The manuscript compares different schemes of aerosol classification. In particular, it compares aerosol types derived from multiwavelength lidar measurements (for predefined aerosol types) with new algorithm, based on the back trajectory analysis. Aerosol types from different schemes demonstrate reasonable agreement and this is important result. Manuscript is clearly written and suits for ACP. I have just technical comments.

Ln 35 – 42. I think it can be skipped or shortened. Well known things.

Ln.65 By this point reader may have feeling that intensive properties for different aerosol types are well known. In reality these present strong variations even for single aerosol type. And not all of these are equally trustable. For example, backscattering Angstrom exponent is very sensitive to variation of particle size and refractive index. I think a short paragraph, explaining complexity of the problem of aerosol classification would be useful.

Fig.3a. $\beta 355$ is not zero at 2.8 km, while $\beta 532$ and $\beta 1064$ are. Is choice of reference point correct?

Fig.3b No reason to show particle depolarization above 2.6 km, because results are already untrustable.

Fig.3 second row. 3a. The same question about reference point at 7 km.

3.e. No reason to show particle depolarization for low backscattering (above ~6.5 km). It is not trustable.

Ln 185-195. Too many numbers. Many be better put them in Table?

Ln 371. "Smoke aerosol layers according to SCAN show medium lr_{355} values (50±5 sr), medium to small lr_{523} values (37±4 sr),"

Actually lidar ratios for smoke present very large variation. In particular, for aged smoke lr355<lr532. It depends also on humidity…

Ln.384. Variability of dust lidar ratio is discussed in recent publication:

Veselovskii, I., Hu, Q., Goloub, P., Podvin, T., Korenskiy, M., Derimian, E., Legrand, M., Castellanos, P.: Variability of Lidar-Derived Particle Properties Over West Africa Due to Changes in Absorption: Towards an Understanding. Atm. Chem. Phys., 20, 6563-6581, 2020.