

Interactive comment on “Springtime aerosol load as observed from ground-based and airborne lidars over Northern Norway” by Patrick Chazette et al.

Anonymous Referee #2

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General

The paper is well written and presents interesting aerosol measurements with a small airborne lidar (aboard an ultra-light aircraft) and a mobile ground-based lidar (in a small van). The authors report aerosol measurements conducted in the European Arctic, a region for which aerosol profile observations are rare. The case studies show that lofted layers advected from polluted regions and wildfire places in North America can easily reach remote and pristine areas. The paper also shows an interesting approach how to characterize individual pollution sources (flares of the Melkoya gas processing facility). In view of the intensive discussions on arctic climate change the paper comes

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at the right time.

Minor revisions may improve the paper.

P4, L107 to P6, L133: Please provide some information (a small paragraph plus reference) on the calibration of 355 nm depolarization-ratio observations. In addition, the determination of the 355 nm particle depolarization ratio is not so easy compared to computation, e.g., at 532 nm. Please provide uncertainty information. At very low values of the particle backscatter coefficient, the determination of the particle depolarization ratio at 355 nm is no longer possible (error exceeds 100%). On the other hand, depolarization ratio observations contain information on the aerosol type and particle shape. So it should be known how good the observations are.

P9, L220 to P14, L259: The BER (or the inverse value... the lidar ratio) is an important parameter to characterize the aerosol type. Please provide as often as possible (in the text and the figures) also the respective lidar ratio values. In 95% of all reports on BER or lidar ratio, the lidar ratio is used. So, the lidar community is familiar with lidar ratio values and not with BER values.

P13 to P14: Figure 8, I would like to see the BER uncertainties as numbers in the plots as well.

P14, L 286: Regarding the flare emissions. I speculate that the freshly produced particles are very small, and most are too small to be optically active already. They may become increasingly activated after growth and coagulation, ...downwind after several hours. ... Please comment on that. To state that the AOT contribution is 0.02 or 0.07 may be misleading, the overall effect may be much higher. ... Please discuss this point a bit.

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