ATM 612: Tentative Course Schedule

Basic Text: Markowski and Richardson, much of Parts I, II, III

Wednesday, Aug. 30: *Markowski and Richardson (MR), pp 5-25*

Course Introduction: Overview of convective storms and systems
Explicit convective modeling... The NCAR-WRF high resolution ensemble

Part I: Convective Storms

Wednesday, Sept. 6: *MR, pp 25-40, pp 43-47, pp 201-223*

Equations for deep convection
Physical processes controlling the convective storm spectrum
Buoyancy processes: Updrafts and downdrafts
Introduction to Convective Storm Matrix Lab

Monday, Sept. 11 *MR, p 32, pp 140-149, pp 292-303also Klemp et al. 1994, On the dynamics of gravity currents in a channel,also Rotunno et al., 1988, A Theory for Strong, Long-lived Squall Lines*

Buoyancy processes: Updrafts and downdrafts (cont.)
Cold-pool processes: Gravity Current Dynamics

Wednesday, Sept. 13:

Review Matrix lab
Supercell storms: observations

Monday, Sept. 18: *MR, pp 105-112, pp 132-142, pp 183-199 also Thunderstorms in the Synoptic Setting; Johns and Doswell, 1992, Severe Local Storm Forecasting*

Review Homework 1
Severe Weather Forecasting
Explicit convective modeling... The NCAR-WRF high resolution ensemble
Intro to case study 1

*****Wednesday, Sept. 20... No Class*****

Monday, Sept. 25 *MR pp 21-25, pp 27-32, pp 224-242; also Klemp, 1987, Dynamics of Tornadic Thunderstorms*

Review Case Study 1
Updraft-shear interactions: The development of updraft rotation
The diagnostic pressure equation, Storm splitting

Wednesday, Sept. 27 *Bunkers et al., WF, 2000, Predicting Supercell Motion using a New Hodograph Technique*

The diagnostic pressure equation, Storm splitting (cont.)
Storm propagation (hodographs)

*****Mon., Oct. 2, No Class, Cyclone Workshop*****

Wednesday, Oct. 4:

Curved hodograph processes, Supercell variations
Equivalent Potential Vorticity

Monday, Oct. 9:

Helicity

Wednesday, Oct. 11: *Weisman and Rotunno, JAS, 2000, The use of vertical wind shear versus helicity in interpreting supercell dynamics*

Tornado Observations

Monday, Oct. 16: *MR pp 273-292; also Davies-Jones, 1985, Tornado Dynamics*

Tornadogenesis

Wednesday, Oct. 18:

Tornadogenesis (cont.)
Tornado forecasting

Friday, Oct. 20:

General review for midterm exam

Monday, Oct. 23:

***** Mid-term Exam *****

Part II: Convective Systems

Wednesday, Oct. 25: *MR pp 245-265*

Introduction to Convective Systems
Introduction to Convective System Matrix Lab

Monday, Oct. 30: *Rotunno et al, 1988, A Theory for Strong, Long-Lived Squall Lines*

2-D Squall Line Dynamics (RKW Theory Revisited)

*****Wed. Nov. 1, NROW no class*****

Friday, Nov. 3:

2-D Squall Line Dynamics (cont.)
Rear-inflow jets

Monday, Nov. 6: *Weisman and Davis, 1998, Mechanisms for the Generation of Mesoscale Vortices within Quasi-Linear Convective Systems*

Review Convective System Matrix Lab
3-D Squall Line Dynamics: Generation of line-end vortices

Wednesday, Nov. 8: *Weisman, 2001, Bow Echoes: A Tribute to T.T. Fujita*

Bow Echoes and Derechoes

Monday, Nov. 13: *Weisman and Trapp, Trapp and Weisman, MWR, 2003*

Bow echoes and derechos (cont.)
Surface mesovortices within QLCSs

Wednesday, Nov. 15:

Surface mesovortices within QLCSs (cont.)

Monday, Nov. 20:

Coriolis influences: MCVs
The generation of balanced mesoscale vortices

*****Wed. Nov. 22... no class*****

Monday, Nov. 27:*MR pp 265-270 Davis and Weisman, 1994, Balanced Dynamics of Mesoscale Vortices Produced in Simulated Convective Systems*

Balanced mesoscale vortices (cont)

Wednesday, Nov. 29:*MR pp 175-179; Parker, Trier et al., JAS, 2006*

Nocturnal convective systems
Flash flooding

Monday, Dec. 4:

Convective Predictability

Wednesday, Dec. 6:

Review for Final Exam

Monday, Dec. 11 * Final Exam *****