We want to thank Referee #3 for the positive feedback on our manuscript and for providing valuable technical corrections. Our replies are given in bold.

This paper investigates the sampling efficiency of the primary aerosol inlet system used aboard the DLR Falcon aircraft during the A-LIFE field experiment. The authors have combined theoretical calculations with experimental data generated by aerosol particle counters mounted on both the wings of the aircraft and inside its cabin. This research approach is innovative, meaningful and contributes to existing knowledge.

The study puts emphasis on the two well-known constituents of aerosol sampling efficiency; i.e., the aerosol inlet/probe efficiency and the efficiency of the aerosol transport tubing. In addition, it introduces and highlights the importance of using the true air speed of the aircraft in lieu of its flight altitude as a representative figure of merit.

There are inherent uncertainties and limitations, which are correctly identified and adequately discussed by the authors nonetheless. Moreover, although the data analysis is limited to that specific setup and focuses on a relatively narrow range of sampling flow rates and particles of specific composition, the presented study is relevant and of significant interest for the aircraft-based aerosol measurement community. The findings demonstrated may retrospectively be considered and even expanded for the quality control of aerosol measurement data collected by the DLR Falcon and other research aircraft with similar setups.

Overall, the manuscript is very clearly written and demonstrates a credible methodology for the derivation of its findings. The study per se and the quality of presentation are appropriate and well within the scope of AMT. My recommendation is that the manuscript can be published after having been undergone a few minor technical corrections in accordance with the remarks given below.

Please note the following remarks:

Line 154: It would be good to mention the exact angle of the (“slightly tilted”) inlet with respect to the fuselage.

To determine the inclination of the inlet with respect to the fuselage, we got in contact with the DLR department “Flugzeugexperimente”. The documentation does not show an inclination of the inlet towards the aircraft’s fuselage. The Falcon always flies “with the nose upwards” (for a distribution of angle-of-attack during the SALTRACE campaign with the Falcon, see Figure A2 in Spanu et al., 2020). The direction of flow into the inlet will vary (slightly) with flight condition. There is no indication that this impacts the measurements.

Line 329: Explain, if possible, what data the estimated average cabin temperature of 30°C is based upon.

We analyzed temperature measurements inside the inlet tubing of the DMT Cloud Condensation Nuclei Counter (CCNC) instrument which was deployed on the Falcon during A-LIFE. Throughout the A-LIFE aircraft campaign, the temperature at the CCNC inlet was 32.6 ± 3.7 °C on average. The inlet of the CCNC was mounted at the top of the mounting

rack, the SkyOPC was mounted in the middle part of the rack where it was slightly cooler. Therefore, we assumed an average temperature of 30°C for the calculations. For clarification we added a sentence to this paragraph in the revised manuscript.

Line 409: Provide a reference or explanation for assuming shape factor $\chi = 1.2$ for mineral dust particles.

References were added in Line 409. Furthermore, in Line 329, where the shape factor of mineral dust particles was first mentioned, an explanation was added.

Line 751: The syntax of the V_{TAS} condition inside the parentheses is wrong.

Corrected.

Line 796: The term "total volume flow" is used, but the unit in Line 797 is m s-1. The same quantity is referred to as "stream velocity" in other parts of the text.

Thank you for spotting this typo. We left the term "total volume flow" in this sentence, but corrected the values to 17.87. – 22.83 l min^{-1}.

In addition to the requested changes, we also included an additional table (now Table 2) which summarizes the derived cut-off diameters of the sampling system (i.e. combined effect of inlet and sampling lines) from Figure 6 for different particle densities at different altitudes so that interested readers do not have to extract these values from Figure 6.

References

Spanu, A., Dollner, M., Gasteiger, J., Bui, T. P., and Weinzierl, B.: Flow-induced errors in airborne in situ measurements of aerosols and clouds, Atmospheric Meas. Tech., 13, 1963–1987, https://doi.org/10.5194/amt-13-1963-2020, 2020.