Comment on amt-2021-139

Anonymous Referee #2

Referee comment on "Mass concentration estimates of long-range-transported Canadian biomass burning aerosols from a multi-wavelength Raman polarization lidar and a ceilometer in Finland" by Xiaoxia Shang et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-139-RC2, 2021

Authors provide comparison of the particle mass concentration obtained from Raman lidar and from ceilometer measurements, which is important topic. The manuscript is well written and can be published after minor revision.

Ln 159. "*calculated from the relative humidity and the temperature profiles from GDAS1 data*"

GDAS profiles may differ significantly from real profiles of the water vapor. This should be kept in mind when using these for correction. Did you compare GDAS with profiles obtained from Raman measurements?

Ln.166. What can we conclude from using both forward and backward Klett methods? Forfward method is very sensitive to the choice of lidar ratio. The lidar ratio of smoke can vary in significant range, so use of just one value obtained from rotational Taman lidar is risky. Did you compare it with lidar ratio provided by AERONET?

Fig.1c. Signal above 3 km is very noisy so results probably depends on choice of the reference height.

Fig.5d. I am a little confused. What means "contribution of BrC"? Please specify.

Fig.6. The demonstration of the temporal evolution of the profiles is useful. Still would be good to quantify the difference between lidar and ceilometer. May be provide standard deviation?

I agree with the first reviewer, that numbers should be used instead expressions like "good agreement".