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Entrainment in a Simulated Supercell Thunderstorm[1] SONIA LASHER-TRAPP, University of Illinois — The turbulent motions of an active cumulus cloud introduce air from outside the cloud inward, in a process called *entrainment*. The subsequent mixing of this air dilutes parts of the cloud, evaporating/sublimating cloud water/ice and reducing buoyancy. An understanding of entrainment is critical to understanding and predicting the initiation of storms and the precipitation they produce. Entrainment has often been studied in cumuli growing in environments lacking vertical wind shear, neglecting a class of thunderstorms called *supercells* that last longer, and often produce copious precipitation. A quantitative evaluation of entrainment and its effects in the developing and mature stages of a simulated supercell thunderstorm is presented. The two stages entrain air by both non-turbulent and turbulent mechanisms. Entrainment rates increase throughout the developing stage, but successive thermals replenish some condensate and drive the nascent storm towards higher cloud tops and precipitation formation. During the mature stage, turbulent entrainment into a rotating supercell core does occur, often at rates greater than in the developing stage, in contrast to previous notions. "Ribbons" of overturning motions wrap around the rotating updraft and ascend in time. Entrainment also occurs from non-turbulent mechanisms. At this stage, entrainment is less effective at diluting the thunderstorm core, allowing significant precipitation production.

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