Weather Maps

I can interpret a weather map, describe the present and predict the future conditions.

1. A weather map is:

2. Weather fronts are:

   a. Label the fronts below:

      1. 2. 3. 4. 5. 6. 7. 8.

3. Clover cover symbols
4. Precipitation symbols

5. Radar Echo Intensity shows

6. Isobars are

7. Wind barbs are

8. A weather station model is
Weather Station Model

At commercial airports throughout the country the weather is observed, measured and recorded. In New York State alone there are over a dozen observation sites. These stations record: temperature, dew point, cloud cover, visibility, height of cloud base, amount of precipitation, wind speed and wind direction to name a few. The measurements made every hour at every station around the world. This is a very large amount of data, which can be very useful in predicting the weather. The challenge is that a large amount of data needs to be communicated to every weather station in the US. Because of the lack of space on weather maps, the weather information needs to be coded. In order to do this the information needs to be highly organized and standard throughout the country. By using station models the data can be represented by a symbol or number, and its meaning is easily understood by where the symbol or number is placed on the station model. Through this lab you will learn to understand station models used in meteorology by coding and decoding a variety of stations.

On the back of this paper, you will create a station model for April 1, 2019 1:45pm at Howell, Michigan (OZW)

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Precipitation Type</th>
<th>Visibility</th>
<th>Dew Point</th>
<th>Wind Speed</th>
<th>Wind Direction</th>
<th>Precipitation</th>
<th>Barometric Trend</th>
<th>Barometric Pressure</th>
<th>Amount of Cloud Cover</th>
</tr>
</thead>
</table>

![Weather Station Model Diagram]
Use the Weather Map and symbols to answer the following questions.

1. Which cities have 50% cloud cover? ________________________
2. Which cities have winds from the northwest? ________________________
3. Which cities have winds above 31 mph? ________________________
4. Which cities have temperatures below 40°F? ________________________
5. Which cities have fog? ________________________
6. Which cities have drizzle? ________________________
7. What is the dew point in Bismarck, ND? ________________________
8. What is the weather like in Del Rio, TX? ________________________
9. What is the wind direction AND speed in Pueblo, CO? ________________________
10. What is the temperature in Boston, MA? ________________________
### Weather Station Symbols

#### Cloud Coverage
- ☁ No Clouds
- ⛅ 1/10
- ⛅ 1/4
- ⛅ 1/2
- ⛅ 3/4
- ⛅ 9/10
- ☾ Completely Overcast
- ☁上がり Sky Obscured

#### Wind Speed
- 🌀 Calm
- ⚪️ < 5 knots
- ⚪️ 5 knots
- ⚪️ 10 knots
- ⚪️ 20 knots
- ⚪️ 25 knots
- ⚪️ 50 knots

#### Wind Direction
- ⚛️ NW
- ⚛️ N
- ⚛️ NE
- ⚛️ E
- ⚛️ SE
- ⚛️ S
- ⚛️ SW
- ⚛️ W

Wind comes FROM the direction of the arrow.

#### Air Pressure
- ⛅️ High
- 🌀 Low

#### Cloud Types
- High Elevation
- Scattered Cirrus
- Dense Cirrus
- Cirrostratus
- Heavy Cirrostratus
- Cirrus & Cirrostratus
- Middle Elevation
- Thin Altostratus
- Thick Altostratus
- Thin Altocumulus
- Heavy Altocumulus
- Low Elevation
- Stratocumulus
- Fair Weather Cumulus
- Developing Cumulus
- Cumulonimbus
- Cirrocumulus
- Nimbostratus
- Stratus
- Fractostratus

#### Weather Conditions
- INT: Intermittent
  - Light
  - Moderate
  - Heavy
- Rain
  - ⦿
  - ●
  - ※
  - ⚫

#### Wind Speed & Direction
- ⚪️ Steady
- ⚫ Light
- ● Moderate
- ※ Heavy

#### Showers
- Slight Rain
- Violent Rain
- Slight Snow

#### Miscellaneous Sky Cover
- Haze = Fog in Patches
- Smoke = Light Fog
- Dust/Sand = Heavy Fog

#### Barometric Tendency

<table>
<thead>
<tr>
<th>Increase in Air Pressure over Last 3 Hours</th>
<th>Decrease in Air Pressure over last 3 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rising, then Falling</td>
<td>Falling, then Rising</td>
</tr>
<tr>
<td>Rising, then Steady</td>
<td>Falling, then Rising</td>
</tr>
<tr>
<td>Rising</td>
<td>Falling, then Rising</td>
</tr>
<tr>
<td>Steady</td>
<td>Falling, then Steady</td>
</tr>
<tr>
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</tr>
<tr>
<td>Falling, then Rising</td>
<td>Rising, then Falling</td>
</tr>
</tbody>
</table>

#### Weather Station Model Demo

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A - Temperature
B - Present Weather
C - Dew Point
D - Low Cloud Type
E - Pressure Change
F - Pressure Tendency
G - Wind Speed & Direction
H - Barometric Pressure
I - High Cloud Type
J - Cloud Coverage
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Majchrzak 1996
Weather Prediction Tips

A weather map is a good tool for finding out about current weather conditions. By understanding why and how air masses move, you can also use the map to forecast weather.

Use the following table to help you forecast the weather when you work on the practice weather maps for the WV STORM simulation or during the mission. Pay attention to how air masses move, their characteristics, and the weather they produce. Air masses react predictably.

<table>
<thead>
<tr>
<th>Measurement or trend</th>
<th>What’s happening</th>
<th>Weather possibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapidly falling air pressure</td>
<td>Low-pressure system moving in</td>
<td>Storms, wind, precipitation (storm likely in 5—6 hours)</td>
</tr>
<tr>
<td>Slow, moderate and ongoing drop in air pressure</td>
<td>Low pressure system will not move out quickly</td>
<td>Extended period of poor weather; precipitation likely</td>
</tr>
<tr>
<td>Rapid, large drop in air pressure</td>
<td>Low pressure system will come into an area quickly</td>
<td>Poor weather will enter an area soon</td>
</tr>
<tr>
<td>Rising air pressure</td>
<td>High pressure system moving in</td>
<td>Fair and dry weather</td>
</tr>
<tr>
<td>Falling temperatures</td>
<td>Cold front approaching (air holds less moisture)</td>
<td>If relative humidity is high enough, precipitation will result (cool air cannot hold as much moisture)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· If the temperature is above freezing, rain forms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· If the temperature is below freezing, snow forms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· If the temperature is colder as the water falls, sleet forms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· If water droplet is thrown upward repeatedly by updrafts, hail forms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· If temperature is at dew point, frost will form</td>
</tr>
<tr>
<td>Rising temperatures</td>
<td>Warm front approaching (warm air holds more moisture)</td>
<td>May indicate fair weather (if air pressure is stable)</td>
</tr>
<tr>
<td>Warm, moist air mass moves into colder, dry air mass (warm front)</td>
<td>Quick uplift produces electric charges</td>
<td>Lightning forms (in thunderstorms)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Expanding air forms pressure wave</td>
<td></td>
<td>Thunder forms</td>
</tr>
<tr>
<td>Cold air mass moves into a warm air mass (cold front)</td>
<td>Less dense (warm) air is forced up, cools, and drops moisture</td>
<td>Precipitation (type depends on the temperature)</td>
</tr>
<tr>
<td>Stationary front</td>
<td>Air masses do not move</td>
<td>Weather remains the same</td>
</tr>
</tbody>
</table>

**Dew Point**

If the difference between the dew point and temperature is small, there is more moisture in the air

The higher the dew point, the more moisture in the air

High dew point and high relative humidity

<table>
<thead>
<tr>
<th>Wind speed</th>
<th>Weights and measures</th>
<th>Weather conditions change quickly and are not long-lasting</th>
</tr>
</thead>
<tbody>
<tr>
<td>If winds are low, air masses will not move quickly</td>
<td>Weather conditions stay the same over an area</td>
<td></td>
</tr>
<tr>
<td>If winds are fast, air masses move more quickly</td>
<td>Weather conditions change quickly and are not long-lasting</td>
<td></td>
</tr>
</tbody>
</table>

**Wind direction**

If an air mass comes from an area that is warmer and over a body of water, humidity and dew point increase

Warm air rises, cools, and condenses to form clouds. Updrafts could cause thunderstorms

These tips help you start the puzzle of weather prediction.

**REMEMBER!** All weather measurements have to be considered before you can make an accurate forecast!