



Vorticity recycling processes in tornadic thunderstorms

G.J. Tripoli and M. Baker

Dept. of Atmospheric & Oceanic Science, Univ. of Wisconsin, Madison, WI 20771, USA

Although the numerical simulation of tornado-like vortices has been possible for over 25 years, the simulation of tornado like intensities has been much more difficult as evidenced by the ability to produce a deep condensation funnel. Recent work by Tripoli et al (2004, 2005) demonstrated that this problem could be somewhat overcome by the use of "vorticity" confinement numerical techniques suggested by Steinhoff (1993), however this earlier work was not defended to be strictly scientifically defensible because of inherent weaknesses in the approach that did not enforce critical integral constraints. Nevertheless, the impact of its use inspired further research into the matter. In this talk, we describe recent results that lead us to propose the hypothesis that vortex merger is a real process that produces a similar enhancement of the tornadic vortex reported by Tripoli et al. (1984). We will defend this hypothesis through the explicit numerical simulation of the merger process. Moreover, we will demonstrate the merger process between simulated scales and the sub grid scale can be parameterized. In fact we will demonstrate that such a parameterization is really what vorticity confinement techniques appear to be capturing.