MESO's CAFE
(Computer-Aided Forecasting Exhibition)

Grid Forecasting

Forecasting severe thunderstorms and tornadoes can be a very challenging endeavor for the storm chaser. Where do I start? Where do I put the data once I get it? These are some common questions that you as a forecaster may ask yourself.

There are many ways you can go about accomplishing this. I use a method called grid forecasting. In grid forecasting, the data is placed onto a grid sheet that I copied off of the website where I get the data from. I made roughly twenty copies and put sheet protectors over them so I could use wet and dry erase markers on them. I labeled each grid sheet with the 15 variables you see below. You can see the grid sheet when you look at the forecast I made for 11/22/99. This will allow you to use them over and over again without the hassle of copying maps every time you have the urge to make a forecast. Along with the grid sheets, I also copied several sheets that have the following information on them, and placed them on a spreadsheet program so I could get a set of four onto one sheet:

1. CAPE
2. SWEAT
3. LIFTED INDEX
4. SHOWALTER
5. CAP STRENGTH
6. MIXING RATIO
7. LAPSE RATE
8. WET BULB ZERO
9. HELICITY
10. BRN
11. TOTAL TOTALS
12. MAX PARCEL
13. STORM MOTION
14. CONVECTIVE TEMP
15. MAXIMUM TEMP

You can get the forecast data from the ETA model or the 12-hour RUC model, they are both offered in the gridded format. The data can be accessed for the next days 18Z or 24Z, and the day 2 data (same times). The grid points are set up one degree apart, and a forecast sounding for each of the grid points can be accessed. What makes this a valuable tool for the forecaster is the closeness of the real estate covered by the data. You can do an accurate forecast since there is not that big of a gap between locations like there would be if you relied on the upper-air reporting stations… which

are in some cases many degrees apart. With a grid spacing of 1 degree, you won't be able to resolve individual cells, but you will be able to resolve a relatively small region where deep convection is likely.

After you figured out where you think severe weather may occur, drawn from your own conclusions or from peeking at other sources, it is time to utilize the fifteen elements mentioned above. Square in the area on the grid sheet so that you have some grid points to look up. Look them up and transfer the data from the forecast sounding to your sheet of the 15 variables. Do this for each of the areas within your square (your forecast area). Be sure to place the data into the corresponding grid point, or you will not have the data positioned for the proper forecast. After all the forecast data has been placed onto the sheets, it is now time to transfer it to the grid sheets. You can do this however you like, since I haven't found any simple remedies that makes this process any faster. This whole process from start to finish will probably take a few hours if not longer, but you will be surprised with the results you achieve. Once you have transferred it all to the grid sheets, look at the data for each of the 15 elements and see what conclusions you can draw from them. Some of them will jump right out at you, and the others you may have to dig for just a little bit. The forecast I made on the 11/22/99 was a simple one for the most part, but some will not be. Play around with the grid sheets, circle areas that you think are most favorable. Where are most of your circles? Do a lot of them overlap and cover the same grid points? This is probably the area most favorable for severe weather. Remember this: this is forecast data. It may not be perfect each and every time, so interpret the data as you see it, and if the model comes out with a good solution, so will you! Good Luck.

Below you will see a forecast I made in the early afternoon of 11/21/99 for the afternoon of 11/22/99. The forecast validated perfectly, so it is a great case study to learn from. I included a few of my gridded maps so you can see the technique described above.

==========

A low pressure system will deepen near Comanche County, Oklahoma tomorrow evening as it marches off to the northeast to extreme southwestern Iowa by early morning Tuesday.

Upper level low will position itself into northeastern New Mexico, as the trough digs to the southeast into the Texas panhandle. As the trough moves southeast, rapid development of the low pressure system will take place, and 60° dewpoints will surge to the north in response. Surface winds as noted from the ETA model run will be from the SSE, with H85 winds veering to the south at 35 knots. H5 winds from the southwest will push into this area at 50-60 knots, while the upper level jet overspreads the area with winds of 85 knots. This will produce helicity values over central and eastern Oklahoma of 350 to 400. Even though instability will be low, CAPE values of only 1100-1300 or so, this should be sufficient for some of the storms to obtain updraft rotation, so tornadoes should not be ruled out at this time. This is not going to be a repeat of early May I can assure you. For the most part, they will be large hail producers and produce wind damage since wet bulb zero heights will stay at or below 10,000 feet.

Lifted indices will range from -2 to -3 into portions of central Oklahoma, while more unstable air will be found to the east with values as low as -5, generally to the east of I-35.

SWEAT indices also favor the wind energy and moisture combinations. Values from this index will exceed 550 to the north and east of I-35.

All in all I think we will have an active severe weather night, whether you have the opportunity to do an active chase or cyber-chase, but do to the timing of the upper level support required, it will not be until sometime after dark that we will see ongoing convection. My first guess will place it sometime around 7pm or so. Storm motion will be 240-250 degrees at 30 knots, with maximum storm tops to 42,000 feet.

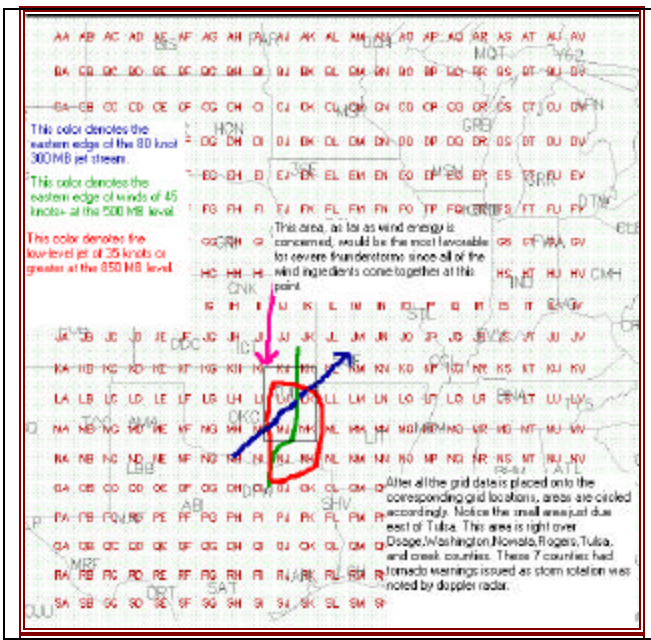
This data was taken from several models, not just one. The reason being is that I am unable to get the later model runs like I had hoped to. Second reason is that none of the model runs had a clear solution. The later model runs will probably give the better picture, but sometimes you have to take what you can get, unfortunately! If anyone plans to partake in a late season chase, have fun and stay safe!

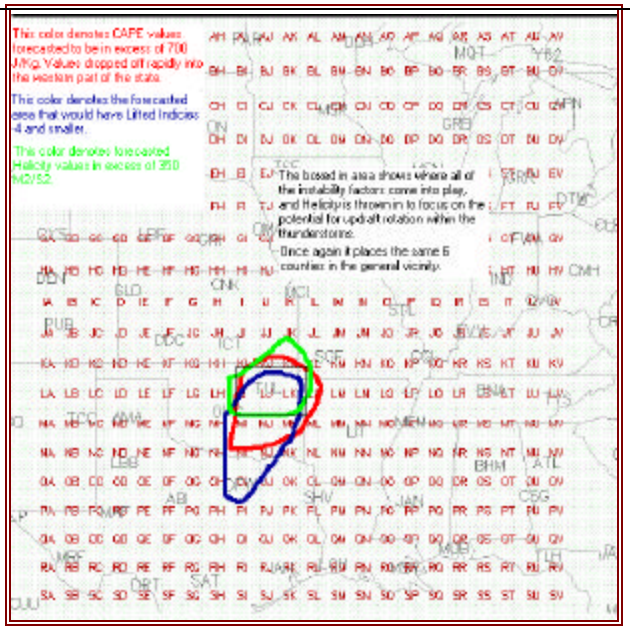
Counties in Oklahoma that may experience severe weather:

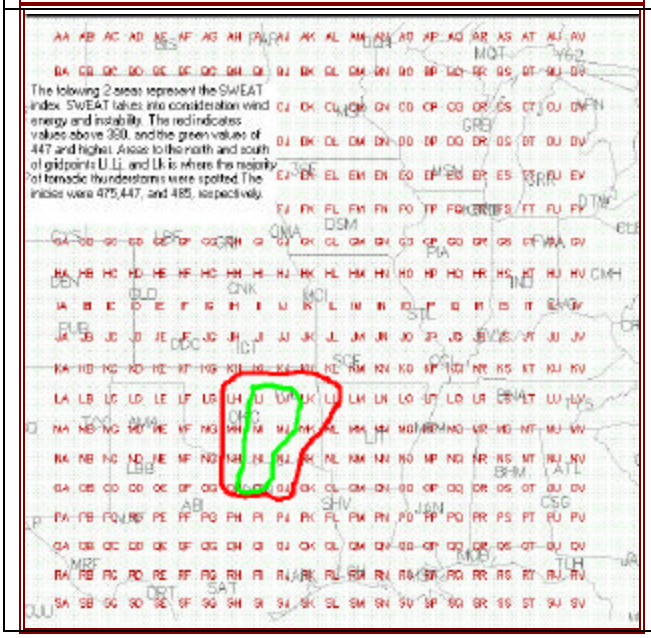
Washington, Nowata, Craig, Ottawa, Osage, Rogers, Mayes, Delaware, Cherokee, Murray, Johnston, Carter, Atoka, and Garvin.

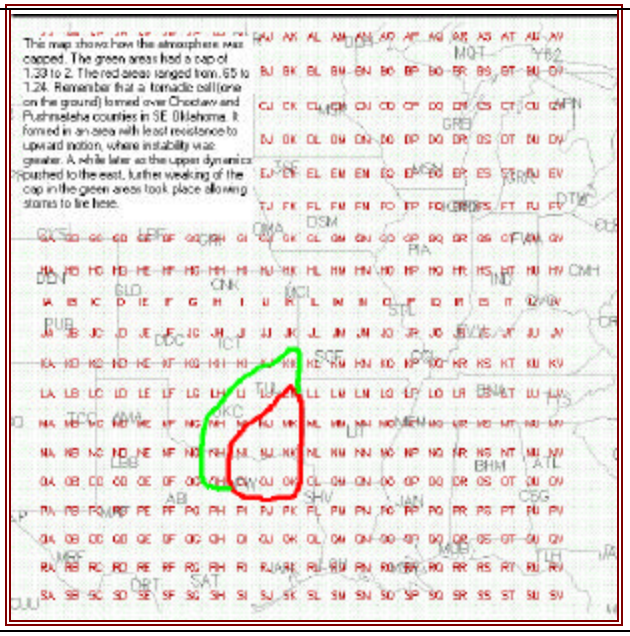
Counties that may experience tornadic storms:

Creek, Tulsa, Wagoner, Muskogee, Okmulgee, Okfuskee, McIntosh, Haskell, Pittsburgh, Latimer, Coal, Pontotoc, Pottawatomie, Seminole, and Hughes.









Chris Howell for *MESO*

http://www.mcwar.org