

Atmos. Chem. Phys. Discuss., referee comment RC2 https://doi.org/10.5194/acp-2021-508-RC2, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on acp-2021-508

Anonymous Referee #2

Referee comment on "Long-term characterisation of the vertical structure of the Saharan Air Layer over the Canary Islands using lidar and radiosonde profiles: implications for radiative and cloud processes over the subtropical Atlantic Ocean" by África Barreto et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-508-RC2, 2021

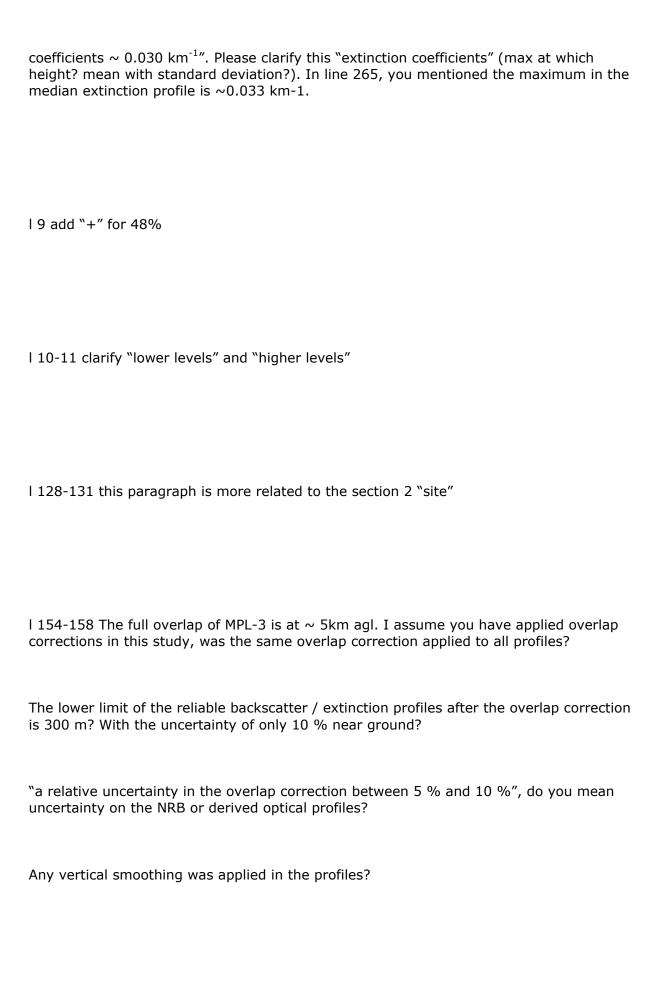
The manuscript presents the seasonal evolution of meteorological vertical profiles and lidar-derived extinction coefficients using long-term observations in Tenerife. Data were analysed under the clean scenario, the summer-Saharan scenario, and the winter-Saharan scenario. Both dust and water vapour impacts in the radiative balance were investigated. The ice nucleation processes were also discussed. The dataset is interesting, and the manuscript is well written. The manuscript is worthwhile to be published, after addressing all the points raised by reviewers.

Please see below some suggestions and comments:

The manuscript is long, and with too many acronyms. The Appendix A helps a bit, but I had to continuously go back and forth to remind myself what all those acronyms represent. Maybe reduce some used of abbreviations, e.g. clean FT (CFT). Besides, it would help if some important abbreviation definitions were added in the figure captions.

I agree with the first reviewer, that acronyms should be reduced in the abstract.

In the abstract (I 8) and conclusion (I 600), "it was associated with lidar extinction



I 159-167 LR were estimated using two-layer approach, and then applies to derive extinction coef. What were the LR values? These are interesting information to present.
What is the error/uncertainty on the derived extinction coefficients? Can it be added in the median extinction profile (e.g. by error bar)? I assume in the overlap region (below 5km), this uncertainty has higher value.
Fig.1 Mean extinction profile is not in the grey shaded area, especially in fig.1b. do you have an explanation?
Please specify "lidar total extinction at each level".
Is the height asl in all figures?
Table2, for winter "and summer" seasons.
Fig.4,5 add "523nm" in the caption for extinction.
l 547 fig.6b not a

