Synoptic Meteorology II: Isentropic Analysis Exercise

Due: 7 April 2015, at the start of class

In Figure 1, you are given an analysis of pressure (hPa; contoured), wind (barbs; half-flag: 5 kt, flag: 10 kt, pennant: 50 kt), and mixing ratio (g kg^{-1}; shaded) on the 300 K isentropic surface. In Figure 2, you are given the same analysis of pressure and mixing ratio, but now the wind that is displayed is the storm-relative wind (i.e., with the motion of the mid-latitude cyclone being analyzed subtracted from the full wind).

a. On Figure 1, using the principles of isentropic analysis developed in class, please *shade* areas of isentropic ascent and *crosshatch* areas of isentropic descent.

b. Where do you believe the strongest ascent to be located? Why?

c. Where do you believe the strongest descent to be located? Why?

d. How do the locations and/or magnitudes of ascent and descent change when the storm-relative wind is considered in place of the full wind?

e. Which analysis – using the full wind or the storm-relative wind – provides better overlap between the wind and mixing ratio fields? What caused you to answer as you did?

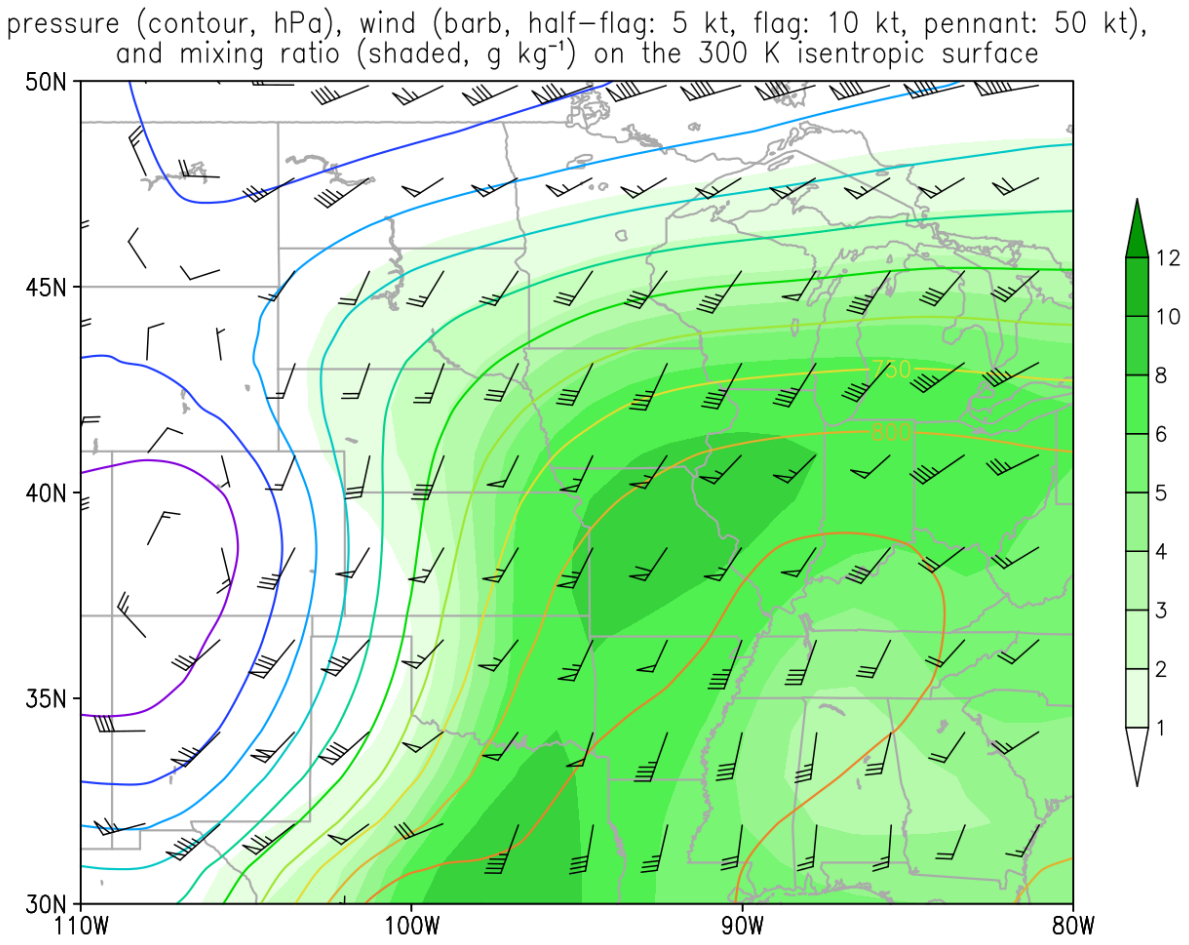

Figure 1. Pressure (hPa; contours), wind (barbs; half-flag: 5 kt, flag: 10 kt, pennant: 50 kt), and mixing ratio (g kg^{-1}; shaded) on the 300 K isentropic surface valid at 1800 UTC 4 March 1976.

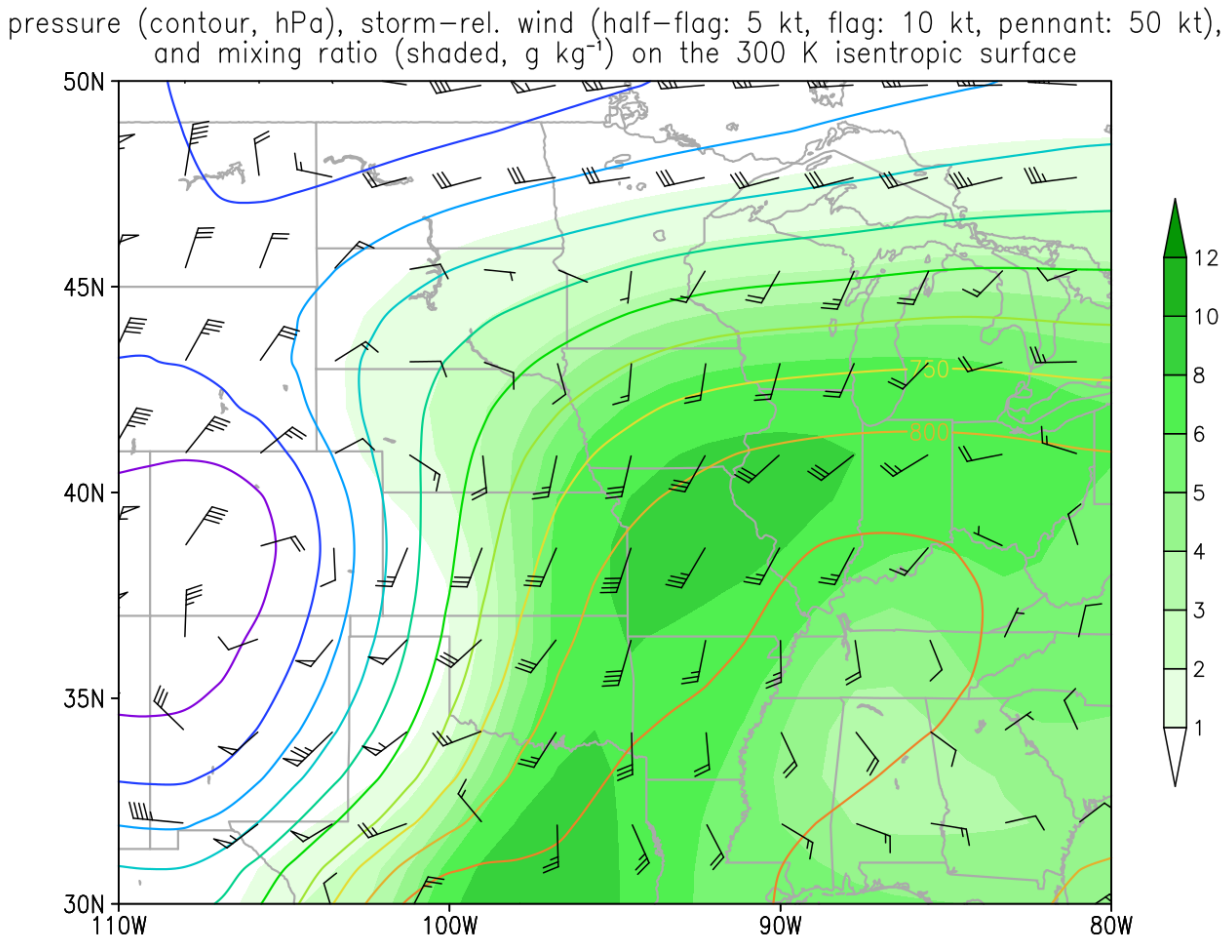

Figure 2. As in Figure 1, except for the storm-relative wind instead of the full wind.