Comment on amt-2022-270

General comments:

The present paper focuses on improving the counting statistics of sub-10 nm aerosol particles using a DMPS system with a modified Airmodus A20 CPC. They further found that improving counting statistics significantly reduces the uncertainty with the estimation of new particle formation and growth rates. I found it very important and interesting for aerosol size distribution measurements. The manuscript was well-written and structured. I would suggest publishing it on AMT after a minor revision.

Specific comments:

1) Line 92. Why do you choose 2.5 lpm? Since a higher inlet flow rate indicates higher counting statistics, can you increase even higher?
2) Section 2.4 uncertainty in CPC measurements. As so many uncertainties are calculated (e.g., counting, measurement, total…) and discussed later in the results section, it is sometimes difficult to follow for readers. I suggest making a summary table listing all uncertainties, including the formula, use of purpose and values for exemplified experiments (e.g., 28th March, 5th and 6th May).
3) Line 142-143 and Figure 2. Why do you choose these certain number ranges?
4) Line 170, …fits sigmoidal functions to the rise of the measured signal.. of which parameter (number concentration)?
5) Line 180-182. What does CS mean in equation (8)? Give some details on how to calculate $GR_{3\text{-}6}$. It would be helpful to have exemplified fitting plots to derive GR and J3 for non-NPF background readers.
6) Line 186. Why do you choose 28 March as an example?
7) Line 187-188. By altering the measured counts in each size-channel for each measurement time according to their underlying uncertainties. Plot out the time series of the uncertainties or give numbers (e.g., avg. +/- std)
8) Line 222-224. How much does the chemical composition influence the cut-offs? Give a number if available.
9) As shown in figure 4, what is the meaning of the numbers: 0.94-70.0 and 0.89-14.0?
10) Line 236-237. Why the formation rate is more robust even though the used $GR_{3\text{-}6}$ is less consistent between the A20 and TSI 3776? It would make sense if the GR term is not the dominant term. But in lines 268-269, the author demonstrated that the dominant term for formation rate is the growth term.
11) Line 241-242, Figure 6 is not well described and explained, add more details if you think it is important otherwise delete it. In Figure 6 (c), formation rate for A20 or TSI 3776? In Fig.6 d-f, why the distributions of A20 are always narrower than TSI?
12) Line 253, please clarify how you derive the statistical uncertainty, refer to the table in comment 2.
13) Figure 7 (a), any explanations on why is the distribution of $GR_{3\text{-}6}$ bi-modal?
14) Lines 277-281, please clarify the relative uncertainties, refer to the table in comment 2.
15) Out of curiosity, is it possible to compare A20 with NAIS as NAIS is good with nano-particles down to 0.8nm?