

Interactive comment on “Atmospheric aerosol characterization with a ground-based SPEX spectropolarimetric instrument” by G. van Harten et al.

Anonymous Referee #1

Received and published: 28 June 2014

"Atmospheric aerosol characterization with a ground-based SPEX spectropolarimetric instrument "

G. van Harten, J. de Boer, J. H. H. Rietjens, A. Di Noia, F. Snik, H. Volten, J. M. Smit, O. P. Hasekamp, J. S. Henzing, and C. U. Keller

This paper describes ground-based SPEX spectropolarimetry instrument (ground-SPEX). The paper provides the description of the measurements and illustrates the aerosol property retrieval by comparing with AERONET data. In my opinion, this paper lacks maturity and needs substantial extension. It can be accepted only after major

C1460

revision.

After reading this paper I left with the feeling that I do not understand the value of the described efforts. . . It is clear that a group of the authors propose newly constructed instrument and it's data interpretation approach. However, I am not sure that kind of advantages this study will open for scientific community? Does SPEX provide more accurate or cheaper and reliable measurements than existing instruments (e.g. compare to Cimel radiometer)? This needs to be clarified.

Also, if new measurements is the focus of the paper, I would think that the authors simply need to compare the new measurements with the measurements of Cimel radiometer that is reference of the community (there are Cimel instruments that measure both radiances and polarizations). I do not see much sense that the author use new measurements and new algorithm and then compare the retrieval results that affected but both measurements accuracy and algorithm capability. I would suggest two complimentary efforts: detailed measurements validation and comprehensive assessment and description of the algorithm.

Generally, the paper is very short while it touches many subjects: very short and general overview of aerosol remote sensing, description of the instruments, validation of measurements and description of the algorithm. No one of these parts provide sufficient insight on the quality of the work. For example, Section 3 contains very short description of the algorithm with references. After reading this Section I have a lot of questions . . . that cannot be answered based on provided information. I wanted to find answers in the referenced work on algorithm description, but cited work Di Noia et al. (2014) is "in preparation". In my opinion this is not acceptable and, since there is not credible reference, the authors should provide more details about algorithm.

MOST IMPORTANT CONCERN: The author put such statement: "It is important to make a clear distinction between the AERONET direct sun total AOT, and the other AERONET products. The AERONET measurement of direct sun AOT is 25 straightfor-

C1461

ward and reliable, and it is therefore crucial that the groundSPEX total AOT does not differ significantly. Any other AERONET products involve inverse modelling, so there is no absolute ground truth.” After reading this I have very simple but serious question: does it make much sense to use SPEX instrument measurements of diffuse radiation with the main objective of retrieving AOD? If this is really the objective of this study it is not impressive one. . . The community always would prefer direct measurements of AOT to the values of AOD retrieved with notably lower accuracy . . .

I also noted some inadequate use of the literature. For example, the authors write: “the AOT error bar of ± 0.02 (Eck et al., 1999)”. I am not sure that it correct, I think the accuracy is 0.01 for most of spectral channel. In addition, this is somewhat outdated information. I would suggest contacting AERONET stuff get from the precise information about AERONET AOD accuracy.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 5741, 2014.