Weather Briefing, 20050706

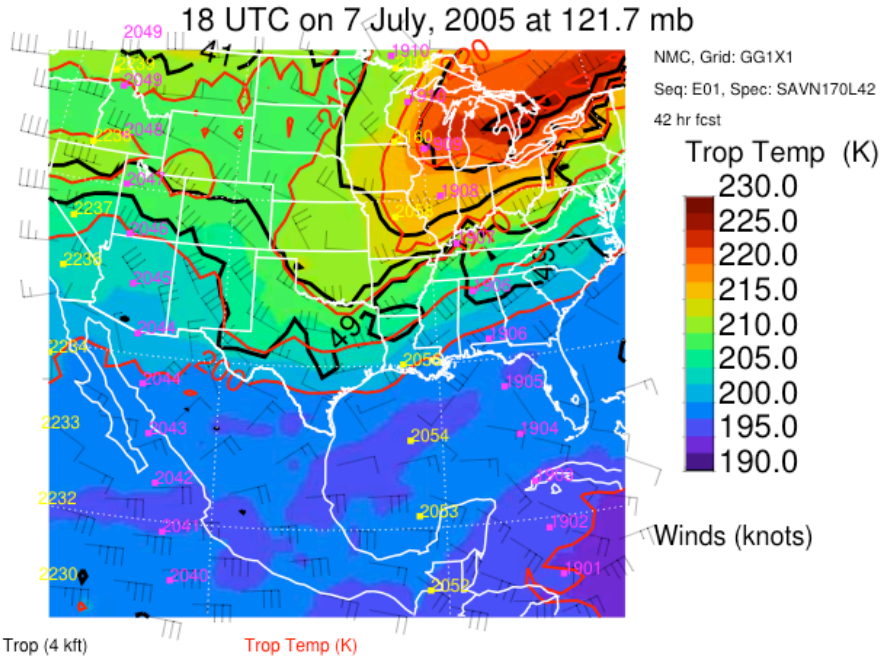
Tropical Storm Cindy has now moved over land. Convection is still strong, and the storm is actually better organized than it was yesterday at this time. The major effect upon our weather, though, has been to suppress major convective activity in our area. The system is expected to move northeastward, arriving at the southern end of the Tennessee/North Carolina border by midday tomorrow. The upper level flow is from the southwest, so outflow will be to the east and to the south.

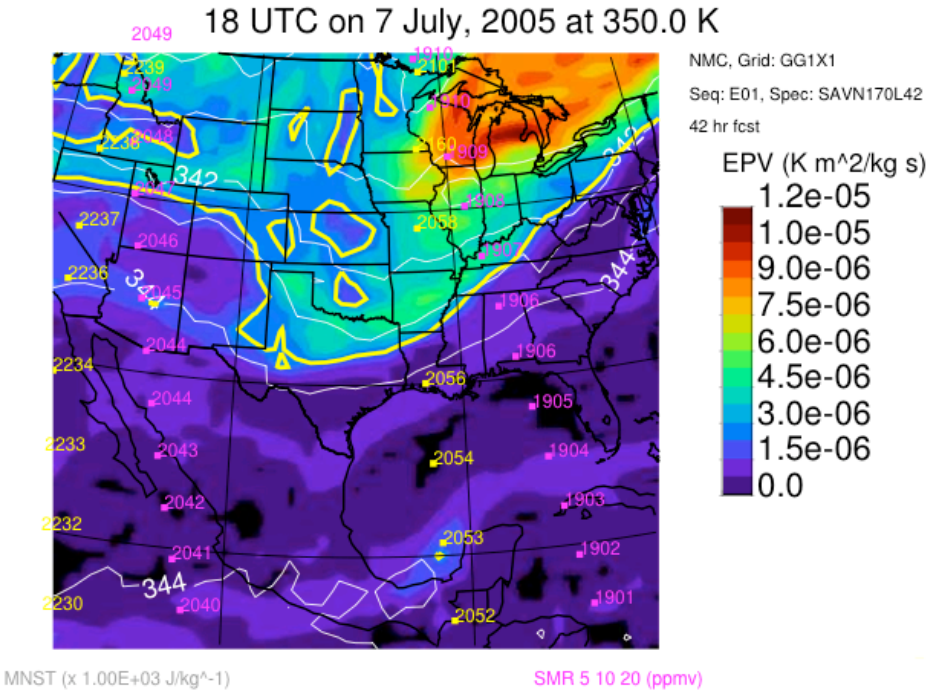
In this area, we currently have an upper level trough with a slight SW/NE tilt just east of our longitude. By tomorrow, this tilt will increase, especially at the higher levels (near the tropopause). This has a number of implications. First, it brings us in an upper level northwest flow situation, which means that MCS's developing in the Great Plains can pass just to the north of us. Outflow boundaries from these systems can set up convective showers in our area. Second, the strong tilt to the trough indicates large scale subsidence over the Great Plains. Though hardly strong enough to in any way eliminate MCS development, the systems are not likely to get quite so strong tonight (they peak at nighttime) and tomorrow. Another factor is that the tropical storm has disrupted the usual easterly low level flow over the Gulf, which, along with a low level jet northward through the Great Plains, feeds moisture to developing MCSs. This flow system will not be as strong in the next day or so. Third, the tilting trough is an indicator of impending wave breaking at upper levels. By tomorrow, there should be a strong air mass gradient at tropopause levels between the northwestern Gulf and the OK/AK/MS/KS corner.

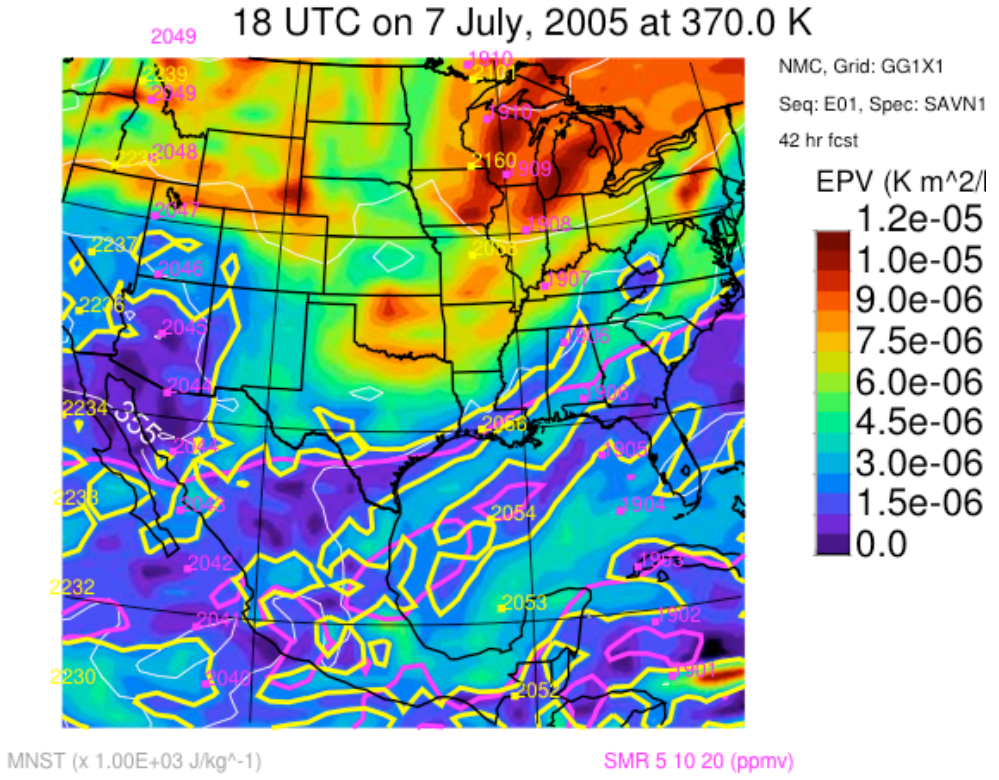
Science:

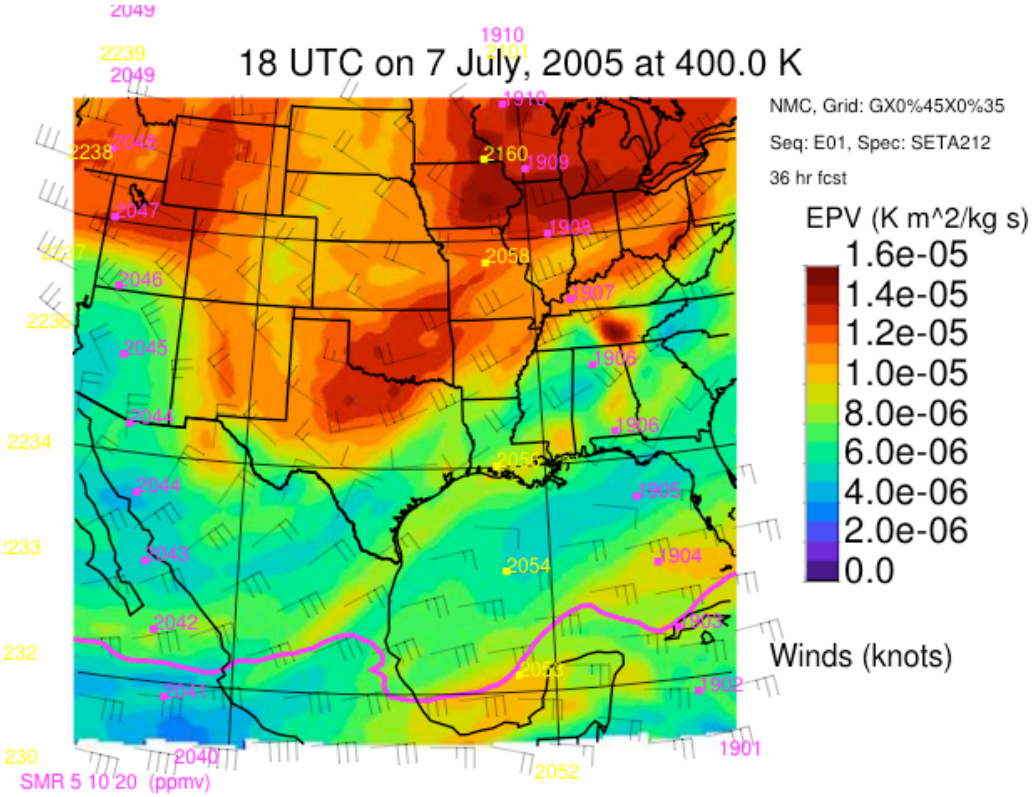
Tropical Storm Cindy is well to the east of us, and outflow will be on the other side, so this is not likely to be a good alternative. There is the possibility of MCS development in West Texas tonight which may continue into tomorrow. GFS progs thunderstorm development over southwestern Louisiana (which is a frequent occurrence anyway). These are not likely to be very high (less than 40kft). Bigger systems are expected over north central Texas and Oklahoma (they may still be going by flight time, though maxima in these occurs during the night). Flight plans based on these developments will have to be done Thursday morning.

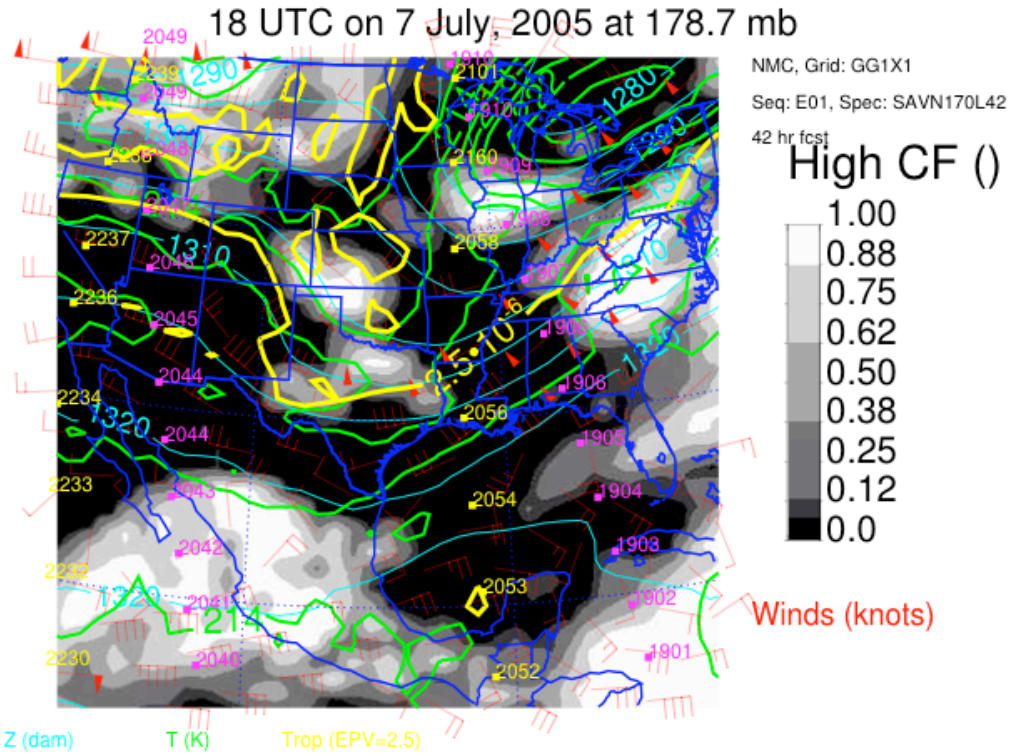
Another alternative is a survey type flight of the strong developing gradient region. Attached are some plots that show strong gradients in tropopause height and potential vorticity. I should note here that 350K is about 41Kft, 370K is about 49kft (the height of the WMO tropopause climatologically over Houston at this time of year), and 400K is well into the stratosphere (low 50Kft's). I have used the eta forecast for the 400K surface, because the AVN PV's are rather squirrelly, especially in the summer where overall gradients and patterns are weaker. A suggested plan would be to fly across this gradient at a variety of levels, perhaps from the Gulf just to the ESE of us NNWward to thefour corners (OK/AK/MS/KS).


18 UTC on 7 July, 2005 at 121.7 mb
NMC, Grid: GG1X1
Seq: E01, Spec: SAVN170L42
42 hr fcst
Trop Temp (K)
230.0
225.0
220.0
215.0
210.0
205.0
200.0
195.0
190.0
Winds (knots)
Trop (4 kft)
Trop Temp (K)


18 UTC on 7 July, 2005 at 350.0 K
NMC, Grid: GG1X1
Seq: E01, Spec: SAVN170L42
42 hr fcst
EPV (K m^2/kg s)
1.2e-05
1.0e-05
9.0e-06
7.5e-06
6.0e-06
4.5e-06
3.0e-06
1.5e-06
0.0
MNST (x 1.00E+03 J/kg^-1)
SMR 5 10 20 (ppmv)


18 UTC on 7 July, 2005 at 370.0 K
NMC, Grid: GG1X1
Seq: E01, Spec: SAVN1
42 hr fcst
EPV (K m^2/
1.2e-05
1.0e-05
9.0e-06
7.5e-06
6.0e-06
4.5e-06
3.0e-06
1.5e-06
0.0
MNST (x 1.00E+03 J/kg^-1)
SMR 5 10 20 (ppmv)


18 UTC on 7 July, 2005 at 400.0 K
NMC, Grid: GX0%45X0%35
Seq: E01, Spec: SETA212
36 hr fcst
EPV (K m^2/kg s)
1.6e-05
1.4e-05
1.2e-05
1.0e-05
8.0e-06
6.0e-06
4.0e-06
2.0e-06
0.0
Winds (knots)
SMR 5 10 20 (ppmv)


18 UTC on 7 July, 2005 at 178.7 mb
NMC, Grid: GG1X1
Seq: E01, Spec: SAVN170L42
42 hr fcst
High CF ()
1.00
0.88
0.75
0.62
0.50
0.38
0.25
0.12
0.0
Winds (knots)
Z (dam)
T (K)
Trop (EPV=2.5)