Weather Forecasting
Learning Activity 2

Objective:

This exercise will allow the students determine the location of high and low pressure systems on a map plotted with pressure observations.

Overview:

Through a series of steps, the student will learn to analyze weather maps using pressure as a variable. In the process, the student will discover the different types of weather associated with weather systems based upon the information provided by pressure observations.

Total Time:

30 minutes

Supplies:

Colored pencils, copies of the unplotted temperature and pressure maps

Bacground:

Analyzing maps with the current weather conditions is an essential part of the entire forecast process. Basically, if we do not know what is currently occurring, it is near impossible to predict what will happen in the future.

Computers have been able to analyze maps for over 20 years. However, computers cannot interpret what they analyze. There is no substitute for the hand analysis. Analyzing maps by hand causes the forecaster to study every detail in the weather and enables him/her to discern the continuity or "flow" of the weather.

Map analysis is not too unlike drawing in a dot-to-dot coloring book. Just as one would draw a line from one dot to the next, analyzing maps is similar in that we will draw lines of equal values between dots representing various elements of the atmosphere.

Procedure:

Begin drawing from the 1024 millibars station pressure over Salt Lake City, Utah (highlighted in blue). Draw a line to the next 1024 value located to the northeast (upper right). Without lifting your pencil, draw a line to the next 1024 value located to the south, then to the one located southwest, finally returning to the Salt Lake City value. Remember, isobars are smooth lines with few, if any, kinks.

The result is an elongated circle, centered approximately over Eastern Utah. The line that was drawn represents the 1024 millibars line and you can expect the pressure to be 1024 millibars everywhere along that line. Repeat the procedure with the next isobar value. Remember, the values between isobars is 4. Since there are no 1028 millibars values on the map, then your next line will follow the 1020 millibars reports. Then continue with the remaining values until you have all the reports connected with an isobar.

Discussion:

Isobars can be used to identify "Highs" and "Lows". The pressure in a high is *greater* than the surrounding air. The pressure in a low is *lower* than the surrounding air.

- Label the center of the high pressure area with a large blue "H".
- Label the center of the high pressure area with a large red "L".

High pressure regions are usually associated with dry weather because as the air sinks it warms and the moisture evaporates. Low pressure regions usually bring precipitation because when the air rises it cools and the water vapor condenses.

- Shade, in green, the state(s) would you expect to see rain or snow.
- Shade, in yellow, the state(s) would you expect to see clear skies.

In the northern hemisphere the wind blows clockwise around centers of high pressure. The wind blows counterclockwise around lows.

- Draw arrows around the "H" on your map to indicate the wind direction.
- Draw arrows around the "L" on your map to indicate the wind direction.

Lastly, draw the cold and warm frontal systems associated with the area of low pressure. Remember that low pressure rotates counterclockwise, and that high pressure rotates clockwise (in the Northern Hemisphere). Also remember the source region of cold and warm air: The coldest air will be found across the Arctic region and Canada, while the warmest air will be found over the Gulf of Mexico and Western Atlantic. Here is another hint: Look for the kinks in the pressure plot. Frontal systems can often be found in these kinks.