted but were ultimately dismissed due to some remaining issues. In this study, the AOD measurements are exclusively from the sun photometer, which is now described in detail on page 4, lines1 pp. Also a confusing referral to AOD results from the Pandora on page 7, line 9 has been eliminated.

“Third, the AOD measurements from the sun photometer indicate a constant AOD ($\beta=0.05$) with a remaining uncertainty from the standard deviation of about 0.005.”

Page 4, line 22. The sun photometer only measures the AOD at four wavelengths without further retrievals of aerosol optical properties which have to be specified for the radiative transfer. We used OPAC type continental average as a sensible approximation which is in accordance with the measured Angstrom alpha value of 1.4.

Page 7, line 2. The variation of Angstrom α is 0.06 (1-sigma) standard deviation which mainly affects the AOD at 450 nm. This fact has been added on page 7, lines 28pp:

“(the standard deviation of α is 0.06 which would further increase the uncertainty of the AOD, predominantly at short wavelengths).”

Fig.2. [rel. units] has been added to the y-label of Fig. 2.