

Interactive comment on “Year-round stratospheric aerosol backscatter ratios calculated from lidar measurements above Northern Norway” by Arvid Brand et al.

Anonymous Referee #2

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This paper presents the analysis of stratospheric aerosols observations using the state of the art Rayleigh-Mie-Raman multiple wavelength lidar at ALOMAR. The stratospheric aerosol layer is observed at 1064 nm with unprecedented high resolution. The topic of the paper is well suitable for publication in AMT. However the description of the data processing and the results should be improved and I recommend a major revision as detailed below.

Equation (1) page 3 for the dead time correction does not seem correct. The correct formulation is: $N=N_{\text{count}}/(1-\tau N_{\text{count}})$

Page 6, lines 10-11, how equation 3 could be applied if the inelastic signal is not

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present?

Page 6, lines 15-21, the justification for a linear correction with altitude of the R355/387 is not given. It may hide some instrumental problems in the lidar. This point should be discussed in more details. Also I wonder why the ratios R532/387 and R532/355 on Figure 4 fall below 1 in the lower altitude range. Is it a problem of detector saturation?

Results section page 7 How the standard error of the monthly mean scattering ratio is computed? Is it from the statistical error on lidar signal at different wavelengths? Due to the limited number of available hours of measurements per month and the large variability of the Arctic stratosphere, especially during winter months, the monthly averaged value of the scattering ratio cannot be considered as fully representative of the monthly climatological value for this month.

Page 7, lines 27-29, the increase of aerosol loading in the lower stratosphere in August-September due to smoke from the Canadian fires merits to be discussed in more details than just put in the mean seasonal cycle.

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