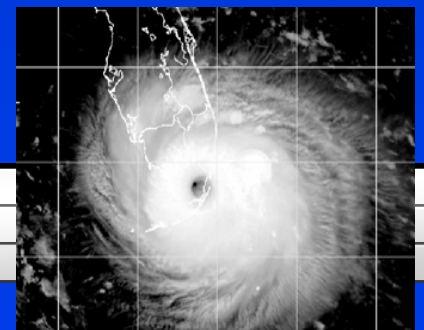


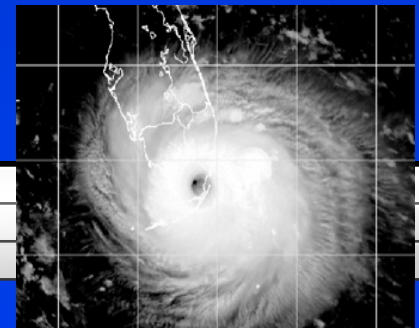
Greenhouse Warming

Applied Climatology



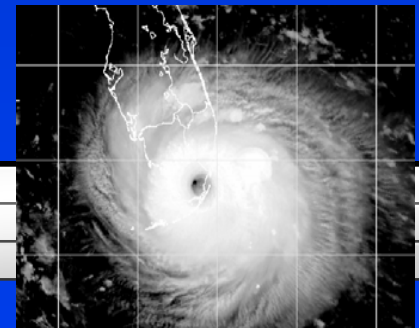
Assignment:

- Read Read Ahrens (*Meteorology Today*) pp. 520-527 (These are the page numbers in the 6th edition. The pages may be different in later editions.)



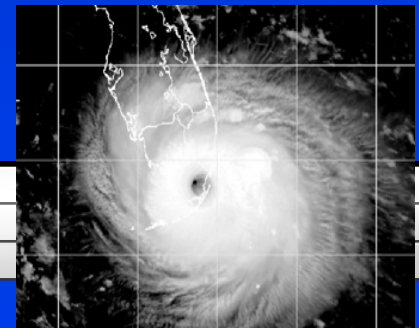
Greenhouse Gases

- **Carbon Dioxide** strongly absorbs infrared radiation emitted by the Earth and may play a major role in warming the lower atmosphere.
 - Carbon Dioxide is steadily increasing because of:
 - » Burning of Fossil Fuels
 - » Deforestation
- **Methane**
- **Nitrous Oxide**
- **CFCs**
- **Water Vapor**
 - Most abundant greenhouse gas
 - Feedback mechanism



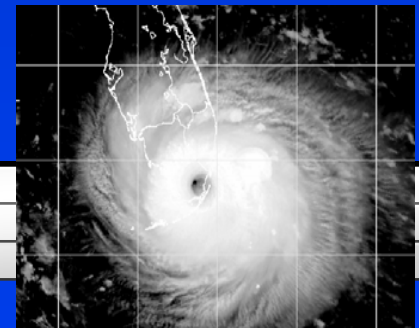
Greenhouse Warming Uncertainties: Cooling Agents?

- **Sulfate Aerosols**
 - produced by burning fossil fuels
- **Clouds**
 - **Feedback mechanism**
 - » **Reflection of solar radiation**
 - » **Absorption of longwave radiation**
 - Low clouds have cooling effect
 - High clouds have warming effect
 - **Models cannot handle clouds well at all**
 - » **Model forecasts of greenhouse warming vary tremendously depending on how they treat clouds**



- **Oceans**

- **Huge carbon dioxide storehouse.**
 - » **Phytoplankton**
 - » **Cold Ocean**
- **Huge Specific Heat**
 - » **Retards global temperature changes**
- **Ocean Circulation**



GLOBAL WARMING EPA WEBSITE

- Please refer to the following web site for more specifics on Global Warming.
- <http://yosemite.epa.gov/OAR/globalwarming.nsf/content/index.html>

