



Subcloud vertical velocity statistics in and away from regions of shallow cumulus convection

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Much of our theoretical understanding of what controls cumulus cloud amount in the tropics, particularly in undisturbed conditions, rests on the idea that the subcloud layer behaves similarly to a dry convective boundary layer. This would mean that the structure of the subcloud layer is not influenced by the clouds that form atop it. With this assumption it is expected that the cumulus mass flux, and the velocity at cloud base in cumulus updrafts, can be derived from our considerable understanding of the shear-free dry convective boundary layer. In this study we use two years of vertically pointing doppler wind velocity measurements from the Barbados Cloud Observatory to test the hypothesis that non-precipitating shallow cumulus have no noticeable imprint on the statistics and structure of convective eddies in the subcloud layer. To do so conditions in very suppressed cloud-free, or nearly cloud-free, scenes (as derived from satellite and cloud radar measurements) are compared to scenes in which clouds penetrate a substantial depth, but do not precipitate.