



The regulation of tornado intensity by updraft width

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Strong-to-violent tornadoes cause a disproportionate amount of damage, in part because the width and length of a tornado damage track are correlated to tornado intensity (as estimated through Enhanced Fujita scale ratings). The tendency expressed in these observations is that the most intense tornadoes are typically the widest. To explain this tendency, Kelvin's circulation theorem and mesocyclone data are used to argue that the large circulation associated with a wide, intense tornado is more plausibly associated with a wide mesocyclone. Because a mesocyclone is, strictly speaking, a rotating updraft, a wide mesocyclone should imply the existence of a wide updraft. Thus, we hypothesize that wide, intense tornadoes should form more readily out of wide, rotating updrafts. Idealized numerical simulations of supercellular thunderstorms provide robust support of this hypothesis. Extensions to other tornado-bearing morphologies will be discussed, as will the operational implications.