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Development of a New Theoretical Framework for the Analysis of Disdrometer Data

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Rain disdrometers are instruments that record the arrival time and drop properties of individual hydrometeors; data from these instruments have been used widely throughout the hydrological sciences to understand spatial and temporal variability of rainfall. Some disdrometers have temporal resolution with enough granularity that the investigator has the freedom to choose time-bins of arbitrary duration. Most studies nevertheless resort to temporal binning that matches some historical standard (e.g. 5 minute binning to match radar data, or hourly/daily binning for climatological studies).

In this study, we use data from a Joanneum 2-Dimensional Video Disdrometer (with temporal resolution finer than 1 ms) to investigate a new way to identify natural integration time-scales for disdrometer data. Results using this new binning technique are compared to standard 1-minute, 5-minute, 15-minute, and hourly binning to demonstrate the relative merits and shortcomings of this new approach. Additional discussion of the implications of these results for hydrological measurement will be presented.