



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with ‘A++’ Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

19AGE401 – CLIMATE CHANGE AND ADAPTATION

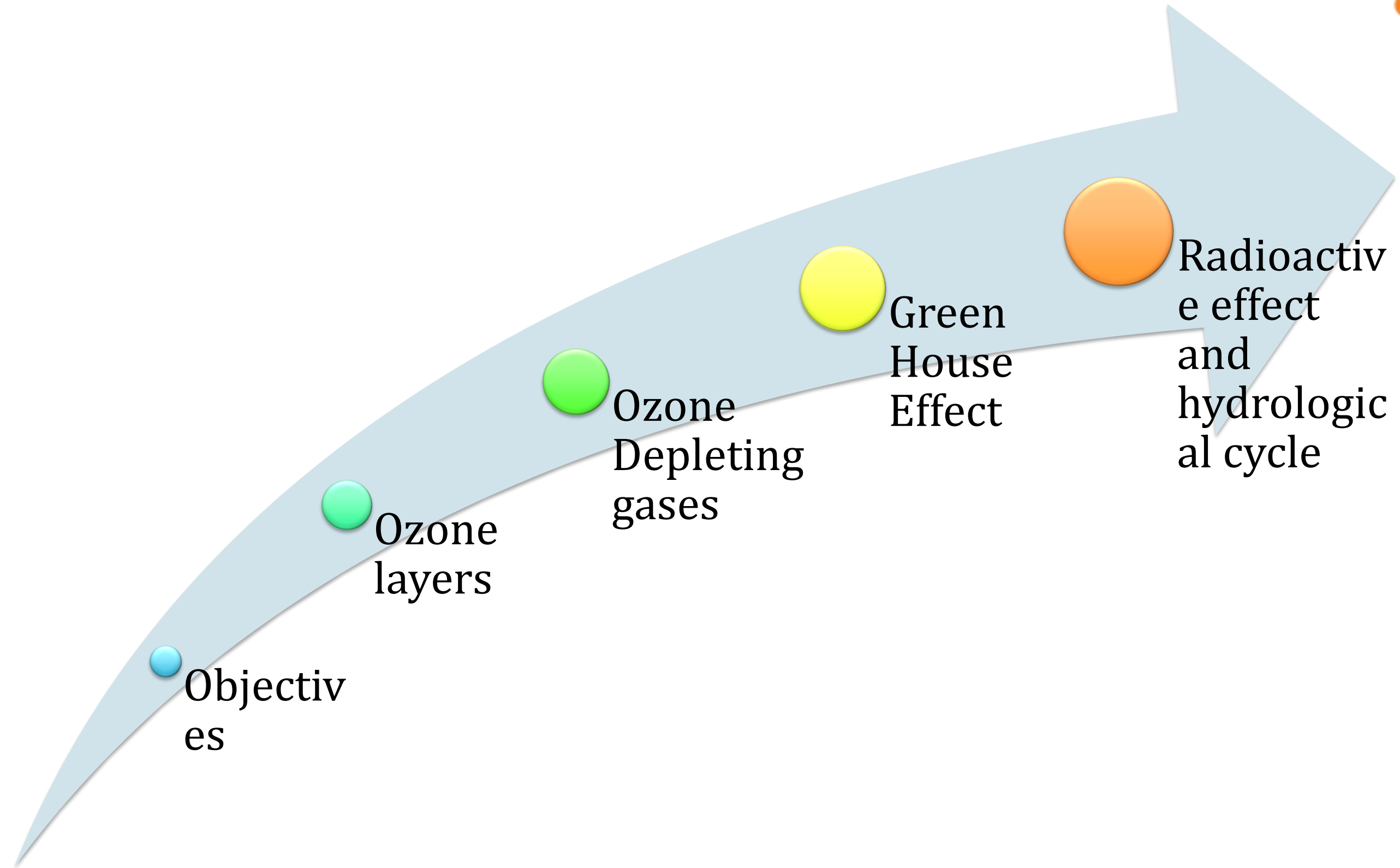
IV – YEAR VII SEMESTER

UNIT 1 – EARTH’S CLIMATE SYSTEM

TOPIC 8 – GLOBAL WARMING AND CARBON CYCLE



Last Class Review



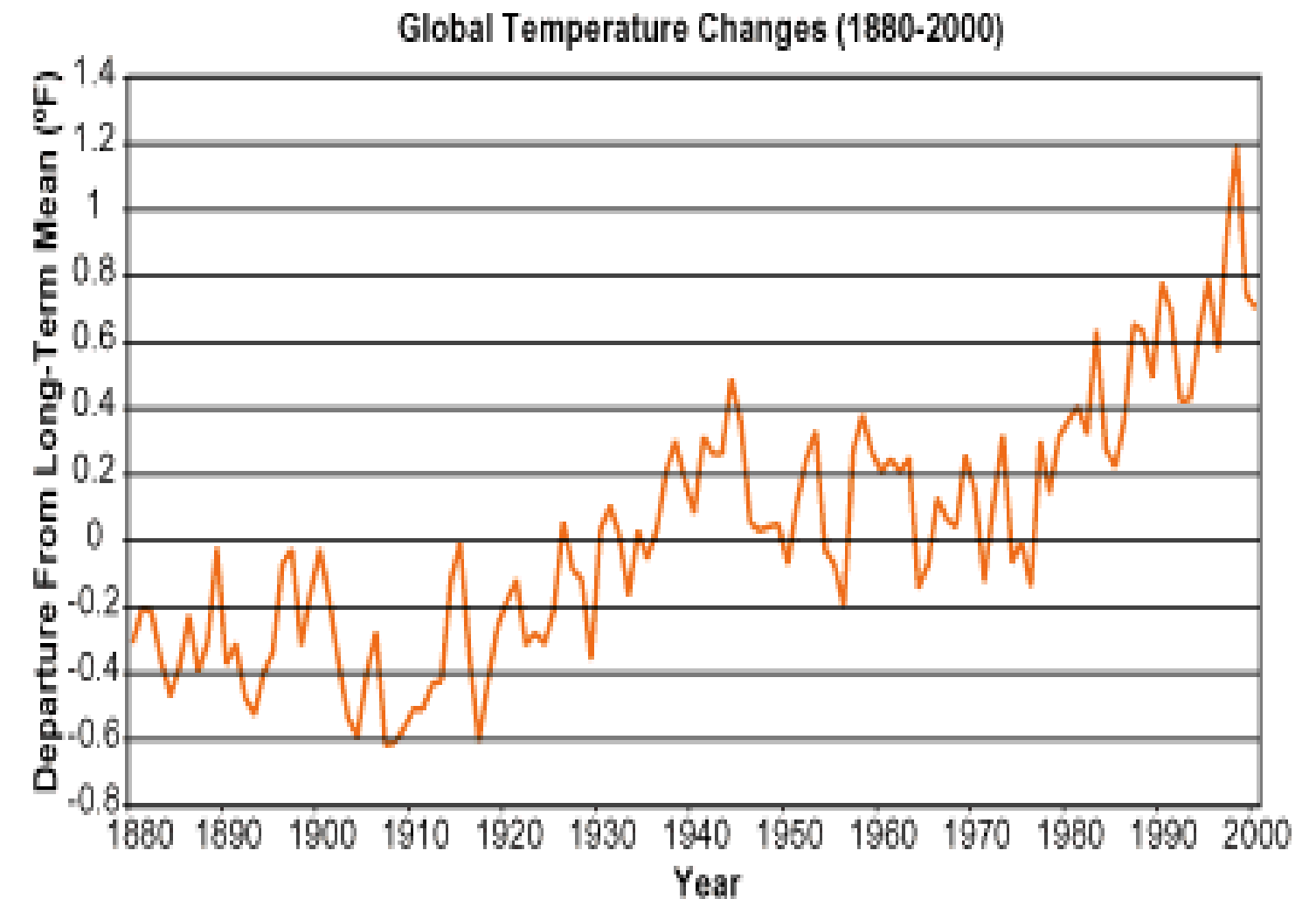


What is Global Warming?

An increase in the average temperature of the Earth's atmosphere and oceans

Global temperature on both land and sea increased by **0.6 ± 0.2 °C** over the past century

Volume of atmospheric carbon dioxide increased from 280 parts per million in 1800 to 367 in 2000, a 31% increase over 200 years



Source: U.S. National Climatic Data Center, 2001

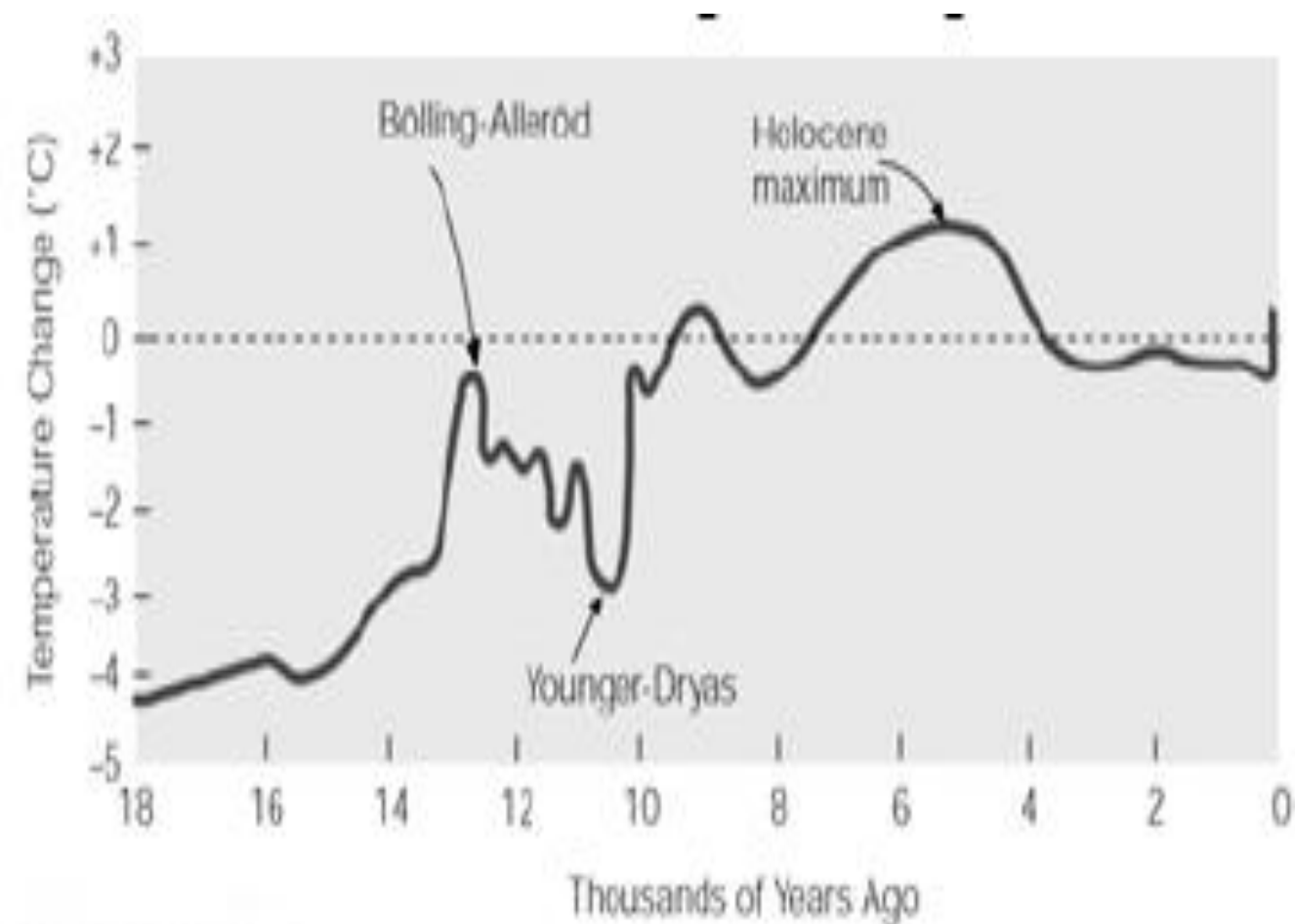


Our Changing Climate



★ Global mean surface temperatures have increased 0.5-1.0°F

since the late 19th century



- The snow cover in the Northern Hemisphere and floating ice in the Arctic Ocean have decreased
- Sea level has risen 4-8 inches over the past century
- Global surface temp. could rise 1-4.5°F (0.6-2.5°C) in the next fifty years, and 2.2-10°F (1.4-5.8°C) in the next century



What causes it?



Human Impacts-

Atmospheric greenhouse gases trap some of the outgoing energy, retaining heat

Natural Impacts-

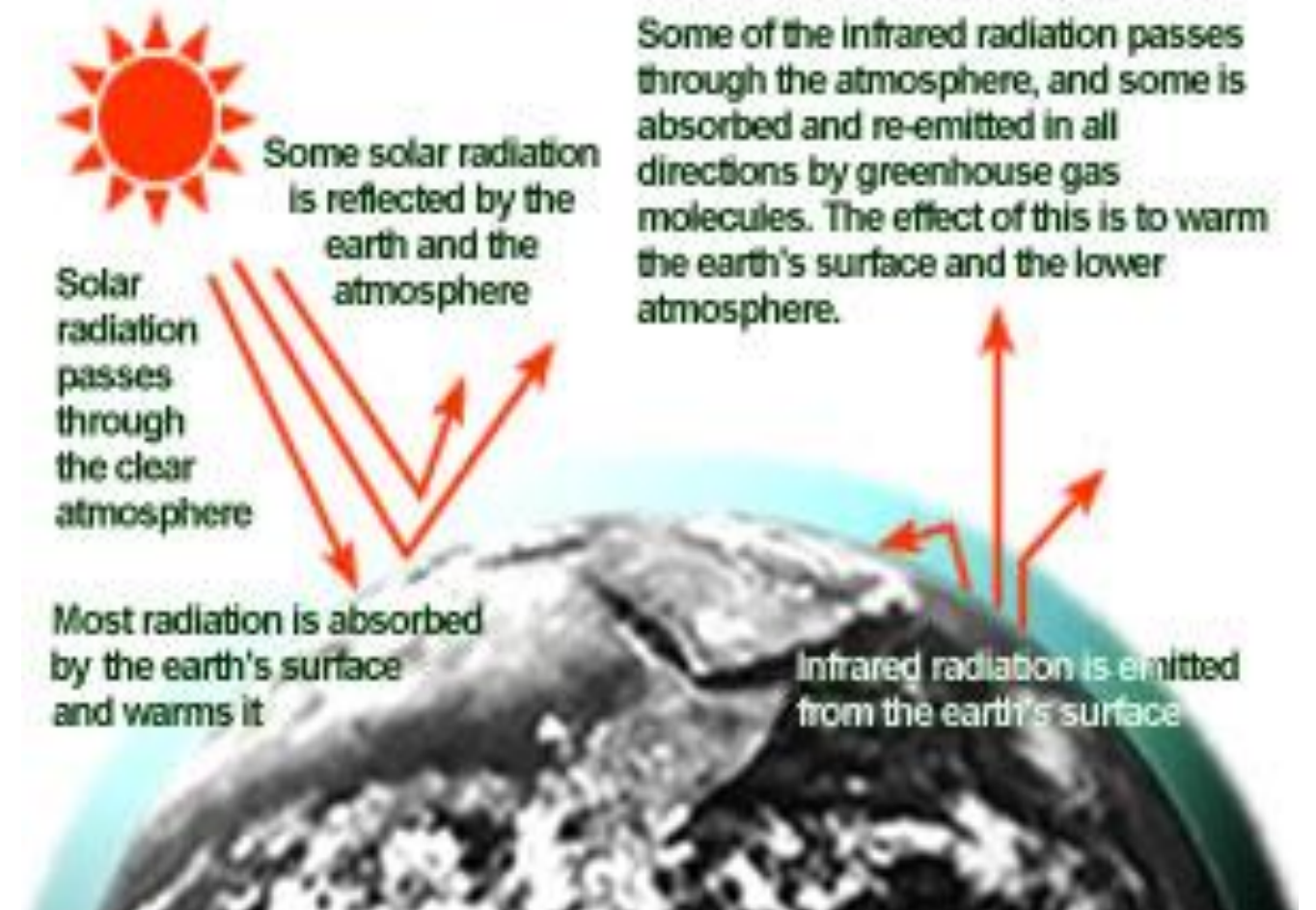
Change in sun's energy output

Volcanoes Water Vapor Clouds

Since industrial revolution, atmospheric concentrations of carbon dioxide increased 30%, methane more than doubled, nitrous oxide risen by 15%.

These increases have enhanced the heat-trapping capability of the earth's atmosphere

The Greenhouse Effect



Greenhouse Gases -

CO ₂ oxide compounds	Methane Fluorinated	Nitrous
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Greenhouse Gas Emissions

- ★ Combustion of fossil fuels → coal-burning power plants, automobile exhausts, factory smokestacks, other waste vents of the human environment contribute 22 billion tons of carbon dioxide and other greenhouse gases each year
 - Animal agriculture, manure, natural gas, rice paddies, landfills, coal, and other anthropogenic sources contribute about 450 million tons of methane each year
 - Atmospheric concentrations of CO₂ and CH₄ have increased by 31% and 149% respectively above pre-industrial levels since 1750





Greenhouse Gas Emissions



- ***Power Plants***

- 40% of carbon dioxide emissions stem from the burning of fossil fuels for the purpose of electricity generation

- ***Cars***

- 20% of carbon dioxide emissions comes from the burning of gasoline in internal-combustion engines of cars and light trucks with poor gas mileage contribute the most to global warming

- ***Trucks***

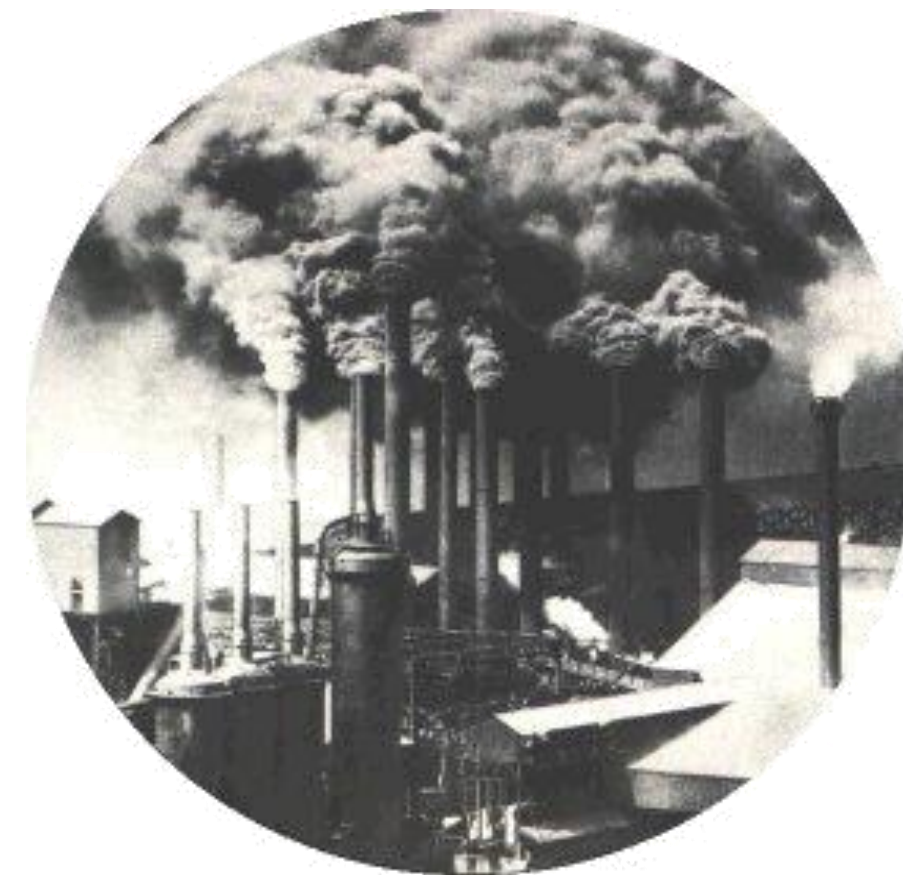
- Another 13% of carbon dioxide emissions come from
- trucks used mostly for commercial purposes

- ***Airplanes***

- Aviation causes 3.5 percent of global warming,
- and the figure could rise to 15 percent by 2050

- ***Carbon Dioxide from Buildings***

- Buildings structure account for about 12% of
- carbon dioxide emissions





Greenhouse Gas Emissions

Methane

- Methane is more than 20 times as effective as CO₂ at trapping heat in the atmosphere
- 2004 Levels of atmospheric methane have risen 145% in the last 100 years
- Derived from sources such as rice paddies, bovine flatulence, bacteria in bogs and fossil fuel production
- In flooded fields, anaerobic conditions develop and the organic matter in the soil decomposes

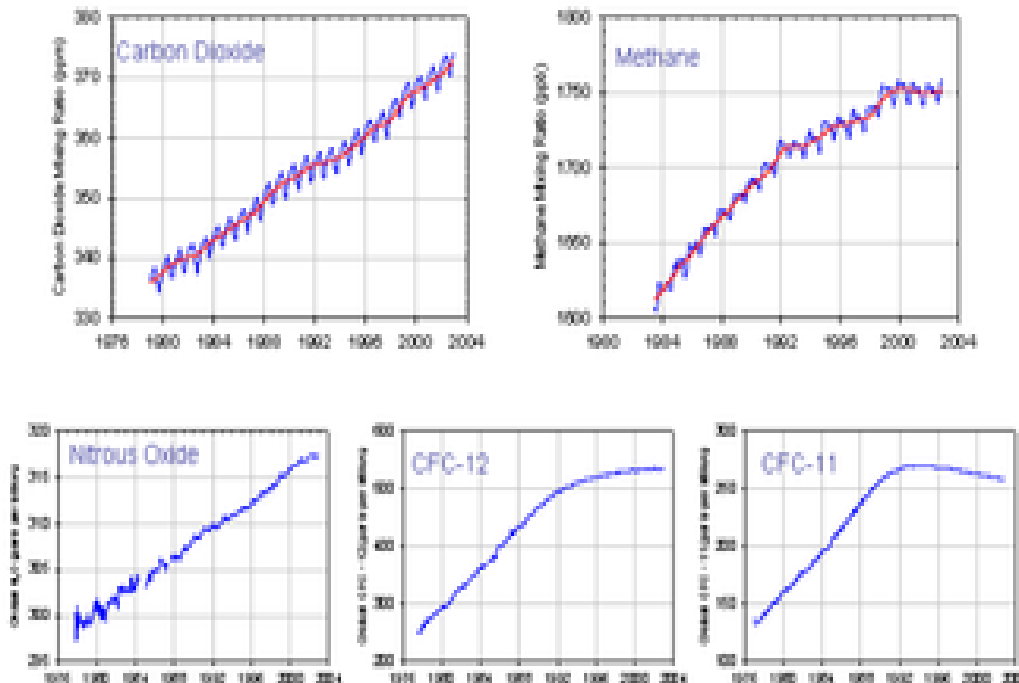
Nitrous oxide

- Naturally produced by oceans and rainforests
- Man-made sources-nylon and nitric acid production, the use of fertilizers in agriculture, cars with catalytic converters and the burning of organic matter

Deforestation

- Responsible for 25% of all carbon emissions entering the atmosphere by the burning and cutting of about 34 million acres of trees each year

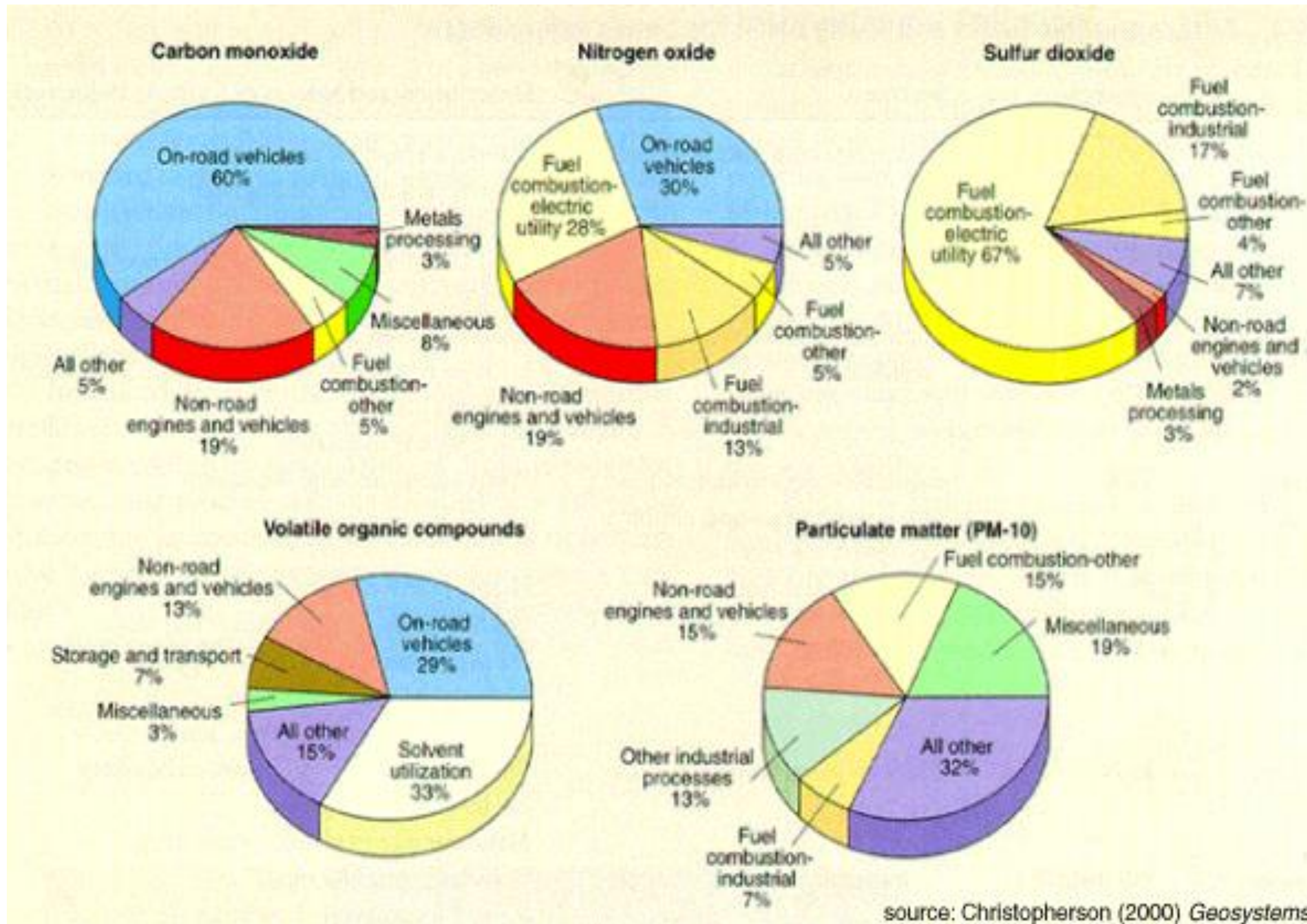
Global Trends in Major Greenhouse Gases to 1/2003



Global trends in major long-lived greenhouse gases through the year 2002. These five gases account for about 97% of the direct climate forcing by long-lived greenhouse gas increases since 1750. The remaining 3% is contributed by an assortment of 10 minor halogen gases, mainly HCFC-22, CFC-113 and CCl₄.



Greenhouse Gases





Reference Videos





See You at Next Class!!!!