ATM 612 Convective Storm Matrix Lab:

(http://www.meted.ucar.edu)

The purpose of this lab is to familiarize you with the basic features of the convective storm spectrum, and its relationship to the environmental CAPE and vertical wind shear profiles. Expect it to take about 3-4 h to complete.

1) Identify storm types for all of the simulations, classifying each case as best representing ordinary cell, multicell or supercell convection.

For this purpose, we will define ordinary cell simulations as those for which there is minimal new convective activity after the initial cell, multicell simulations as those for which there is significant new convective activity after the initial cell, but with no supercells present, and supercell simulations as those in which there still may be much multicellular activity, but for which some of the cells are very long-lived (i.e., greater than 1 h) and display significant updraft rotation at mid-levels (4 km AGL).

2) Using the forms given, create shear-buoyancy diagrams characterizing the relationship of storm type to the environment.

For the buoyancy axis, use Cape. For the shear axis, use Us, which represents the net length of the hodograph.

Can you identify Cape/Shear environments most favorable for the specific storm types?

3) Now plot storm type versus the bulk Richardson number (BRN).

Similarly, can you identify BRN environments most favorable for the specific storm types?

4) Which environment produces the most "classic" supercell?

5) Which environments produce dominant left-moving supercells?

6) Which environments seem most conducive to developing tornadoes? (Identify which cases seem to develop reasonably-resolved low-level mesocyclones).

7) Can you deduce the impact of dry mid-level air on storm evolution? (compare the high-moist and high-dry simulations)

8) What is the impact of the depth of the shear layer on storm structure and evolution?