Review of acp-2016-1181
“Depolarization Ratios Retrieved by AERONET 1 Sun/Sky Radiometer Data
2 and Comparison to Depolarization Ratios Measured With Lidar” by Youngmin
Noh, et al.

General comments:
The manuscript describes the results of comparing aerosol column value of particle linear
backscatter depolarization ratio retrieved from AERONET sun-radiometer measurements, \( \delta_s \),
and its direct measurements by lidar, \( \delta_{CL} \), as well as detailed analysis of the relationship
between the parameter \( \delta_s \) and the characteristics of the aerosol dust fraction. The results of this
work can be implemented in observations of Asian dust transport.
Evaluation of aerosol depolarization ratio, \( \delta_s \), from AERONET measurements of direct and
scattered solar radiation is the result of solving of “ill-posed” inverse problem. Correlation
coefficients between \( \delta_s \) and \( \delta_{CL} \) characterize the uncertainties of parameter \( \delta_s \). It is useful
information to improve the algorithms for processing data of complex experiments with
employment of sun-radiometers and lidars.
I consider this paper to be a good and useful work and suggest to public it with some corrections.

Specific comments:
1. The term "linear backscatter depolarization ratio" is used in the scientific literature to
denote two similar but not identical parameters: the ratio of the backscatter perpendicular
intensity to the parallel intensity, as well as the ratio perpendicular to the total
backscattering intensity. The relationship between these quantities is nonlinear and for
large depolarization the difference between parameters is significant. Therefore, at
the beginning of this manuscript (in Abstract) it should be specified which parameters are
used for characterization of radiometric and lidar data.
2. The question of the causes of the differences in depolarization evaluations, made from the
results of radiometric and lidar measurements, is of interest. What part of these
differences is caused by instrumental measurement errors?
3. Line 217: “The molecular depolarization ratio is assumed to be 0.0044”. It means that all
lidar systems have optical filters with very small bandwidth and measure almost only
central Cabannes line of Rayleigh scattering (PC-SCI-201, CALIOP Algorithm
Theoretical Basis DocumentCalibration and Level 1 Data Products).
4. Lines 41-44 in Abstract (the same, in Summary) should be compared to lines 362-363.