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Measurements of rainfall microstructure at CESAR using a 2D video disdrometer during BBC2

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We present detailed analyses of the microstructure of rainfall (in particular the raindrop size distribution or DSD) observed using a 2D video disdrometer operated at CESAR during the Baltex Bridge Cloud campaign, phase II (BBC-2, May 2003). Knowledge of the DSD and its spatial and temporal variability is indispensable for the development of accurate and robust rainfall retrieval algorithms for e.g. ground-based and spaceborne radars and for microwave links. Here we focus on two issues: (1) the effects of sampling fluctuations on the observed DSDs and the derived bulk rainfall variables (e.g. rain rate, radar reflectivity, specific attenuation); (2) the effects of these sampling fluctuations on the parameterization of the DSDs and on the resulting (power-law) relations between bulk rainfall variables. It is shown that it is important to distinguish between sampling fluctuations and natural variability in disdrometer observations of rainfall microstructure. A recently proposed analytical model is used to provide first order estimates of the sampling fluctuations involved in such observations.