APPLICATION OF THE 2D-VIDEO-DISTROMETER FOR WEATHER RADAR DATA INVERSION

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Conversion of radar reflectivity Z to precipitation rate R is the basic task in weather radar data processing. The relationship Z = a * R^b depends on precipitation fine structure, like material type, shape and size distribution. In order to apply the right constants for Z-R conversion, ancillary precipitation characteristics are required.
The 2D-Video Distrometer (2DVD) offers the capability of measuring particle shapes and sizes (front and side views) with 0.2 mm precision, as well as the particle's fall speed, with an error typically less than 5%, over an active catchment area of approx. 100 cm^2.
Over the last eight years an extensive data base has been collected with such distrometers, in different climates and seasons. Significant samples have been extracted from this data base, in order to check the validity of so far used Z-R relationships and their extreme cases. It is found, that tropical rain contains more smaller, showery or convective events in moderate climate more bigger drops than expected by present parameter limits. The overall result of this study is that traditional literature models and parameter limits may be exceeded in nature, and in particular that higher ZDR values may be observed than expected, caused by an excess of large drops.