

***Interactive comment on* “Revisiting particle sizing using grayscale optical array probes evaluation using laboratory experiments and synthetic data” by S. J. O’Shea et al.**

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This study summarizes laboratory studies that were conducted to evaluate the use of gray scale thresholding to better constrain the sample volume of OAPs and reduce the uncertainty in sizing of out of focus particles.

This is an important contribution to the ongoing discussion of how to process cloud measurements made with imaging probes. It is written concisely and makes clear the steps that should be taken to process the measurements from gray scale OAPs. I did not identify any errors in either assumptions or interpretations.

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I am attaching an annotated pdf of the manuscript with a few minor suggestions/corrections.

The one, somewhat glaring omission that I think should be addressed concerns the lack of any discussion of doing a size correction using some combination of the gray level information instead of using the K07 corrections. The reason that using the three gray level values to derive the in-focus size could be beneficial is because application of K07 requires a table look-up that consumes processing time whereas a direct derivation from the gray levels might improve the processing speed and maybe accuracy.

I think it is a reasonable request to explain why this was not done.

Final point. Alexei Korolev has a new table with many more data points than used in the K07 paper. Was this used in this study? If not, the authors should contact Alexei for these data and test if the outcome is significantly different

Please also note the supplement to this comment:

<https://www.atmos-meas-tech-discuss.net/amt-2018-435/amt-2018-435-RC1-supplement.pdf>

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-435, 2019.

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