

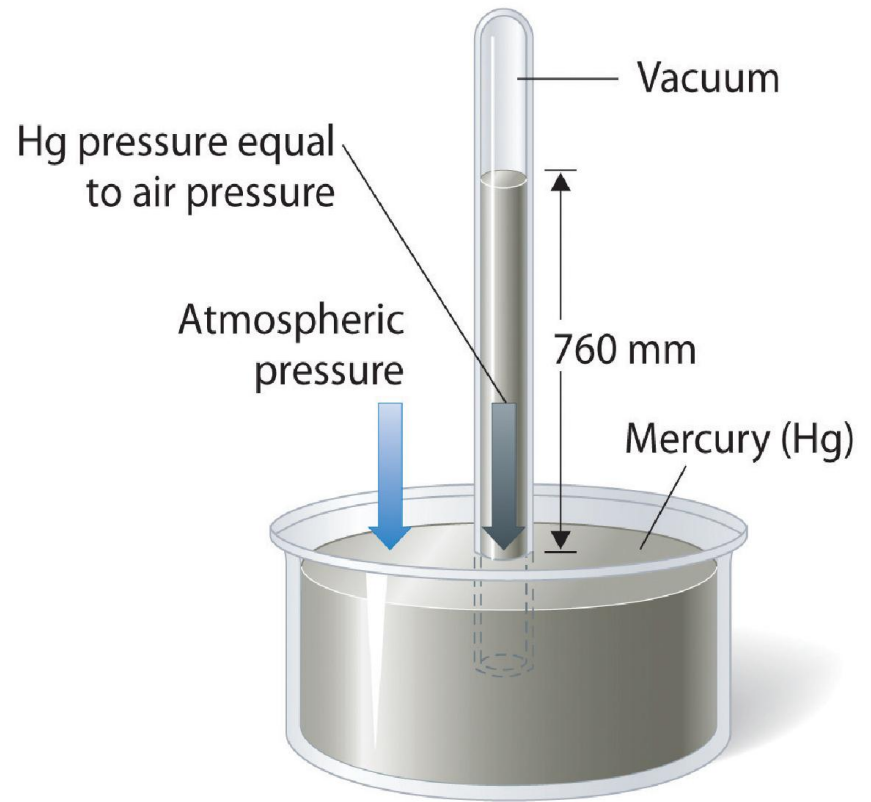
Air Pressure and Wind

What is air pressure?

- **Air Pressure: the force exerted by the weight of the air above it**
- Why does the weight of the air not crush you?
 - The pressure is exerted in all directions, not just down
 - (Ruler and newspaper demonstration)

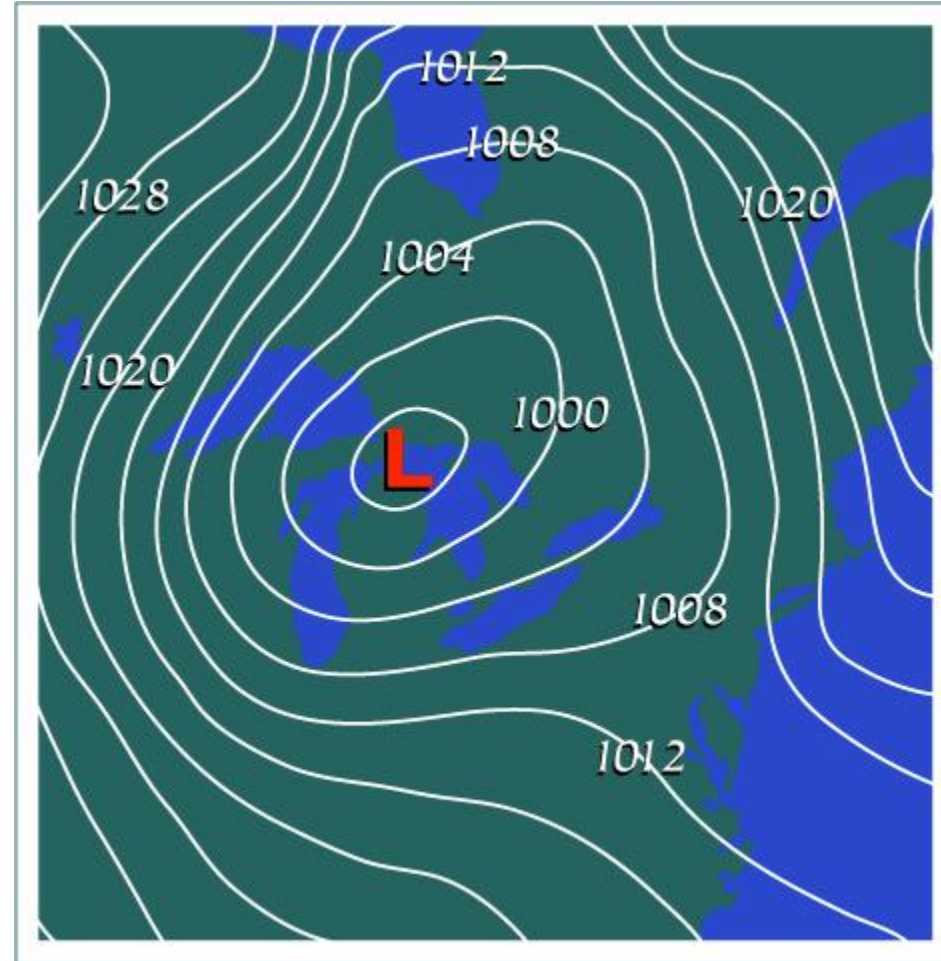
How to measure air pressure

- **Mercury barometer**
- **Aneroid barometer**
- Pressure is measured in inches of mercury or pounds per square inch.



Isobars

- **Isobars are connected lines of equal pressure**
 - The spacing between each isobar indicates pressure change

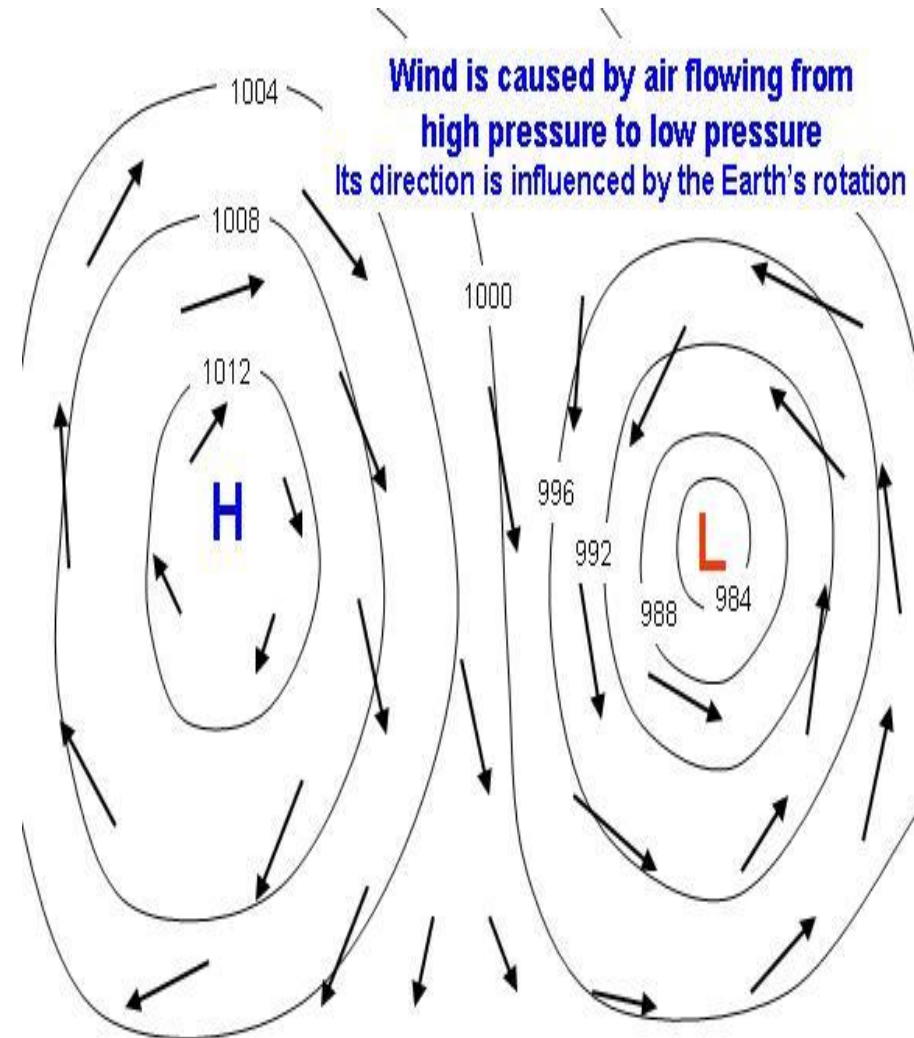


**Why does air pressure matter?

- Why do places have different air pressures?
 - **Solar radiation** creates air pressure differences
- This difference in air pressure causes a phenomena called wind.
 - Wind is when air flows from areas of high air pressure to areas of low air pressure

High and Lows

- **Areas of Low pressure are characterized by:**
 - Hot Air Rising
 - **This leads to clouds and precipitation**
 - Due to coriolis winds rotate in a counter-clockwise motion
 - **Low Pressure = Cyclone**
- **Areas of High pressure are characterized by:**
 - Cold Air Sinking
 - winds blowing away in clockwise motion
 - High Pressure = Anti-cyclone



Factors of Wind

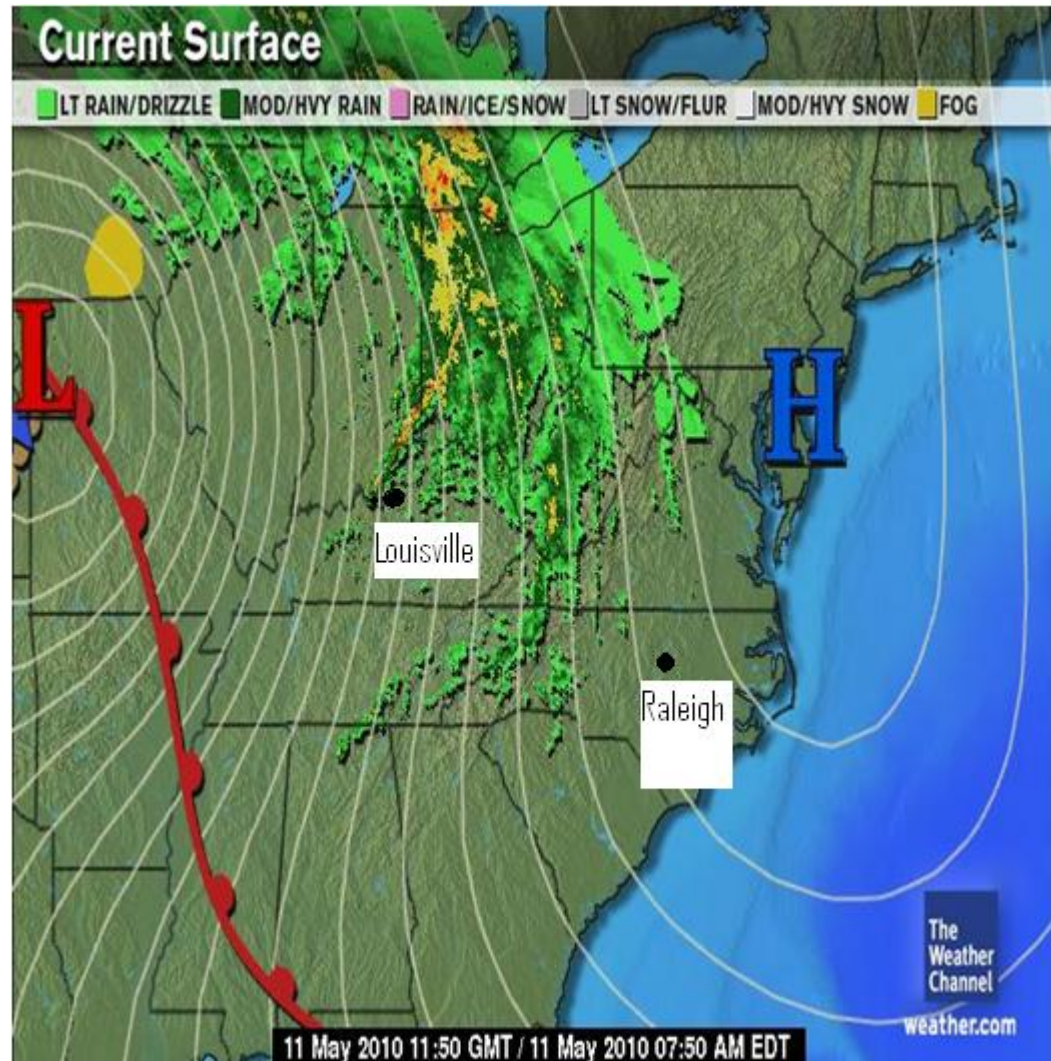
- What makes some places windier than others?
- Two factors:
 - Pressure differences
 - Coriolis Effect

Pressure Differences

- Wind is caused by differences in air pressure.
 - The greater the difference the greater the wind speed.
- By looking at your isobars the closer the lines are together, the steeper the pressure gradient (changes in pressure)
 - **Close Isobars= High Winds**
 - Widely Spaced Isobars= Low Winds

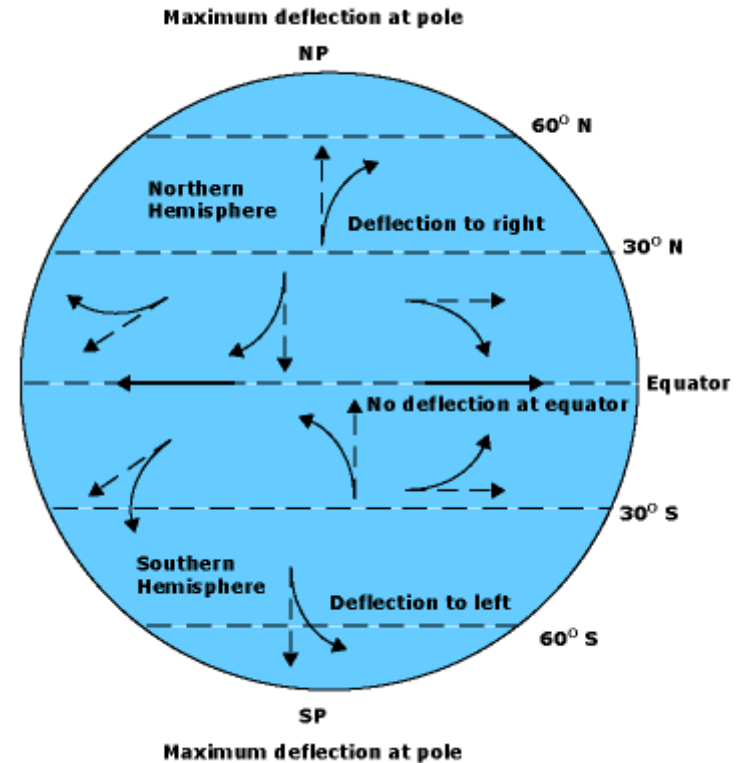


- Where is it windier, Raleigh NC or Louisville KY?



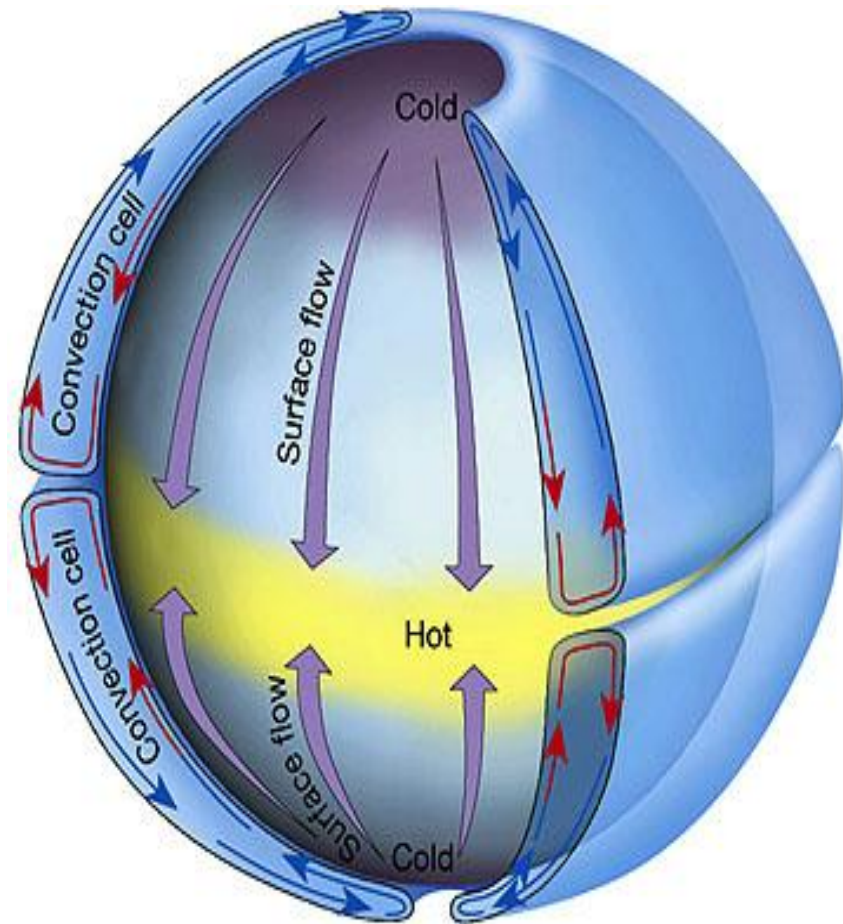
Coriolis Effect

- **The rotation of the Earth deflects wind direction**
 - In the Northern Hemisphere to the right
 - In the Southern Hemisphere to the left.
- The faster you move the stronger the effect
- <http://techtv.mit.edu/videos/3714-the-coriolis-effect>



Global Winds

- **Winds caused by uneven heating of Earth's atmosphere.** Equator gets more sunlight,
 - Equatorial air expands, rises and flows toward poles
 - Polar air is denser so it flows toward the equator
- Non-rotating Earth, 2 cells(North & South) ->



Rotating Earth

- Due to the Earth rotation, instead of two cells you have six.
- Why do we have six?
 - High pressure around 30 and low pressure around 60
 - High Pressure Sinks
 - Low Pressure Rises
- Three winds in each hemisphere
 - Trade – blow from east
 - Westerlies – blow from west
 - Polar Easterlies – blow from east

