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Atmospheric Measurement Techniques Discussions

Interactive comment on "Synchronous starphotometry and lidar measurements at Eureka in High Canadian Arctic" *by* K. Baibakov et al.

Anonymous Referee #1

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The paper deals with synchronous measurements of star-photometry and lidar at the High Arctic Place at Eureka (Canada). Generally, it is well-structured and written. The paper shows the last advances in star-photometry that is being quite useful for the retrieval of nighttime AODs, and is of particular interests for aerosols studies at high-latitudes places such as the Arctic places. Nighttime measurements are needed to better understand aerosol dynamics and aerosol processes. Also, the author present novel measurement of combining star-photometry / lidar to evaluate cloud screening procedures in an environment where thin-stable clouds has an important relevance in the optical depth. Overall, I recommend its final publication in Atmospheric Measurement Techniques after some minor considerations. âĂć In section 4.1.5 you say that Spectral Deconvolution Algorithm (SDA) is used. Can you specify which range of wave-

lengths do you use as inputs to the algorithm? âĂć In Table 1 and in section 4.5.1 (Page 2031, line 27) you define τf', τc' and τa' as the fine mode, coarse mode and aerosol optical depth derived from integrating the lidar profiles that have been partitioned into aerosol (assumed fine mode) and cloud segments using the βthr classification scheme. Which is the wavelengths of βthr? Is it taken into account the wavelength difference in the comparisons with SDA obtained by star-photometry? âĂć Page 2024, line 22: It seems to be a typo as there is no Table 4 in the manuscript. âĂć Section 4.3.1.: Have you characterize the effect of the blinking in your star-photometry measurements? It could be a source of uncertainty especially for low exposure times. âĂć In section 5, I assume that all the star-photometry data are after applying the cloud-screening algorithm. I am right? Please clarify in the text. âĂć If you have a Raman lidar system, why are you working with elastic-backscattered signal and using Klett method? Raman measurements can provide independent extinction and backscattering measurements and you would avoid the assumption of lidar ratios. âĂć Graphs quality should be improved. I can provide some examples: o Graph 5: It is not clear what you present in the lidar color plot. Also, what is the orange and blue color in graphs a.3? Please clarify. Moreover, y-axis in Figure 5.b is wrong. Please revise. These things apply for the other graphs. o Graph 6: It is difficult to understand if you represent only night time data. It seems that you connect by a line the last value of the night with the first of the following night. I am right? I recommend skipping the line when there are no measurements. This suggestion applies for the rest of graphs. Minor changes Page 2014, Line 19: change "course" by "coarse" BIBLIOGRAPHY Pérez-Ramírez, D., Lyamani, H., Olmo, F.J., and Alados-Arboledas, L., (2011) Improvements of star photometry for aerosol characterizations, Journal of Aerosol Science, 42, 737-735.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 2013, 2015.