

General Meteorology**Laboratory #9**

Name _____

Date _____

Partners _____

Section _____

Frontal Analysis**Purpose:**

Develop the ability to contour two dimensional data and use the resulting information to locate a cold front.

Equipment:

Station Thermometer

Min./Max. Thermometer

Anemometer

Barometer

Psychrometer

Rain Gauge

Psychometric Tables

Barometric Correction Tables

I. Surface observation.

Begin the first 1/2 hour of lab performing a surface observation. Make sure you include pressure (station, sea level, and altimeter setting), temperature, dew point temperature, wind (direction, speed, and characteristics), precipitation, and sky conditions (cloud cover, cloud height, & visibility). From your observation generate a METAR and a station model.

A. Generate a METAR for today's observation

B. Generate a station model for today's observation.

**II. Analysis of surface maps**

During this part of lab we will continue analyze the surface data for 00Z April 17, 1998. In addition the the temperature plots from last week we will look at the pressure, winds, and dew point depression. We will locate high and low pressure regions as well as identify the location of a cold front. Four maps are included with this project. The first includes all of the information provided by the Purdue Weather Processor Surface Map (Map #0) with the radar and frontal analysis removed. The next three maps include only portions of this information to avoid confusion during analysis.

A. Pressure map.

The pressure map (Map #2) consists of pressures across the United States. Since these pressures are from a station model, they are recorded in millibars, have the leading 10 or 9 removed, and the last digit is the 1/10 millibar value. To avoid any confusion during analysis begin by placing the leading 10 or 9 and the decimal point for each pressure reported on the map. Next draw isobars (lines of constant pressure) on this map at 4 mb intervals beginning at 1000 mb. Your isobars should obey the same rules indicated above for the isotherms.

At the location where you expect the pressure to be lowest place a capital "L" to represent the center of the low pressure system. At the location of highest pressure place a capital "H" to represent a high pressure system.

B. Wind direction.

The wind map (Map #3) consists of wind direction and speed across the United States. Remember that the wind barbs are oriented in the direction from which the winds are blowing. Winds will blow counter-clockwise (cyclonic flow) around a low pressure system and clockwise (anticyclonic flow) around a high pressure system. In the vicinity of fronts the wind direction changes very quickly.

On the map provided it is not very easy to make out a high pressure area; however, there is one low pressure system which can be located by identifying the cyclonic flow. Locate the low pressure system and place an "L" on the map. Identify the cold front on this map by locating where the wind direction changes suddenly from the south to the northwest. The cold front should terminate on your low pressure system.

C. Dew Point Depression.

The dew point map (Map #2) consists of temperature and dew point temperatures across the United States. The dew point in the advance of a cold front will be 0 - 3 degrees less than the air temperature. Once the front has passed the dew point will drop to 3 or more degrees less than the air temperature.

On the map place a cold front which separates the warm humid air leading the front from the cold drier air behind the front.

D. Combined Map.

On Map #0 indicate the center of the low pressure system and draw a cold front extending from this low pressure system. From your other maps you may not have the cold front located at the same location. On the combined map you must give your best estimate as to the correct location of the cold front.

On a separate sheet of paper summarize the differences you saw in the location of the cold front from the different analyses and explain why you decided to draw your cold front as you did.