

Interactive comment on “1064 nm Raman lidar for extinction and lidar ratio profiling: Cirrus case study” by Moritz Haarig et al.

Anonymous Referee #1

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In their paper, M. Haarig et al. present a case of cirrus extinction profiling at 1064nm using a rotational Raman lidar. This is an very interesting paper demonstrating clear advancement in the field, and will be interesting to many lidar scientists. However, the paper needs improvements in terms of presentation, and in particular needs to provide more detailed information about the technique.

Specific comments

Introduction: The paper is missing a clear overview of aerosol extinction measurement techniques, and thus the novelty of what is presented. First, when discussing past measurements, the authors should make clear distinction of vibration and rotational Raman techniques. Rotational Raman should be in the title. Second, the presented method is an extension of Veselovskii et al. 2015 and this should be made clear in the

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introduction.

Page 2, lines 29 - 30: Provide the source of these estimates (reference or your calculations).

Page 2, lines 31- 32: Provide some quantitative argument for your choice (why two and not three or one filters). What are the expected RR and elastic cross sections in a typical cirrus cloud?

Results: Collect in a paragraph all the scattered details about the lidar processing (e.g. vertical window lengths). Provide details and references of the multiple scattering corrections and which cases they are applied (and in which not). For clarity, provide also the basic equations for RR retrievals. Give detailed error estimation of the new product. What are the effects of polarization-dependent receiver transmission in these cirrus measurements(Mattis et al, Applied Optics 48(14):2742-51, 2009)

Page 3, lines 25 – 26: I don't see any value of the HSRL channel in this paper. Without all the necessary HSRL corrections, any agreement could be coincidental. I suggest to remove it from the final version of the paper.

Page 4, line 10-15: Compare your values with previously published values in the literature.

Figure 3. Change the line labels either to the letters “beta” and “alpha” or to the words “backscatter “ and “extinction”.

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