

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-251

Anonymous Referee #2

Referee comment on "Laser imaging nephelometer for aircraft deployment" by Adam T. Ahern et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-251-RC2>, 2021

In this work, the setup and validation of a laser imaging nephelometer that can be used for aircraft deployment and measurement of polarization state of particles was introduced. In addition, this instrument was also applied in the FIREX-AQ campaign for measurement of smoke plume and was found to be able to measure very high scattering coefficients with high temporal resolution. This work expanded the application of LiNeph, which can play an important role in comprehensive measurement of aerosol optical properties. The manuscript fits well to the scope of AMT and I recommend it to be published after addressing the following comments listed below.

Specific comment:

Although it is impossible to use polarized particles to calibrate PiNeph, it is helpful to check the measurement of -P11/P12 for non-polarized particle. Quantification of the uncertainty of P11/P12 measurement is very important for the measured polarization state of particles in field campaign.

Technical comments:

L138: It would be better to describe the cell volume and the exchange rate here.

L142: Since you have measured the RH and temperature of instrument exhaust, how did they change during the measurement in the FIREX-AQ campaign?

L181: The calibration requires not only compositions but also the size of aerosol, as you mentioned later.

L195: The cut-off size impactors before each instruments were different from each other. Why don't you use impactors with the same cut-off size?

L305: How large in specific do you mean by "very large ash particles"? Because there is a PM1.5 impactor before PiNeph, it seems that "very large ash particles" should be smaller than 1.5 μ m.

L311: Which aerosol concentration do you refer to? Volume, number or mass?

L313: "in" should be "if".

L341: How did other imaging nephelometer perform in the comparison with AOP-derived scattering?

L363: It's not "cumulative".

L372: It would be better to present the measured values of the asymmetry parameter in the main text besides in the figure.

L416: It's unclear that "accurately determine the asymmetry parameter within 3%".