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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Some considerations about Ångström exponent distributions" *by* F. Wagner and A. M. Silva

Anonymous Referee #1

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Review on the paper MS-NR: acpd-2007-0254 "Some considerations about Angstrom exponent distribution" by F. Wagner and A. Silva

Summary. The aim of the paper is to analyse the influence of the aerosol optical thickness (AOT) distribution together with its associated error distribution on the resulting Angstrom exponent (AE). It is based on a simulation study and not on experimental data. The study appears in principle as very interesting and promising. However, various of the main hypothesis under which the study is based may be far from real experimental situations (in spite that the authors try to demonstrated its applicability). At what extent this hypothesis are valid?. I thing that most of them are not sufficient demonstrated. Therefore, this can make the article of low or weak validity or applicability.

In my opinion the authors need to apply this theoretical results to 2-3 stations (i.e. those of AERONET) representatives of different aerosol types or one with well defined different aerosol types in order to assure the validity and feasibility of this study. Otherwise, these critical points this work may be considered as an initial study of maximum interest but not sufficient in its current form. I encourage the authors to work in this address but with a more close exercise. The description in the introduction is well addressed but it seems that in paragraph 4.3 the author will apply the method to AOD measurements, but not. This paragraph bring to readers toward mistake.

We try to summarize this weak points 1. The authors assume lognormal distribution for the AOT values according to the references of O’Neil(2000) and Smirnov et al., (2000). However 2. The simulated error distribution of AOT is assumed as normal. 3. I can not understand why the authors assumed constant AOD error (usually, 0.01 or 0.02) but in many places in the text they say that the AOD error varies as 1/m. Otherwise, it is well demonstrated by the error theory applied to Beer law to obtain the AOD, the dependence on m. At some place in the text, the authors say that error are lower for high m. 4. Also the authors say that this study is applied for the total error of the AOD (systematic as calibration error and random errors). It is not clear at what extent this analysis may be applied in the case of systematic calibration error on photometers. 5. The first term of Equation (non number) on page 9 is not clear 6. At the end of the methodology paragraph where they explain how the simulation are done, in step 2. It is correct that the authors calculate the AOD at the second wavelengths based on a given AE. Why the authors do not select randomly these second wavelength AOD in order that the two channel will be independent.

Minor points

1. AOD and AOT symbols are mixed in the text. 2. The authors must numbered all the Equations. Also please put a number over each line. This facilitate the review. 3. At the end of 4.1 paragraph appears the sentence: Equation (1) and (2) together describe the entire time development of America. Again no geomagnetic term enters???? What

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is this?

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