Comment on amt-2021-423

Anonymous Referee #1

Referee comment on "Intercomparison of holographic imaging and single-particle forward light scattering in situ measurements of liquid clouds in changing atmospheric conditions" by Petri Tiitta et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-423-RC2, 2022

General comment

The paper "Intercomparison of holographic imaging and single-particle forward light scattering in-situ measurements of liquid clouds in changing atmospheric conditions" by Tiitta et al. shows the advantages and disadvantages of a holographic imaging instrument (ICEMET) and a cloud droplet spectrometer (FM-120). The instruments are introduced in great detail and compared to particle measurements using a twin-inlet system. Such comparison studies are important to better know the short-comings of different instruments and being able to correct for biases in further scientific studies using these instruments. I therefore support the publication of this paper in AMT and only have two specific comment and a few technical corrections.

Specific comments

P8, L223: Why is the number concentration of the activated particles the difference of the number concentration of the observed total and interstitial aerosol particles? Are only particles larger than 1μm assumed to be activated particles?

P15, L417: It is written that the mutual correlation among the different data sets increases significantly when the criteria of isoaxial sampling of the FM-120 is met. First of all what is a significant change? Second of all, there is a similar increasement in the correlation between N_{act} and $N_{d,IM}$. What is the explanation for that?

Technical comments

P5, L144: Make sure that the names of the variables in the text fit the ones in the equations, e.g., it is Δt in the equation and Dt in the text, furthermore all variables are italic in the equations while they are not in the text.

P6, Figure 3: Incorrect sentence: "… and thus have no uncertainty value was defined (black crosses)."

P7, L218: Typing error: 1 um = 1 μm

P9, L258: If the mutual correlation is the same as the mutual information, why not using the same abbrevation, i.e., either MC or MI?

P9, L282: Incorrect sentence: "The criteria for the occurrence and intensity of cloud, a typically on… "

P10, Figure 5a: A color bar missing.

P13, L373 (Figure 8): Incorrect sentence: "Only data points where a fraction of $N_{d,FM2-5} <$ 0.2 are presented."

P13, L374: Incorrect sentence: "In order to look more detail a representative…"

P13, L378: Incorrect sentence"As expected, larger the cut-off size of…"

P14, Figure 9a: I think it would make sense to also add the sympols to legend.