

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2021-123

Andrew Heymsfield (Referee)

Referee comment on "Comment on "Review of experimental studies of secondary ice production" by Korolev and Leisner (2020)" by Vaughan T. J. Phillips et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-123-RC1>, 2021

I'm openly sharing my identity. I have tried to address the authors' comment/concern of the Korolev and Leisner article which suggests that ice fragmentation during sublimation is not generally an important process for secondary ice production. To address that point, I drew on the Lagrangian spiral descents during the CRYSTAL-FACE field program, where the in-situ aircraft spiraled in a descending pattern, drifting with the wind and descending at a rate of about 2 m/sw. These were thunderstorm anvils, which began at a temperature of about -15C and ended at temperatures from about 6 to 8C. The relative humidity in the region at temperatures above 0C were significantly below 100% and the ice particles were sublimating, not melting. I have 3 figures for the 3 spirals, showing temperature, relative humidity and total ice concentration. I see no evidence of a concentration increase that would suggest ice fragmentation in the sublimating region is significant. Furthermore, in such regions, sublimating ice particle fragments would each rapidly fully sublimate or be collected by other particles. Andy Heymsfield

Please also note the supplement to this comment:
<https://acp.copernicus.org/preprints/acp-2021-123/acp-2021-123-RC1-supplement.pdf>