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Statistical Analysis of 2D-Video Disdrometer Measurements and Errors of Polarimetric Rainfall Estimators

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Rainfall characteristics in the area of Athens, Greece, for the time period of the rainy season of 2007 – 2008 using a 2-D video disdrometer are presented. The system operates in continuous basis at open area in the suburbs of Athens close to the sea. In addition to the typical measurements of the system like fall velocity, horizontal velocity, diameter and oblateness of each particle canting angle is estimated from an analysis of recorded shape of the particles. Based on the drop size distribution the recorded rain events are classified basically as rain from stratiform or convective clouds. Statistical analysis of rainfall characteristics for the two rain categories is presented. The disdrometer measurements, which make a complete description of droplets size, shape and orientation, were used to construct rainfall estimators for polarimetric radar reflectivity and specific differential phase measurements using the T-matrix simulation approach. The errors of the estimators for the two different classes of rain events are related to average rainfall characteristics of each class.