

Interactive comment on “Aerosol and thermodynamic effects on tropical cloud systems during TWPICE and ACTIVE” by P. T. May et al.

Anonymous Referee #2

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General Comments

This paper describes changes in convective characteristics within different environmental forcing regimes for storms in the vicinity of Darwin, Australia. The authors use a number of radar observed parameters and correlate these to changes in environmental conditions, attempting to sort out the dominant control mechanisms of island convection (Tiwi islands north of Darwin): thermodynamic/shear characteristics vs aerosol concentration. The study is highly relevant to the topic of anthropogenic influences on weather and climate. The paper is concise and generally well written.

As the authors discuss, it is difficult to isolate the relative roles of convective forcing in observational studies and the conclusions here largely reflect this fact. As expected,

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changes in CAPE/CIN were correlated with most of the radar indicators of convective vigor, though there was significant overlap in the means of most of the analyzed radar parameters. The trends of convective intensity with aerosol forcing, however, were more ambiguous: most of the radar parameters examined did not show clear differences in high vs low aerosol regimes.

This raises the question of whether there are other radar parameters that better reveal differences in aerosol forcing such as drop diameter or rain rate intensity. One could argue that increasing aerosol concentrations reduce drop size and allow more drops to be lofted into the mixed phase region of the cloud, thus altering the contribution of "cold"; vs. "warm" rain to the overall rain volume of the storm. Some discussion on this point is warranted.

I agree with the authors that CRM simulations are required to help interpret the observational results.

Specific Comments

1. P. 6, near bottom: I'm not an expert in statistics but doesn't the T-test require an assumption of a normal distribution in the parameter to be tested? Do all of the parameters under investigation satisfy this assumption?

Technical Comments

1. Figure 5,6,7 captions should read "as for Fig. 4..."

2. P. 2 top: I suggest including Carey et al. 2000 in the list of references here

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 14247, 2008.

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