Weather Forecasting

- All times on a weather map use the 24 hour time scale also known as *military time*

- There will **never** be AM/PM when using this time scale

- Midnight (12 AM) begins the day. 12 AM Monday means Monday has just begun

- Minutes are also used. Ex. 1:30 AM = 0130, 11:45 AM 1145, 3:15 PM = 1515, 9:59 PM = 2159, etc.

<table>
<thead>
<tr>
<th>12 Hour Clock (AM/PM used)</th>
<th>24 Hour Clock (No AM/PM used)</th>
<th>12 Hour Clock (AM/PM used)</th>
<th>24 Hour Clock (No AM/PM used)</th>
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</thead>
<tbody>
<tr>
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<td>0000</td>
<td>12 PM</td>
<td>1200</td>
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<tr>
<td>1 AM</td>
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<td>2 AM</td>
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<td>3 AM</td>
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</tr>
<tr>
<td>11 AM</td>
<td>1100</td>
<td>11 PM</td>
<td>2300</td>
</tr>
</tbody>
</table>
• The map above shows 1530 UTC on Dec 30, 2012 – NOT local New York time
Weather Forecasting

• Map times are plotted using “World Time” either with UTC, GMT, or Z time

• Local time (EST) is NOT the same as map time

• Local time is based on how many time zones the location is away from Greenwich, England (pictured right)
• The world turns 360° in 24 hours = 15° longitude per hour

• Every 15° longitude away from Greenwich, England = one more time zone (hour) away

• New York is about 75° W longitude = 5 time zones (hours) away from GMT
Weather Forecasting

Time zones of the world
Arizona is in the Mountain Time Zone and does not observe daylight saving time except in the Navajo Indian Nation. To view the current time in Arizona select from the state menu below.
Weather Forecasting

• Clouds prevent incoming sunlight while preventing outgoing radiation overnight

• When all other factors are considered:
  • Clouds during the day cause cooler afternoon temperatures
  • Clouds overnight cause warmer morning temperatures
Weather Forecasting

- Earth’s surface is the heat source for the air above
- **Clear skies in afternoon** = maximum heated surface = **warmer air temperatures**
- **Cloudy skies in afternoon** = minimum heated surface = **cooler air temperatures**
Weather Forecasting

- Earth’s surface emits heats to space overnight causing cooling

- **Clear skies at night** = maximum heat loss = **cooler air temperatures**

- **Cloudy skies at night** = minimum heat loss = **warmer air temperatures**
Weather Forecasting

- Wind is always reported as **where it is coming from**

- A *north* wind means **from the north** and therefore most likely **cooler temperatures**

- A *south* wind means **from the south** and therefore most likely **warmer temperatures**
Weather Forecasting

- **Calm afternoon** = heat stays near surface = **warmer air temperatures**
- **Windy afternoon** = heat mixed away from surface = **cooler air temperatures**

Modified from WW2010
Weather Forecasting

• **Calm overnight** = heat easily leaves surface = **cooler air temperatures**

• **Windy overnight** = heat mixed back toward surface = **warmer air temperatures**
• Thickness values relate to air density which is primarily due to the average air temperature in the lower troposphere

• **Higher thickness** indicate a **warmer lower atmosphere**

• **Lower thickness** indicate a **cooler lower atmosphere**
Weather Forecasting

- Thickness values are plotted in 6 Dm intervals
- **Blue** dashed lines are values of 540 Dm or lower
- **Red** dashed lines are values of 546 Dm or higher
- This image shows cooler air in Great Lakes region and warmer air in the Texas region
• 850mb temperature is that of the air near 5,000 ft. above sea level

• Rapidly changing values indicate an air mass change - most likely a frontal passage
Weather Forecasting

- 850mb T values are plotted in 5°C multiples
- **Blue** contours are values below 0°C
- **Red** contours are values above 0°C
- The **purple** contour is 0°C
Weather Forecasting

- Air temperature cannot drop below the dew point
- Dew points help to forecast the lowest possible temperature overnight
- Dew points do NOT influence afternoon T
The value of air pressure does **NOT** influence air temperatures.

However, isobars plotted at 4mb multiples can be used to estimate **wind direction** and **wind speed**.

Wind direction and speed greatly influences air temperature.
Weather Forecasting

- Long Island experiences a **northerly wind** in this example due to counter clockwise flow around deep low pressure center
- Isobars are **narrow = windy**
- Result = **cold weather**