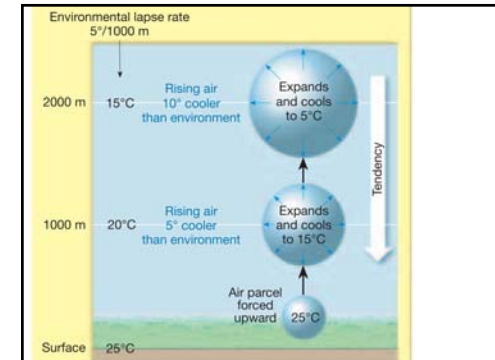


Clouds and Precipitation Pressure and Wind

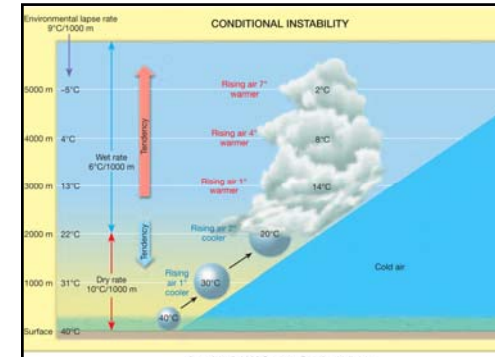
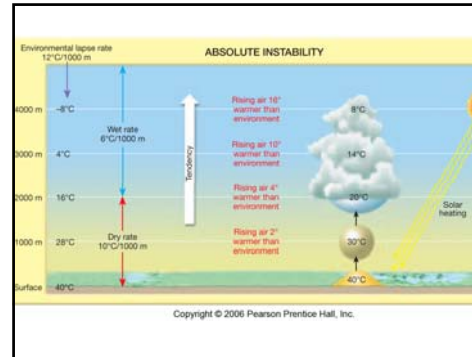
Stability of Atmosphere

- Air rises due to a number of factors
- Expands as it rises: cools as it does so
 - Can calculate the new temperature
 - Use the adiabatic lapse rate:
 - Dry for unsaturated
 - Wet for saturated
 - Compare the temperature of the air that has risen to the temperature of the air at that height
 - Use the environmental lapse rate
 - Higher density air that has risen is stable (cooler)
 - Lower density air that has risen is unstable (warmer)



Stability

- Environmental lapse rate $> 5^\circ\text{C}/1000\text{ m}$
- Dry adiabatic lapse rate $> 10^\circ\text{C}/1000\text{ m}$
- Rising air is cooler than area it rises into
- Stable!!



Cloud Development

- Air cools upon rising
- Cools to dew-point temperature
- Condensation begins
- "Lifting condensation level"

Cloud Shapes

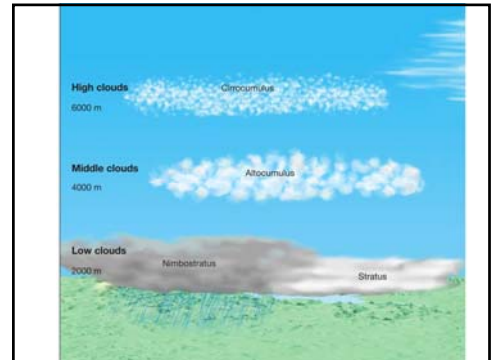
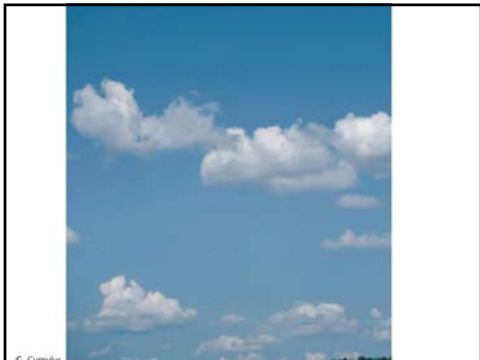
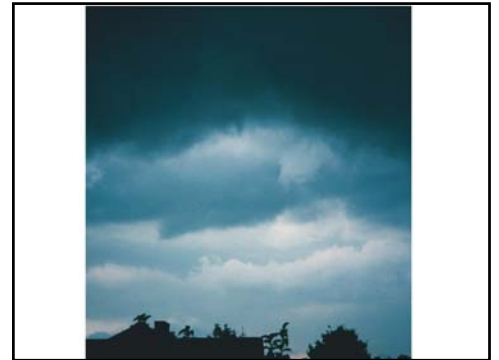
- Cirrus—curl (of hair): thin wisps
- Stratus—blanket: extensive layers
- Cumulus—pile: puffy masses

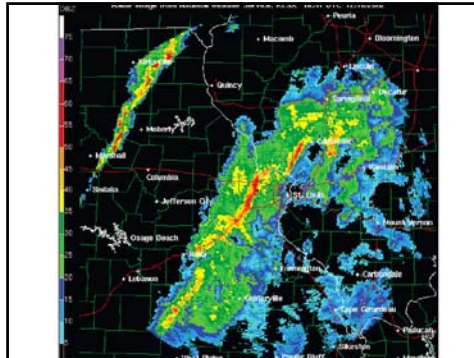
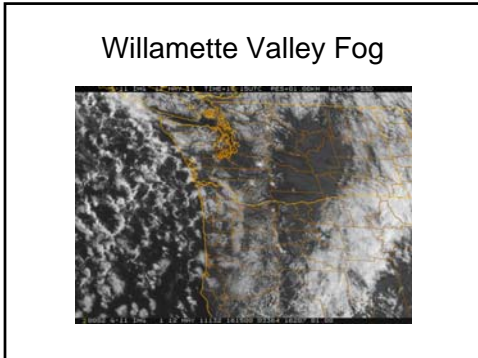
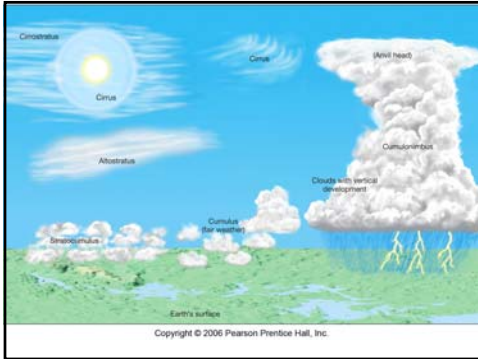
Additional modifier of name

- Nimbus = rain
 - Cumulonimbus: puffy rain clouds
 - Nimbostratus : layered rain clouds

Cloud Groups

- High clouds—6000 m or more above surface
- Middle clouds—2000 m to 6000 m above
- Low clouds—less than 2000 m above surface
- Clouds of vertical development
 - Present through more than one level
 - Product of atmospheric instability





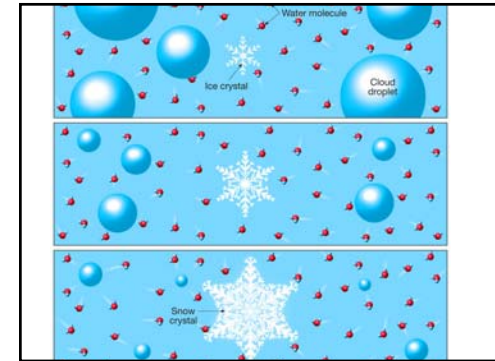
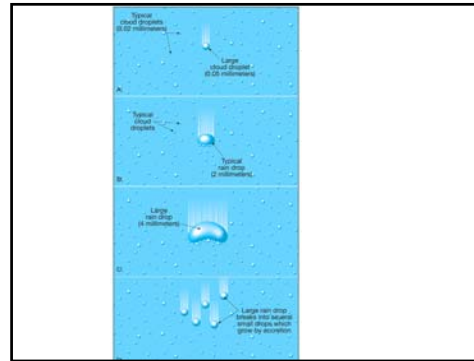
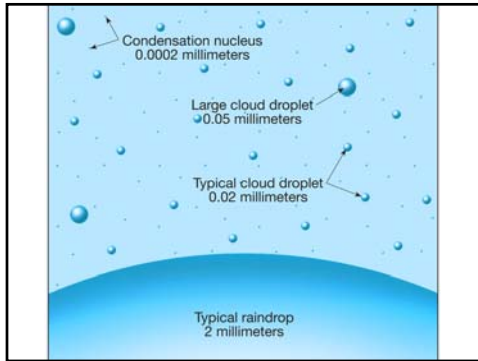
Storms of 2011

- Tornado activity at all time high in May
- Wide swath across southeast
- http://media.nola.com/weather_impact/photo/severe-weather-27apr11-0745-utc-animatedgif-4f51095f52e087b4.gif

High rainfall led to severe flooding

- 75-year flood?
- Last happened in 1937...
- Some areas are at record levels





Bergeron Process

- Snow falls from clouds
- Melts as it is falling
- Result is rain
- Most common method of precipitation in the mid-latitudes

Fog

Warmer (+4°C)

Fog

Colder (-12°C)

- ### Forms of precipitation
- Mist: tiny droplets
 - Drizzle: small droplet
 - Rain: larger drops
 - Sleet: small frozen raindrops
 - Glaze: rain that freezes upon contact
 - Rime: frost deposition
 - Snow: solid flake-shaped crystals
 - Hail: solid concentric balls
 - Graupel: collected snowflakes

