



Correlation among characteristic rain DSD parameters measured at the tropical surface

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Using mathematical drop size distributions (DSDs), Kuo et al (2004) establish liquid water content, W , effective radius, r_e , and effective variance, ve , as a triad of DSD parameters that forms a robust basis for radar rainfall retrieval. They also note that, the three parameters must not be completely independent if one hopes to somewhat accurately retrieve them from only two pieces of reflectivity measurements obtained from a dual-frequency radar. In this study we use DSDs measured by disdrometers on the surface to show that there indeed exists correlation among the triad of parameters. However, the correlation is not a simple one such that their principal components essentially occupy a two-dimensional space, in which case two pieces of independent measurements would be sufficient to determine all three parameters. In addition there appear to be two regimes with distinctive correlation relations, likely corresponding to the convective-stratiform classification.