

MMM SEMINAR

DISTINGUISHED SPEAKER SERIES

The Regulation of Tornado Intensity by Updraft Width

Robert Jeffrey Trapp

*Department of Atmospheric Sciences
University of Illinois*

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. Indeed, the tendency expressed in the observational record is that the most intense tornadoes are typically the widest. Here we explore the rather simple hypothesis that *wide, intense tornadoes should form more readily out of wide, rotating updrafts*. This hypothesis is supported by a quantification of Kelvin's circulation theorem using Doppler radar observations. It is further supported by idealized numerical simulations of supercellular thunderstorms, wherein updraft width is controlled most significantly by environmental vertical wind shear; analyses of linear and nonlinear dynamic pressure forcing readily explain this control. In addition to a robust relation between updraft width and tornadic-vortex intensity, the simulations show internal consistency between the supercellular updraft, downdraft, cold pool, and cloud top characteristics. Some broader implications of this convective coupling will be discussed, including a possible application of satellite remote sensing to anticipate high-impact convective weather.

This seminar will be webcast live at:
<http://ucarconnect.ucar.edu/live>



Recorded seminar link can be viewed here:
<https://www.mmm.ucar.edu/events/seminars>

Thursday, 29 June 2017, 3:30 PM
Refreshments 3:15 PM
NCAR-Foothills Laboratory
3450 Mitchell Lane
Bldg. 2, Small Seminar Room 1001