

We would like to thank the Reviewer for his/her comments and suggestions. Our replies (regular font) for each comment (bold font) are provided below.

Reviewer #3

Gkikas et al. compared the Aeolus L2A particle backscatter coefficient retrievals with ground-based lidar measurement in Greece. The authors showed Aeolus SCA and GRD backscatter profiles for 4 cases and statistic assessments for 46 collocated cases. It is not clear if the 4 cases are representative for the SCA backscatter coefficient product. For the statistic assessment, the authors showed that the SCA (SCA mid bin) cloud filtered backscatter profiles have better agreement with the GRD backscatter profile than the unfiltered profiles. The authors used AERONET, CAMS, MERRA-2 aerosol data to describe the aerosol situations for the 4 cases but not compared AOT from the auxiliary data with L2A. It may give readers a feeling that more auxiliary information than the Aeolus L2A data is used in the paper. The paper is well-written, good structure and lots of references. Some long sentences can be rewritten to make the paper easy to read.

The four cases presented in Section 6.1 correspond to some typical aerosol conditions in the E. Mediterranean under the prevalence of different aerosol species in the broader area of the Antikythera island. Unfortunately, due to our relatively small sample it is not feasible to include more cases. Nevertheless, we are collecting ground-based measurements during Aeolus overpasses and we hope that we will identify new interesting cases. We agree with the reviewer that there is a confusion to the reader as it is written in the submitted text. We are clarifying better this point in the revised manuscript. The utilization of several ancillary datasets is necessary in order to characterize the probed atmospheric scene since there is not this capability on Aeolus retrievals. The comparison between Aeolus AOD against those provided by the ancillary observations/outputs cannot be made at this phase due to the very noisy extinction profiles. Finally, in the revised text we have reduced the long sentences thus simplifying the readability of the manuscript.

Specific comments

Abstract

Line 27 Change 'hydrometeors' to clouds. I think hydrometeor is too broad here.

We changed "hydrometeors" with "clouds" as suggested by the reviewer.

Please provide the L2A data version (Baseline) in the abstract, because there are different L2A versions available.

We have added the baseline in the abstract.

It would be nice to provide some numbers in the abstract.

We have added few evaluation metrics in the abstract.

Introduction

It is impressive that the authors have cited so many papers throughout the manuscript.

Thanks!

Line 285: 'lat = 35.86 N, lon-23.31 E'. The degree symbol is missing. Please check the texts with 'lat=, lon = ' throughout the manuscript.

Done.

Line 307: ‘...at 354 and 532 nm...’ Is it 354 or 355 nm?

It is 355nm. We have corrected it in the revised manuscript.

Sect. 5 collocation between Aeolus and ground-based lidars.

It is not clear how the Aeolus and ground-based lidar are matched in altitude bins. Could you explain it in the texts?

We are calculating the average value of the ground-based retrievals residing within the Aeolus bin ranges. We are clarifying this point in the revised manuscript.

Sect. 6.1 results, Please explain why these 4 cases are selected. Are they the best cases?

In the revised text we are explaining the reason for presenting these four cases.

Sect. 6.2, Lines 554 – 555: Please move this sentence to the earlier section. It is important to know the L2A data version.

Done.

Lines 576-577: ‘... the GRD profiles have been rescaled to match Aeolus vertical product resolution’. How is the rescaling performed? How many Aeolus profiles are used in the statistic assessment? Later I saw it is in the figures.

In the revised text we are explaining the rescaling method as well as the number of Aeolus profiles used in the statistical assessment.

Lines 672 -673: Units are missing after the values.

Done. Thanks!

Line 796: ‘... and the EarthCARE derived AEOL-FF and ...’ Change AEOL-FF to AEL-FM.

Thanks a lot for the correction!