

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

### **Anonymous Referee #2**

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This paper presented a ground-based spectral polarized radiometer for sky light measurements and aerosol property retrieval. The authors introduced instrument calibration and aerosol parameter retrieval as well as illustrated several observation cases. The results are comparable with independent co-located CIMEL sun-sky radiometer in the level of retrieved aerosol parameters (e.g. AOT, SSA, refractive index) with respect to a few selected cases. However, I feel this paper is too earlier to be published with two major concerns: (i) Many important techniques (e.g. polarization calibration, radiance calibration, retrieval method) related to the results of this paper are only described in a level of “introduction or conclusion” while most of details remain to be unrevealed in

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the unpublished/in press literatures, for example: P5749, line 14, Residual differential transmission, referring to van Harten et al. 2014b, not yet published; P5750, line 11, Propagation of uncorrected dark current, referring to van Harten et al. 2014b, not yet published; P5751, line1-4, Error analysis of spectrally modulated polarization measurement, referring to van Harten et al. 2014a & Rietjens et al. 2014, all not yet published. P5754, line 6, retrieval method, referring to Di Noia et al.2014, not yet published. The lack of these important information prevents the verification and well understanding of this work. For example, on P5752, line 15, as mentioned by authors themselves “The origin of this phenomena is unknown, . . .”. If the authors do not provide real details on the radiometric calibration, the readers will not able to understand and think by themselves why this phenomenon exists, what this phenomena means, and which kind of influence it is. (ii) More details and a comprehensive independent verification versus co-located instrument (e.g. CIMEL radiometer at the site) should be supplemented. First, this should be done in the measurement level, i.e. angular distribution of sky radiance and polarization at several comparable wavelengths including 441, 675 and 870 nm used in this paper. Then, the retrieval results comparison can be introduced. Only by this separated description, the readers can know the details when there is an error, e.g. from where (the measurement itself or the retrieval algorithm?) it comes. The authors are suggested not to mix the measurement performance with retrieval algorithm together in this preliminary stage.

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