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Investigating a New Disdrometer Sampling Method to Reduce Measurement Variability

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A new method of sampling for precipitation events was developed to reduce errors associated with the idiosyncrasies of the conventional, temporal based, method. Using data from a Joanneum two-dimensional video disdrometer near Charleston, SC (USA), several rain events were divided into samples containing a uniform number of drops (the new method) as well as standard samples (of uniform temporal duration). Bulk quantities including rain rate, radar reflectivity factor, liquid water content, and mass weighted mean diameter were found for each sample type. This new sampling methodology is implemented in order to minimize the influence of samples with few drop arrivals from having disproportionate impact on estimating bulk rainfall properties. Uniform drop-number sampling of precipitation events is expected to produce less scattered Z-R relationships compared to those derived from conventional sampling. The alternative sampling method presented here, although unsuitable for direct use by weather RADAR, offers new insights into the use of disdrometers in measuring bulk quantities and determining Z-R relationships.