Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-268

Anonymous Referee #1

Referee comment on "The eVe reference polarisation lidar system for the calibration and validation of the Aeolus L2A product" by Peristera Paschou et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-268-RC1, 2021

The paper provides a technical overview of the eVe lidar instrument with a clear and comprehensive description of the opto-mechanical components and blocks as well as a comprehensive description of the detection setup of the two WSU. One interesting aspect of the paper is the in depth description of the pre-processing and processing chains used to retrieve the lidar products – even if I have the feeling that this part could be improved, especially for the error calculation. The next section of the manuscript describes an inter-comparison between synthetic signals and retrieved signals to assess the performance of the eVe inversion algorithm. The overall feeling is that this section needs to be revised since the purpose of the analysis is not clearly mentioned. On one hand, the section specifies that the synthetic profiles are used to test the inversion algorithm (this is clear) but on the other hand the synthetic coefficients are compared to so-called retrieved coefficients. The authors should specify why this comparison is relevant and what the retrieved coefficients are.

Next, the paper shows two case studies: one with low aerosol load and low depolarizing particles and a second with higher amount of depolarizing particles. These sections are well described but some details are missing and some uncertainty values must be explained (please see comments in the attached pdf).

The scientific significance makes the manuscript suited for publication but the content needs revision for the final submission.

Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2021-268/amt-2021-268-RC1-supplement.pdf