

Interactive comment on “Clear-air lidar dark band” by Paolo Di Girolamo et al.

Anonymous Referee #3

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Summary:

This paper presents an interesting case study of multiwavelength lidar measurements (including linear depolarization ratio measurements) of an unusual aerosol event made during the HOPE campaign in 2013. A thin layer of boundary layer aerosol with an apparently distinctly low associated backscatter coefficient was observed giving rise to a "clear-air dark band". The authors discuss the measurements and offer an explanation for the observations. Namely, they hypothesize that the layer was produced by hydrating lignite particles from a local open-pit mine.

In the main, the paper is clear, the measurements appear sound and the offered explanation seems plausible. The paper is suitable for ACP. However, there are a few areas that should be addressed before publication.

While preparing my review I have noticed that Anonymous Reviewer #1 has posted

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their review, which seems thorough. In the interest of efficiency (and the coming holidays) I will frame my review with reference to Reviewer #1's comments.

General comments:

I can state that I agree with the general comments of Reviewer#1 with the exception of the contention that "No satisfactory explanation is given why the reversal process likely to occur in downdrafts does not produce a similar effect". I find that the discussion offered in the Section 5 of the paper is plausible and "complete enough" in the context of the present work. Perhaps the authors can state that this is a preliminary hypothesis and outline what exact work would be needed to test their offered explanation in a quantitative manner.

I can also state that I especially agree with Reviewer#1 that the Figures need to be, in general, improved.

Specific Additional Comment

-Line 30 on Page 4 refers to Figure 6: I think this should be Figure 5 OR the authors have left a figure out by mistake. The discussion makes me think they are referring to a line-plot of the depolarization ratio vs height. If this is not the case, and they are really mean to be referencing Figure 5, then they should consider inserting a line plot of the depolarization. In any case, Figure 5 is not clear enough for me to draw any quantitative information from !

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-959>, 2017.

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