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# Influence of entrainment of CCN on microphysical and radiative properties of warm cumulus

J.W.B. Derksen and G. J. Roelofs
University of Utrecht, IMAU, Utrecht, Netherlands (j.w.b.derksen@uu.nl)

We use a 1D model with explicit microphysics and a binned representation of the aerosol size distribution to investigate the influence of entrainment of cloud condensation nuclei (CCN) on the microphysical and radiative development during the growth of warm cumulus clouds. The model separates droplets that grow on aerosol that is initially present in the parcel from drops growing on entrained aerosol for a more realistic representation of cloud drop spectral width. Model results are compared with observations of trade wind cumulus microphysics from the Rain in Cumulus over the Ocean experiment (RICO). The results indicate that CCN are entrained throughout the entire cloud depth, and part of these becomes activated. Compared to a simulation without ambient CCN this leads to higher cloud droplet number concentrations (CDNC) and a continuous presence of droplets in the range smaller than $\tilde{7}$ μm that is consistent with the observations. The cloud optical thickness is also affected. We conclude that a better understanding of the effect of entrainment on cloud microphysics is essential for accurate simulation of drizzle formation and of the modification of aerosol optical properties by cloud processing