

## General Comments:

This manuscript evaluates the Level 2 aerosol backscatter coefficient retrieved by the spaceborne backscatter lidar CATS (Cloud-Aerosol Transport System) using collocated ground-based measurements from 14 EARLINET (European Aerosol Research Lidar Network) stations. The manuscript is well written and its contribution to the scientific aerosol community is valuable. I believe that the paper is adequate for publication under the special issue “EARLINET aerosol profiling: contributions to atmospheric and climate research” of the Atmospheric Chemistry and Physics journal after minor revision.

## Specific Comments:

Page 2, Line 5: “...underestimations of the total Aerosol Optical Depth (AOD)”. Please reframe this sentence. The way it is currently written it gives the impression that the AOD exploration is part of this study.

Page 2, Line 29: “CATS retrievals.....complementarily used”. This sentence is incomplete as written. Please reframe.

Page 4, Line 3: Could the authors specify the reason behind choosing the aerosol backscatter at 1064 nm as the only parameter in the comparison? As explained in Section 2.1, Mode 2 gives the opportunity to include the aerosol backscatter coefficient at 532 nm in the comparison which would have enabled a better evaluation of CATS products spectrally and would have also enabled an error estimation for secondary derived lidar parameters such as the backscatter-related Ångström exponent.

Page 4, Line 30: “CATS was a....to three years”. Difficult to read sentence. Please rephrase.

Page 35, Line 35: “CATS products and....of processing”. Please rephrase the sentence. The part “...and provided in ...” is not in the correct tense or it is not a continuation of the previous text.

Page 5, Line 1: What is the error in CATS aerosol backscatter retrievals?

Page 7, Line 4: Hohenpeissenberg site is not listed here. Please add it.

Page 7, Line 22: “widow” → window

Page 8, Line 11-13: The authors used two different processing algorithms for the retrieval of the ground-based aerosol backscatters namely the SCC and PollyXT specified retrieval algorithms. Under the SCC, all measurements could have been processed/treated in the same way. Could you comment on this decision not to process all measurements in the same way and whether these two algorithms can introduce discrepancies in the reported CATS comparison?

Page 9, Line 28: CATS has an overpass over Athens-NTUA at the same day even closer to the measurement site than Athens-NOA but at different time frame (a bit later). As the authors explain, the atmospheric conditions were rather stable at that day. To authors' discretion, I find it valuable/informative if the profiles from that station would be added to Figure 2d and discuss further on the possible differences or similarities.

Page 10, Line 30. I suggest to put each of the cases into a different section giving a short title indicating the complexity of the example.

Page 12, Line 1: I suggest to report the numbers with the same accuracy, for example the numbers at the end of this sentence are inconsistent. Similarly to Table 4.

Page 14, Line 10. To my understanding, the authors mention at Page 10, lines 19-21 that cases where CATS backscatter coefficient is zero or it is at its minimum detection limit have been eliminated from the study yet they are present in this figure for altitudes higher than 6km. Could you clarify?

Page 16, Line 4: The authors have used the Level 2 v2.01 for the evaluation. Nonetheless the latest available version is the v3.01. How this versioning is going to change the associations reported here? Could you correct the versioning to the latest available as in here and line 1 at page 17, for consistency?

Page 17, Line, 11: “52o” → “52°”

Page 17, Line 20: “explotations” → “explotation”

Page 34, Line 2: Please include a complete explanation of the figure, e.g the time frame of the ground-based lidar retrieval and the overpass of CATS along with explanation on the error bar in Figure c. The same applies to the rest of the cases (Figures 4 and 5).

Page 34, Line 12: In Figure 5a the overpass, although nighttime, it is colored as red. To my understanding nighttime overpasses are blue colored. Please ignore this comment if not relevant.