

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-176

Anonymous Referee #2

Referee comment on "Reconstruction of the mass and geometry of snowfall particles from multi-angle snowflake camera (MASC) images" by Jussi Leinonen et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-176-RC2>, 2021

The article presents a proposed method for hydrometeor mass retrieval and geometric 3D modelling by the application of a GAN trained for these purposes. The GAN is trained on simulated data and the reasoning for this is well explained, however this might warrant further work with captured data. 14 printed flakes for 198 images seems like the minimum (although I may be wrong).

The paper is well written and does an admirable job of explaining a difficult topic. The authors make an effort to outline the limitations of their work and discuss their means to address them. The figures and tables are clean and support their work.

I have no concern publishing this document, although I do have some general questions for the authors.

General Questions:

One thought I have is if the snowflakes used (3D printed) for evaluation were part of the training? Or were they generated specifically for evaluation. Is there any thought on how much error is introduced by using faux snowflakes in validation testing on a network trained on simulated snowflakes? I expect it to be minimal but wonder what your intuition is. This is a difficult problem to solve, and I commend your approach.

Did the printing allow for the introduction of air pockets? How solid were these printed flakes? Did any flakes have cavities? How did the GAN perform with irregular shapes? You cite Kleinkort et al with a "volume reconstruction (using a standard 3-camera MASC) is quantified to be 27% in terms of absolute error...". Kleinkort found improvement by introducing additional camera angles. Have you given thought to including additional angles for the GAN?

Line Specific:

170- What were the 3 PCA components kept? Or what were they related to. Might help in reproducibility if we had that information.

192- Were there any experiments with different printer material? A larger validation set would be beneficial and perhaps a more durable material could assist in that.

289- Mean terms of mean NSE. Want to make sure this is not a typo.

319 – Table 5 and 4... this causes me fits. I don't know if there is a rule of numbers being listed in order, but it certainly stands out.

Repeated in Fig. 6 so at least the authors are consistent.