

Interactive comment on “Study of the diffraction pattern of cloud particles and respective response of Optical Array Probes” by Thibault Vaillant de Guélis et al.

Baumgardner (Referee)

darrel.baumgardner@gmail.com

Received and published: 12 January 2019

This study is a relatively detailed evaluation of the impact of diffraction on non-spherical particles passing through the laser beam of OAPs at varying distances from the center of focus (COF). The results do not differ from those published many years ago by Korolev. The primary difference is that the authors extend the Korolev results from spheres to columns and capped columns. In addition, the uncertainties in sizing that they derive are only marginally larger than have been published in many previous studies. This takes nothing away from the current study that provides more validation using comparisons with the most current state-of-the-art OAP.

C1

I think that the paper could be significantly shortened by removing a lot of the detailed description of how the images become distorted but that is not a major distraction. On the other hand, the paper could be lengthened and strengthened by adding what I consider to be an obvious extension, i.e. adding the grayscale information. I realize that the OAP they were evaluating the model with does not have grayscale, nor do I expect them to extend the study by comparing with a grayscale. On the other hand, a number of the features that they show that are caused by a single threshold could be totally or partially mitigated by processing with more than a single threshold, such as can be currently done with the Cloud Imaging Probe (CiP) with the grayscale option. As the authors are probably aware, there is another study in peer review in AMT that shows with laboratory studies that using the grayscale thresholds, the DOF can be much better defined. I think the current study would be especially powerful and complementary to the sister study in review on the grayscale.

I will not reject this paper if the authors choose not to extend it with some additional grayscale information but I think it will be of less interest if they leave it out.

I have attached an annotated pdf with some grammatical corrections.

Please also note the supplement to this comment:

<https://www.atmos-meas-tech-discuss.net/amt-2018-437/amt-2018-437-RC1-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-437, 2018.

C2