Lab 4: Surface Analysis

Objective: We will apply the concepts of scalar analysis to lower atmospheric levels.

Materials: A No. 2 black pencil, eraser, colored pencils. All handouts can be obtained from the course web site at `http://weather.ou.edu/~scavallo/classes/metr_4424/`.

Procedure:

1) Review the handout on "Guidelines for drawing surface pressure contours".
2) Beginning with the surface chart:

   What is the range of sea level pressure?

   Determine what contours you will be drawing.

   Scan all data carefully, thinking about tentative frontal locations. Place frontal locations **VERY LIGHTLY on your map** so that you can refine these positions later. Using your No. 2 black pencil, lightly draw isobars using a contour interval of 4 hPa. Use your eraser frequently. Do not finalize your isobars in colored pencil yet.

   Tip: Recall that friction is no longer negligible near the surface, so winds should not be exactly parallel to the isobars.

3) Make sure you label all high and low pressure centers using an 'H' (blue) and 'L' (red), respectively, and all contours.
4) On the same plot, analyze isotherms using an interval of 5°F. Do not finalize your isotherms in colored pencil yet.
5) On your second plot, analyze isodrosotherms using an interval of 5°F. Do not finalize your isodrosotherms in colored pencil yet.
6) Keeping in mind the conceptual picture of fronts discussed in lecture and in the textbook, review your frontal positions and change them if necessary. When you have decided on your frontal positions, make sure that all your isolines intersect the front correctly, and that the isolines are packed on the correct side of your fronts. Finalize your fronts with colored pencils, using the color blue for cold fronts, red for warm fronts, and purple for occluded fronts. If there are any dry lines, draw them in orange. Finalize your isobars using a black colored pencil, isotherms using a red colored pencil, and isodrosotherms using a black colored pencil.
7) On your second plot, shade areas where precipitation is occurring. Start by lightly contouring precipitation areas in green, and finalize by shading with a green colored pencil. Similarly, analyze areas of fog with your yellow colored pencil.
8) Now do the following using the 850 hPa chart:
   What is the range of 850 hPa geopotential heights and temperatures?

Determine what height contours you will be drawing, using the handout of suggested contours as a guide.

Draw isohypses using a contour interval of 60 meters. Finalize your isohypses using a black colored pencil. Keep in mind the locations of your surface fronts as you analyze your 850 hPa plot, and especially keep in mind how you expect your fronts to tilt with height.

9) Now add isotherms using an interval of 4°C.
10) Label all high and low height centers using an 'H' (blue) and 'L' (red), respectively, and all contours.
11) Write a paragraph discussing the important weather features you have analyzed.

This lab is due at the beginning of class on Monday 9/17.