

Atmos. Meas. Tech. Discuss., referee comment RC2
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Comment on amt-2021-427

Anonymous Referee #2

Referee comment on "A Comparative Evaluation of Snowflake Particle Size and Shape Estimation Techniques used by the Precipitation Imaging Package (PIP), Multi-Angle Snowflake Camera (MASC), and Two-Dimensional Video Disdrometer (2DVD)" by Charles Nelson Helms et al., Atmos. Meas. Tech. Discuss.,
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This is an important contribution to understanding how various optical imagers observe properties of snowfall. Overall, the manuscript is understandable. While I have no qualms with the included analysis, there does appear to be some low hanging fruit that would greatly improve the impact of the paper. These and other comments are highlighted below.

Specific comments:

Horizontal motion should/needs to be addressed. Sampling/flow issues aside (and this is extremely important but beyond the scope of the article), the open design of PIP will lead to more translational motion vs. the MASC. Based on the field campaign data, there should be surface wind data you could use that would help guide upper-values for analyses like Figure 3. Further, I would like to see how this relates to the PIP vs. 2DVD analysis (e.g. Figure 9).

The normal caveats apply to studies based on one case during a campaign. Is there the opportunity to conduct this analysis on other cases? How many were available during ICE-POP 2018? More reasoning is needed. While this case provided lots of variety, it is important to demonstrate how varied results are for other types of cases as perhaps you could demonstrate for certain types of cases, the discrepancies between instruments is either amplified or diminished.

The manuscript could be more concise by merging the Data and Instruments sections.

For example, the first paragraph in section 3.1 is essentially duplicative with the material under data. I would remove this, then make the sections on the instruments as sections 2.x.

Technical comments:

Line 200: is vs. will be performed?

Paragraph (255-268): This paragraph could be cleaned up. Examples include multiple 'For simplicity' phrase and you could omit 'it should be noted'. I would lead off with the 2nd sentence to remind the reader, then discuss the number of factors that aren't addressed rather than revisiting the 'number of factors' phrase.

Line 275: Agreed, but you should probably provide a citation for this statement. The larger concern is potential *horizontal motion*

Line 304: Extra 'both' in this sentence.

Line 321: How about: Motion blur of the top (bottom)- edge pixels occurs when the particle leaves (enters) those pixels during the image exposure period.

Figure 3: The sentence starting with 'Calculations... and Specifically...' is repetitive with the body of the text and does not describe the visual properties of the figure. I would omit for brevity or restate in text instead of the caption.

Figure 4: best fit lines? I would omit the last sentence in the figure caption as this is already included in the text right after Line 355.

Figure 7: Once again, some of the caption is discussed in text (sentences starting with 'This' and the first 'The'.

Line 447: 'Because the 2DVD'

