

***Interactive comment on “Parametric representation of the cloud droplet spectra for LES warm bulk microphysical schemes” by O. Geoffroy et al.***

**Anonymous Referee #1**

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General Comment This work is an attempt at improving representation of the spectral shape of the cloud droplet size distribution as embodied in the commonly assumed lognormal and generalized Gamma forms; sensitivity of “tunable” parameter to different methods is examined and empirical expressions are presented by analyzing data collected from stratocumulus and cumulus clouds during ACE-2 and RICO experiments. In view of the importance of the spectral shape of the cloud droplet size distribution, as discussed in the manuscript, I recommend publication of this paper, if the authors can take care of the following comments.

Major comments My major comment is on Section 7.2 where the authors provide use-

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ful curve-fitting expressions that relate the spectral shape parameters to liquid water content, which suggests a decrease of relative dispersion with increasing LWC. The result seems qualitatively consistent with that reported in Liu et al (Environ. Res Lett, 3, 045021, 2008). Liu et al also showed that relative dispersion is better parameterized in terms of the ratio of LWC to droplet concentration than using droplet concentration alone (Liu and Daum, Nature, 2002). Therefore, it would be useful to briefly review and compare the three ways to parameterize dispersion (in terms of N, LWC and of LWC/N). Minor comments 1. L13: replace “cell” with “eddy” or “parcel”? 2. Liu and Hallett (Quarterly J of Roy Met Soc, 123, 1997) and Liu et al. (Atms. Res., 35, 1995) are good references for theoretical studies on droplet size distributions after Williams and Wojtowicz 1982).

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