ATM 612 Case Study 3: Due Wednesday, Nov. 29

13-14 July, 2015 Severe Weather Outbreak

Data Sources:

http://ensemble.ucar.edu
http://www2.mmm.ucar.edu/imagearchive/
http://www.spc.noaa.gov/exper/archive/events/
http://weather.uwyo.edu/upperair/sounding.html

PART I: Nocturnal Convection: 00 UTC 13 July through 12 UTC

1.1) Using surface and upper air maps, etc., along with any appropriate NCAR ensemble analyses for 00 GMT 13 July, create a severe weather composite chart, including the locations of any surface fronts, dry line, or other mesoscale boundaries, high and low pressure centers, the polar jet, subtropical jet, low-level jet, etc.

. . . What large-scale and mesoscale features might have been critical for triggering and maintaining the convection overnight?

1.2) Now consider the 00 UTC observed soundings as well as the 00 UTC through 12 UTC WRF-ensemble soundings for Minneapolis, MN (MPX), Davenport, Iowa (DVN), Greenbay, WI (GRB), along with any of the appropriate ensemble analyses of sounding parameters:

. . . How would you characterize the thermodynamic and vertical wind shear environment for the overnight convection?

1.3) Now consider the overnight WRF-ensemble convective forecasts:

. . . How well does the WRF-ensemble reproduce the overall convective structure and evolution (e.g., timing, location, mode), including the cold pool characteristics: **a)** deterministically, and **b)** probabilistically?

. . . Similarly, how well does the WRF-ensemble represent the potential for severe weather?

. . . How much "spread" in convective evolution (e.g., timing, location, mode) is there among the various available ensemble members?

1.4) How does the environment for the current event compare to the environments for the supercell, squall line, or bow echo/derecho cases previously discussed in class (e.g., compare the primary features from the composite charts, sounding characteristics, etc.)?

PART II: Daytime convection: 12 UTC through 00 UTC July 14

2.1) Repeat the above four exercise for the 12 UTC through 00 UTC period, including constructing an updated 12 UTC composite chart. For the sounding analysis, now consider Lincoln, Ill. (ILX), Wilmington, Ohio(ILN), and Blacksburg (RNK).

... Are there any significant changes to the meteorological conditions for the daytime versus previous night's convection?

... Are there any significant changes to the resulting convective mode and associated severe weather production?

2.2) Overall, what can you conclude about the predictability of this case?