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Atmospheric Measurement Techniques Discussions

Interactive comment on "Microphysical properties and fall speed measurements of snow ice crystals using the Dual Ice Crystal Imager (D-ICI)" *by* Thomas Kuhn and Sandra Vázquez-Martín

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Overall I find this paper well worth publication in AMT for introducing a new instrument that can be applied to the concurrent fallspeed and imaging of small precipitation particles. It is an advance over widely used instrumentation that provides similar quality images but no direct measurement of fallspeed. The D-ICI instrument and data processing are thoroughly described and initial results are provided the are largely consistent with expectations.

I have only a few substantial comments.

1. The writing is rather idiosyncratic at times and could use a professional edit

2. Section 2 about the inlet and sampling tube is insufficiently supported. The inlet design is such that in sufficiently high winds I could easily imagine based on experience and prior literature such effects as poor sampling, induced tumbling, crystal fracturing, and altered particle fall speeds. The paper states currently "The length of the sampling tube upstream of the sensing volume is sufficient (more than ten times the diameter of the sampling tube) so that particles can relax from any effects of wind. Hence, the fall speed of ice particles is not affected by wind or turbulence," but without justification that would lend real confidence.

There is an extensive literature on particle sampling by inlets, even in the atmospheric sciences, back-of-the-envelope calculations could be done, and Computational Fluid Dynamics simulations can also be performed relatively easily in e.g. CAD. I feel that some improvement is needed here.

3. A limitation of the device that should be acknowledged for particle classification is that the larger particles are near silhouettes. I would say that the rounded particles in the top row of Figure 8 could just as easily be assemblages of small crystals as graupel, particularly given their more structured boundaries.

4. Figure 10 includes prior results by Mitchell. What not show the same comparison in Figure 11? There are many possible sources, e.g. Locatelli and Hobbs.

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