



Improving 2D-Video-Distrometer Performance Characteristics for High Data Rate and Heavy Weather Events

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The 2D-Video-Distrometer (2DVD) is an established image based in-situ precipitation measurement device developed and manufactured by JOANNEUM RESEARCH with over 80 successful deployments world-wide to its record. The instrument is based on two perpendicular towards each other oriented and vertically displaced high-speed line-scan cameras and is capable of delivering individual per-particle data such as fall velocity, shape, volume, equivalent diameter as well as statistical information like for example the drop-size distribution and accumulative data products such as total amount and rate of precipitation for a wide range of hydrometeors, including rain, hail, snow or graupel.

Recently, advances in imaging technology, which allow the capturing of an ever increasing number of small particles, together with a trend towards deployments during extreme weather events, like for example tropical thunderstorms, motivated measures to improve the capabilities and the stability of the device.

We will outline the challenges faced by image based precipitation measurement systems in general and the 2DVD in particular under such extreme conditions and will present advancements in algorithmic and software engineering towards the end of increasing the stability and the scalability of our system. Special emphasis is placed on a comparison of the effects introduced by changes to the matching criteria and weighting factors and the verification of the correctness of these results under such software changes. Additionally, practical experiments and measurements under controlled conditions will be presented which are intended to document the improvements achievable especially by soft- and hardware adaptations under high data loads. The presentation is concluded by an analysis of the applicability of the results towards a system using only one optical capturing device such as the currently developed 1DVD.