

Interactive comment on “On the potential of 2-D-Video Disdrometer technique to measure micro physical parameters of solid precipitation” by F. Bernauer et al.

Anonymous Referee #2

Received and published: 5 May 2015

Anonymous review May 5, 2015

The 2DVD instrument manufactured by Joanneum Research is one of the few commercially available products designed to provide a detailed view of micro physical properties of liquid and solid precipitation particles. The authors aim at describing the performance of the instrument when measuring solid precipitation. A combination of actual precipitation and artificial particles (steel spheres and Styrofoam clusters) are used to estimate a number of parameters and their accuracy.

General comments I believe that there is a lot of validity in the idea that instru-

C1013

ments such as the presented 2DVD by Joanneum as well as measurement techniques/algorithms provided by the manufacturers should be independently tested and the results provided to the broader community. With that respect, I believe the paper by Bernauer et al. has the potential to be a valuable contribution to the field, and AMTD is the appropriate platform. Having said that, I believe the paper needs a major rewrite. There are a number of issues that should be addressed by the authors to improve the clarity describing the testing methodology.

Specific comments In section 2, the authors introduce an updated matching algorithm building on the work of Huang et al. (2010). Section 2.4.2 starts with a rather controversial proposal. To compare the manufacturer supplied matching algorithms, the authors use a real snow fall event whereas the new matching algorithm is evaluated with Styrofoam particles of known size. Besides mentioning the procedures, no results were presented. The authors need to explain why they introduce the new procedure and how it compares to the one provided by the manufacturer. It is better? Why only velocity was measured in this step? Why not use the Styrofoam for both cases? Why not use it to test for all other parameters (elongation, roundness, etc.)? Since this is a matching algorithm comparison section, I was expecting comparison based on how well the two algorithms can match particles (camera A and camera B). As it is presented right now, it makes little sense to even mention it, altogether. Also, I am a bit confused by the logic presented in Figure 5. Is there any reason why camera A is used to initiate the “search” (and not the camera B)? Why is the search area shifted in the positive (from 977 to 1016) direction? Is it possible that the particle that triggered camera A at time corresponding to line 977 could trigger camera B at the same (or earlier) time? This should be clarified. Section 3.1 deals with the calibration procedure. Is this the manufacturer supplied methodology? In such case, this leads to a trivial conclusion that users should follow manufacturer’s recommendation and calibrate the instrument periodically. I am disappointed that the authors decided not to use Styrofoam to test for elongation, roundness, shape factor, etc. I am not convinced that statistics reported for perfectly round, metal spheres can tell us much about how well the instrument is

C1014

doing when characterizing solid, irregular precipitation. Reporting just consistency is like saying that we are always right or always wrong, we don't know, but we are consistent about it. This is not a very useful way of reporting. Why are the results presented separately for cameras A and B? From a user perspective, the instrument should provide a "final" answer and I honestly don't understand the logic of reporting individual cameras. The results should be combined to a single result for the instrument. This is how the instrument is utilized in the field, so the overall performance is much more valuable.

Final comments The authors overpromised in the title of the paper and left with many questions to be answered. I applaud the initiative to test the 2DVD and I especially like the concept of using irregular particles for assessing the capability of deducting complex shape characteristics. This is not what the paper offers. This paper has a lot of potential to be a valuable contribution, but at this point it needs some

Minor comments Figure 8 should use the same axis ratio (1:1) for a better visual effect. In my humble opinion: The naming and section, sub-section convention is somewhat overused. I can see how a simpler structure for this (rather short paper) could work better. Short format is good, but using fewer sub-sections could make it better. Page 3100, line 20 – konvex should be convex.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 3087, 2015.