

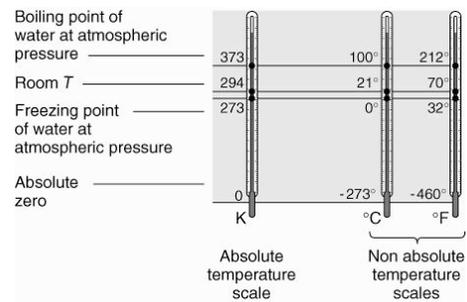
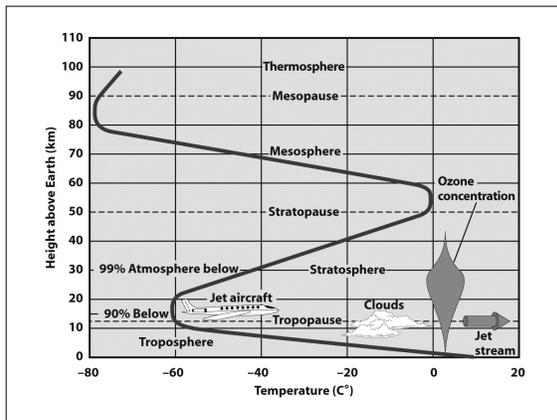
Chapter 23



The Atmosphere, Climate, and Global Warming

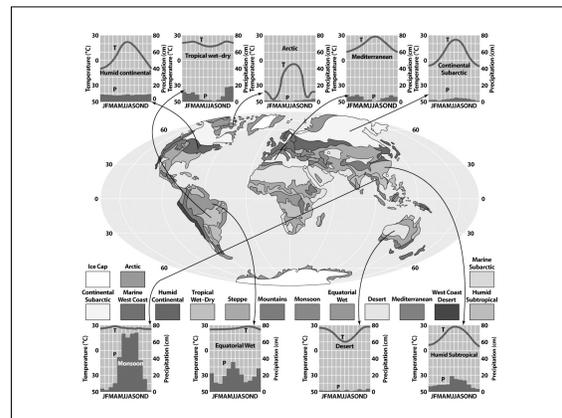
The Atmosphere

- The thin layer of gas that envelops the Earth
- Chemical reactions
- Atmospheric circulation produces weather and climates



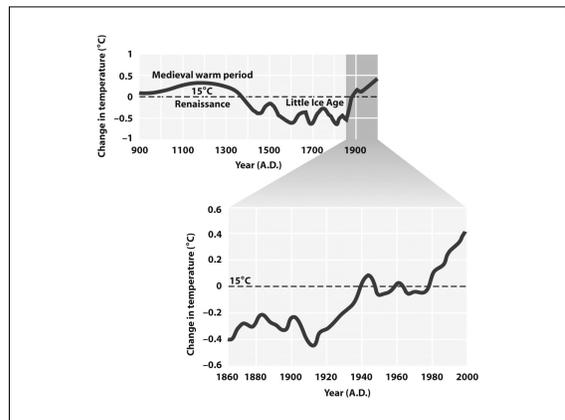
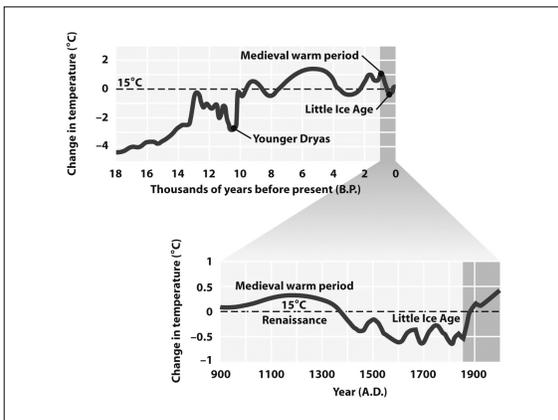
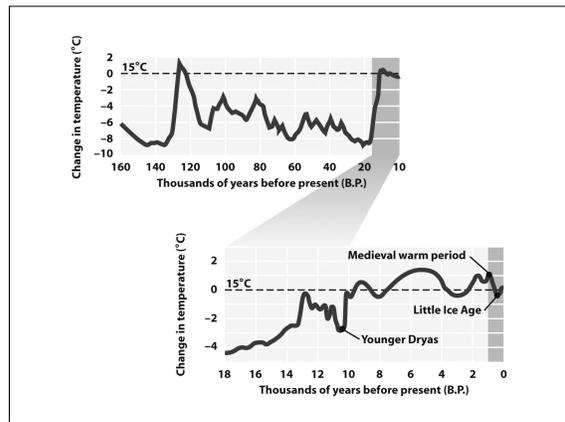
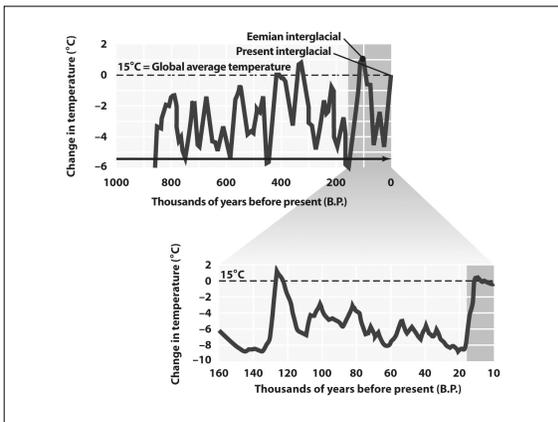
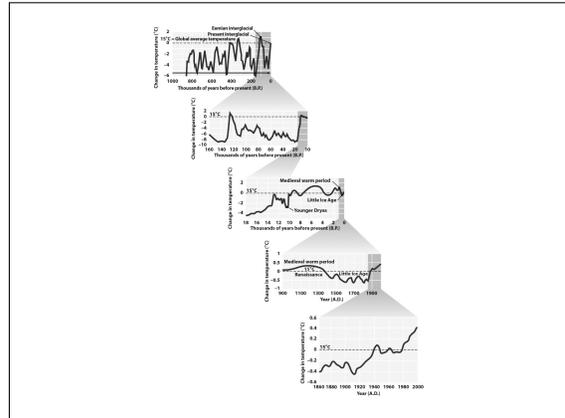
Climate

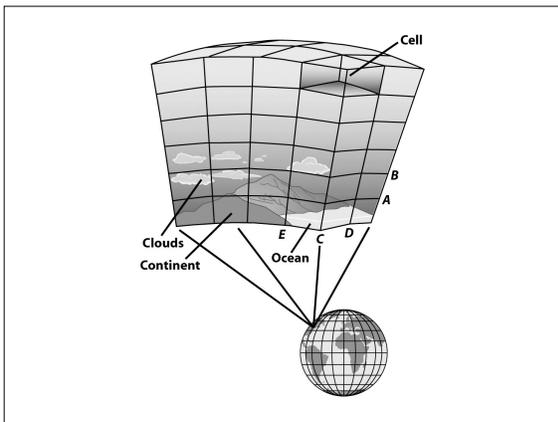
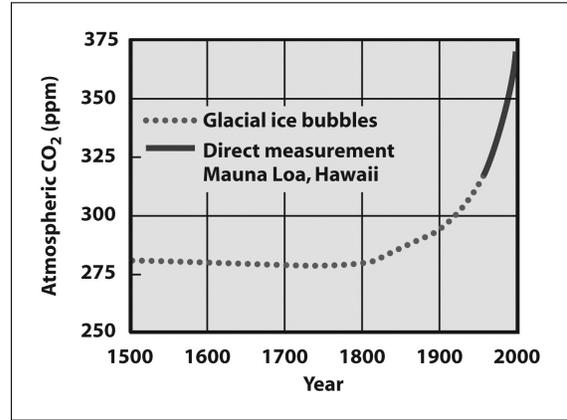
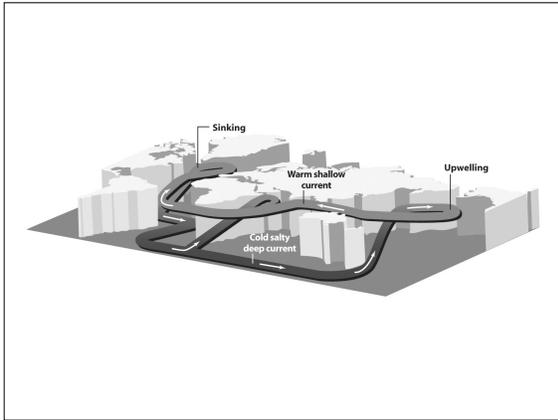
- Climate:
 - the representative or characteristic atmospheric conditions for a region on Earth
- Microclimate
 - The climate of a very small local area
- Urban Dust Dome
 - Polluted urban air produced by the combination of lingering air and abundance of particulates and other pollutants in the urban air mass



Climatic Change

- Major climatic changes have occurred during the past 2 million years
- Appearances and retreats of glaciers
- During the past 100 years, the mean global annual temperature has increased by .5 degrees Celsius





Global Warming

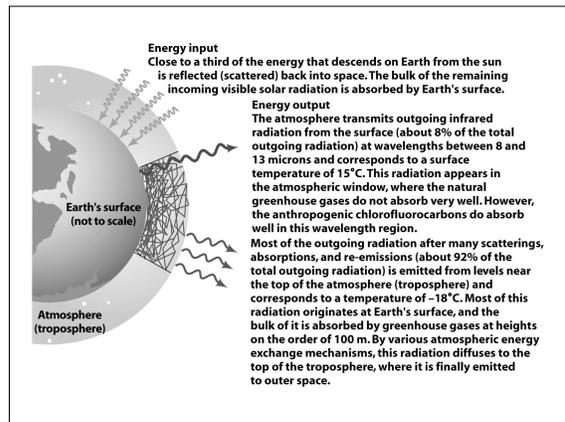
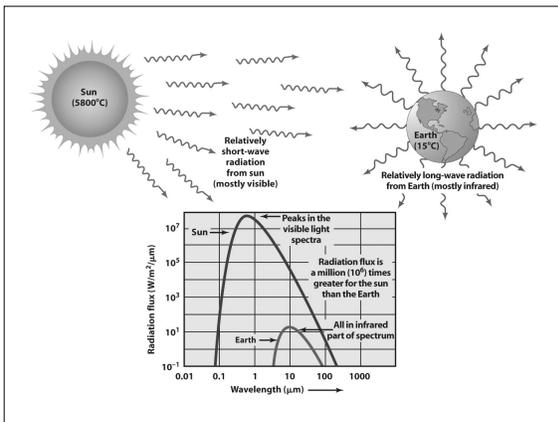
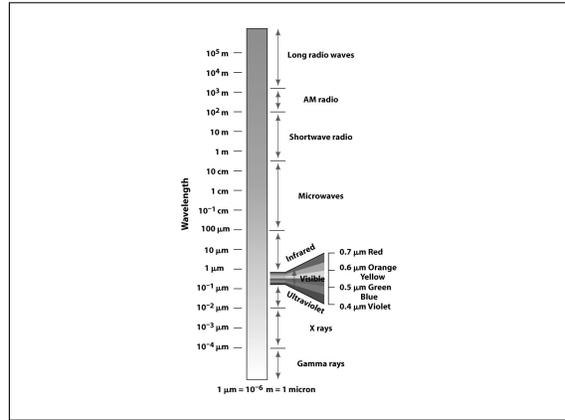
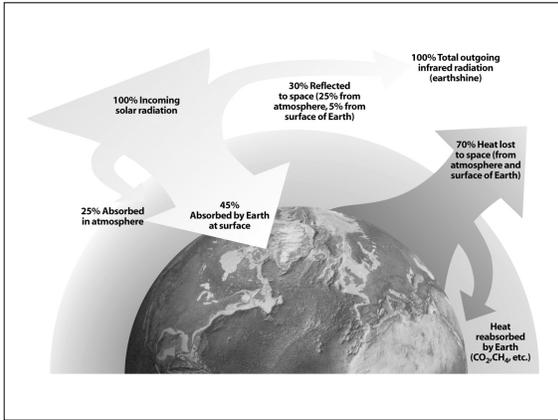
- A natural or human induced increase in the average global temperature of the atmosphere near the earth's surface
- 4 factors
 - Amount of sunlight Earth receives
 - Amount of sunlight Earth reflects
 - Retention of heat by atmosphere
 - Evaporation and condensation of water vapor

Electromagnetic Radiation and Earth's Energy Balance

- Electromagnetic spectrum
 - The collection of all possible wavelengths of electromagnetic energy, considered a continuous range

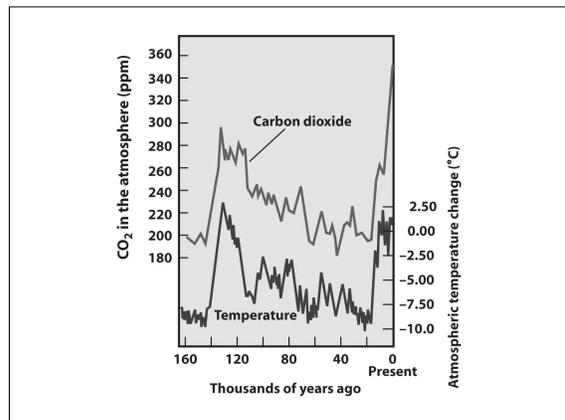
The Greenhouse Effect

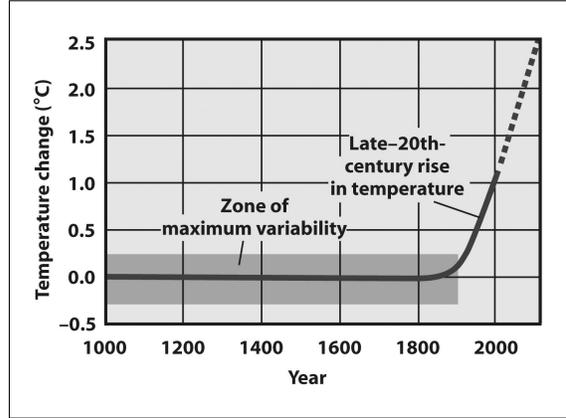
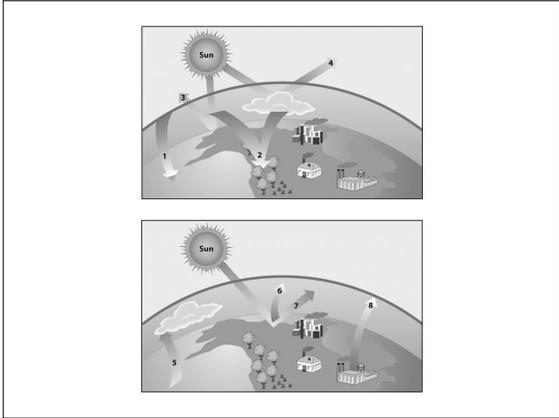
- Greenhouse Effect
 - The process of trapping heat in the atmosphere
 - Water vapor and several other gases warm the Earth's atmosphere because they absorb and emit radiation
- Greenhouse Gasses
 - Gasses that have a greenhouse effect
 - Water vapor, carbon dioxide, methane, CFCs



Global Warming

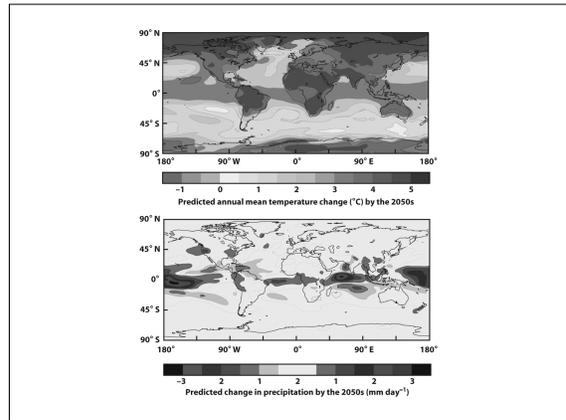
- Negative and Positive feedback cycles affect the atmosphere
- Increase in emission of greenhouse gasses
- Solar Forcing, Natural Cycles, Aerosols (global dimming), Volcanic Eruptions, El Nino





Effects of Global Warming

- Changes in climatic patterns
- Rise in sea level
- Changes in biosphere



Adjustments to Global Warming

- Mitigate warming through reduction of greenhouse gasses
- Energy conservation
- Alternative energy sources
- Danger: rapid climatic change

