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# Modifications to the Effective Sample Area in Data Acquired by 2-Dimensional Video Disdrometers

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The 2-Dimensional Video Disdrometer (manufactured by Joanneum Research) is an instrument widely used for ground validation and precipitation microphysics studies. This instrument is capable of reporting back multiple properties of each detected hydrometeor; fields in the data record include arrival time, fall velocity, oblateness, mass-weighted equivalent diameter, detection position, and estimated detector sample area for each detected drop.

The last of these variables is necessary for using the data record to reliably estimate the instantaneous rain rate and total accumulations; it varies from detected drop to detected drop because a detected hydrometer must be fully enclosed within a fixed sample area to be successfully characterized by the instrument; this means that larger droplets have a smaller region that their centers can fall through and still be accurately measured. Careful analysis reveals that improvements can be made to the manufacturer's calculation of this drop-dependent effective sample area.

These improvements are related to four key observations. (1) Due to the optical geometry of the instrument, not every pixel comprising the detection area has the same size. (2) The manufacturer's algorithm makes some sub-optimal corrections for accounting for the detection area boundary. (3) The assumed extent of the full detection area field-of-view has been found to be slightly inaccurate. (4) There is a recently found anomaly that intermittently renders part of the detection area insensitive to reliable drop detection.

Here, we present a review of these observations, outline the structure of a simple post-processing algorithm developed to adjust the effective sampling area for each drop, and present results quantifying the overall impact on precipitation accumulations for a data record incorporating over 200 million detected raindrops.