

Interactive comment on “Parameterizing deep convection using the assumed probability density function method” by R. L. Storer et al.

Anonymous Referee #2

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This is a valuable paper that extended the pdf-based CLUBB to deep convections. It showed SCM simulation results and comparison with LES results for three cases of deep convection and two cases of shallow clouds. The paper is a valuable contribution to document a potentially viable scheme of deep convection and its performance in SCM setting. I therefore recommend acceptance of the paper subject to the following improvements.

Major comments:

In extending the CLUBB to deep convection, the paper emphasized cloud and precipitation microphysical process. The paper did not discuss the viability of CLUBB to describe the dynamics of deep convection and how their extension would impact the dynamics of deep convection, i.e., the profiles of vertical velocity and its properties in

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deep convective clouds. Ultimately, one needs to have credible dynamics to trust the microphysics. The authors should also try to discuss why CLUBB works for the dynamics of deep convection since it was initially designed for shallow convection and turbulence, and show results that it works.

Some key basic controlling equations of the moments should be included so that the readers can see where the modifications are made and why only these are chosen but not others. The sensitivities of the results to time step and vertical resolution make the scheme unsuitable for practical use. Some discussions will be useful on what should be done.

Minor comments:

Page 3812, line 15, “correlated”, do you mean “collocated”?

For the second assumption on page 3812, why do you need to make this assumption?

Interactive comment on Geosci. Model Dev. Discuss., 7, 3803, 2014.