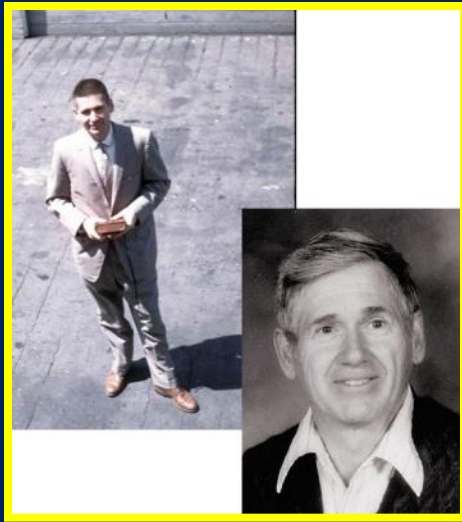


Global Climate Change



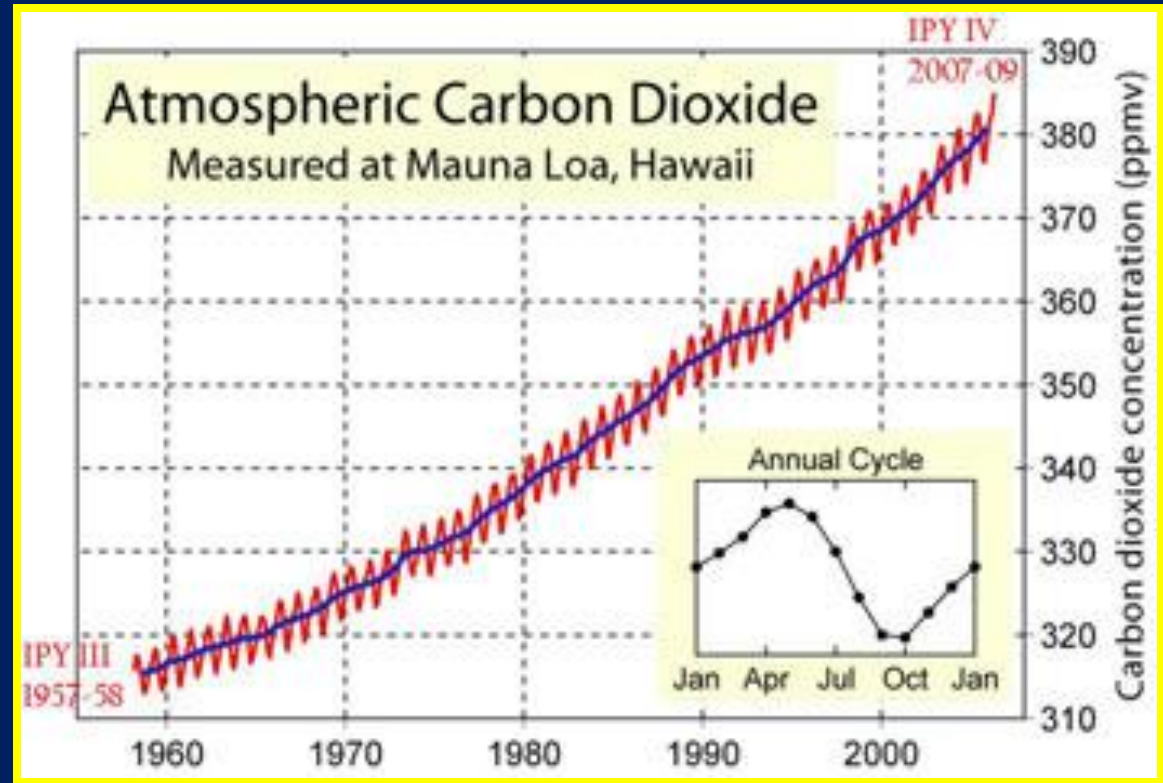
Increased Levels of CO₂ in the Atmosphere



Charles David Keeling



1955 – 315 ppm



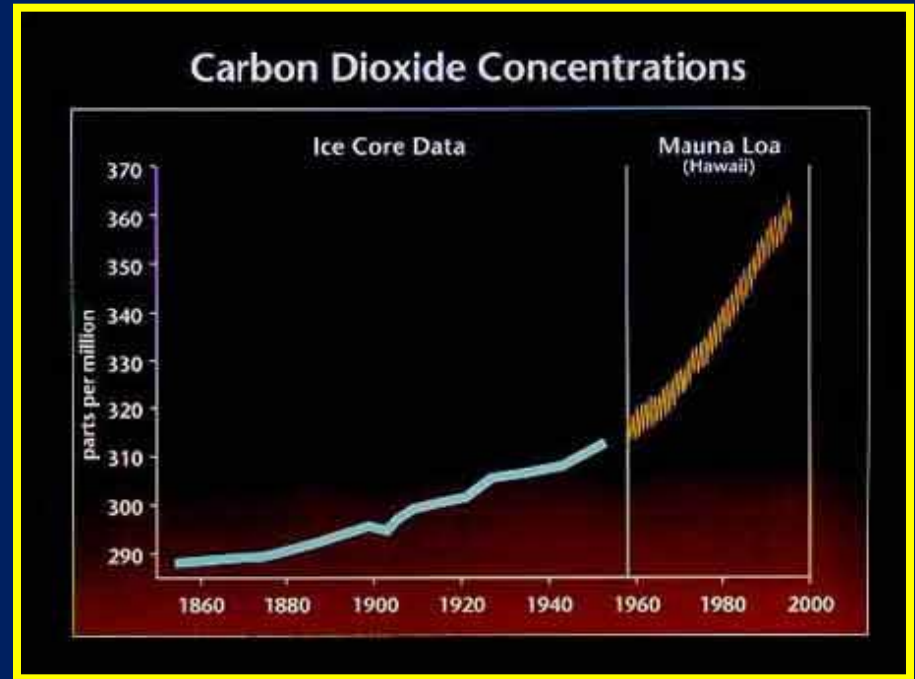
PPM = 1 carbon dioxide molecule
1,000,000 air molecules

2016 – 409 ppm

Increased Levels of CO₂ in the Atmosphere

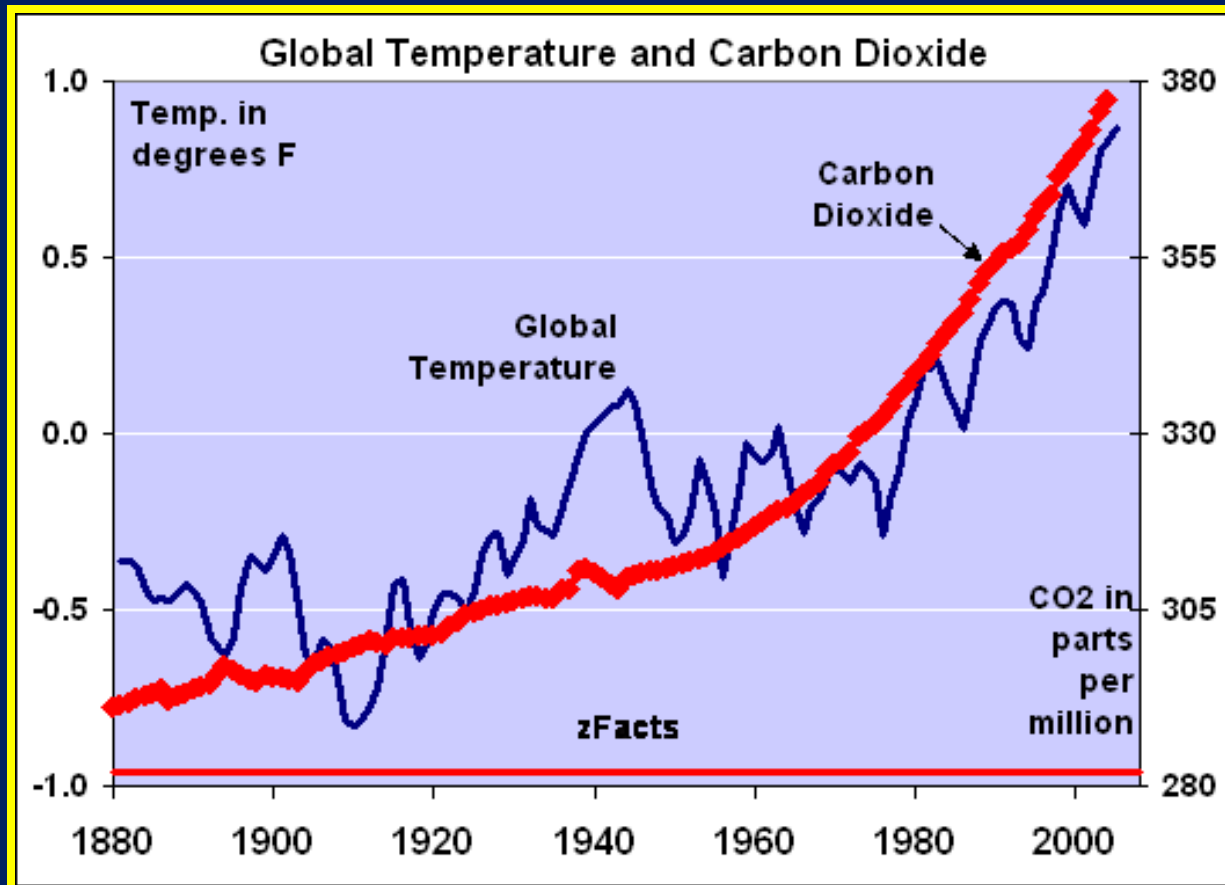
Ice Core Data

Industrial Revolution



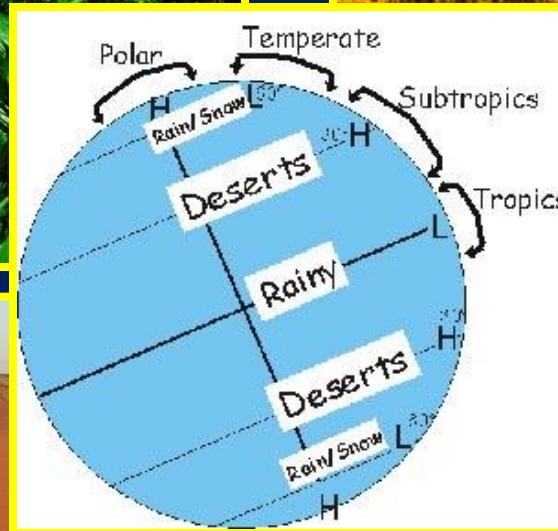
Increased Levels of CO₂ in the Atmosphere

Average Global Temperature Since the Industrial Revolution



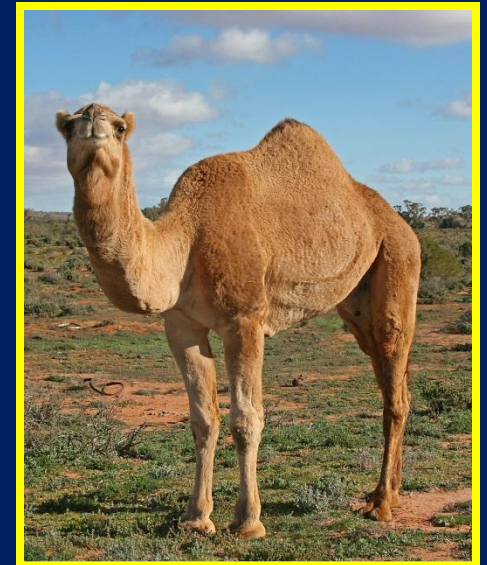
Climate

Climate refers to long-term weather patterns for a particular area



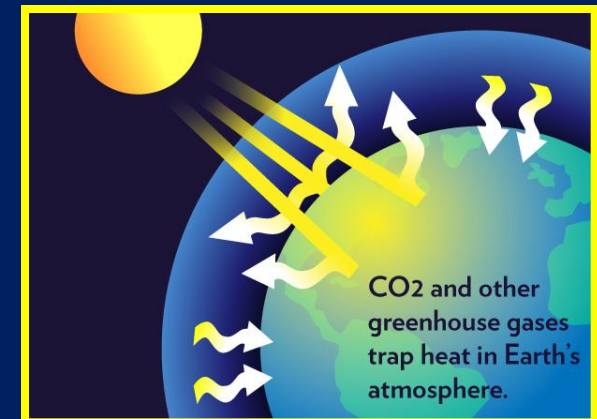
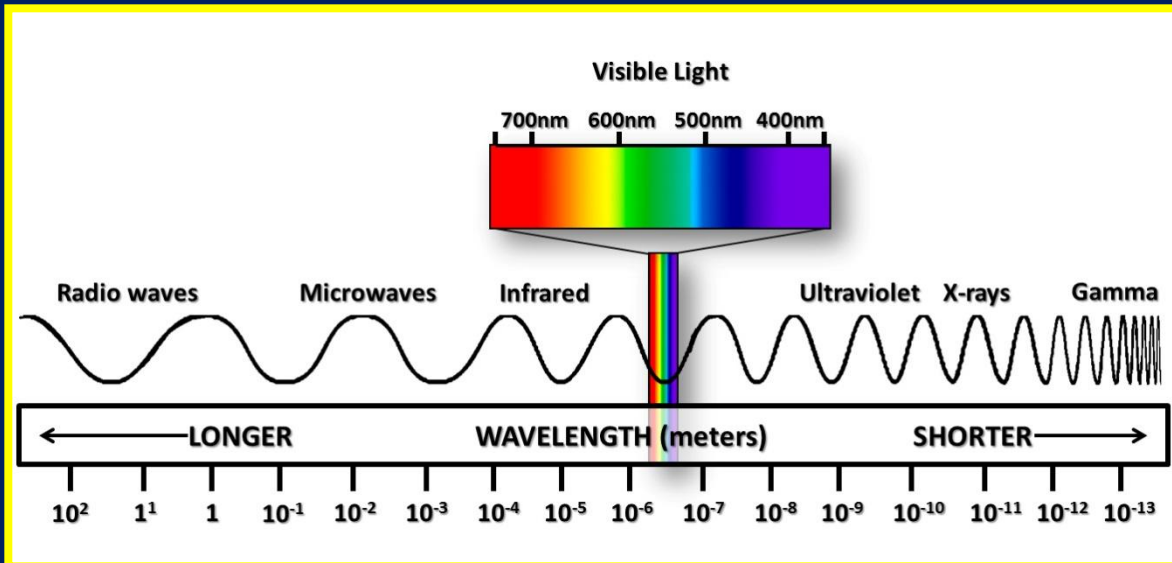
Ecosystems

Climate determines the types of vegetation that can survive in an ecosystem, which in turn, determines the types of animals.



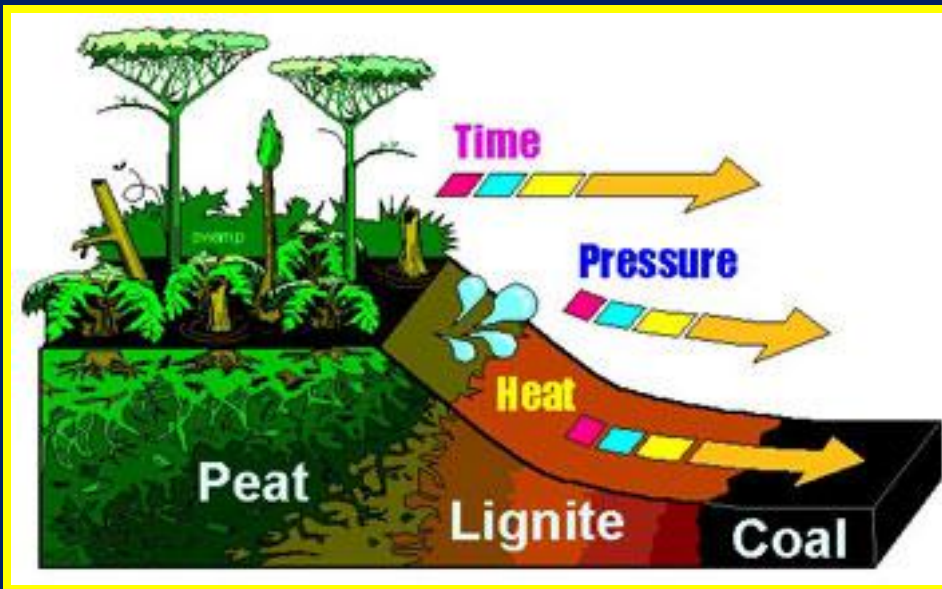
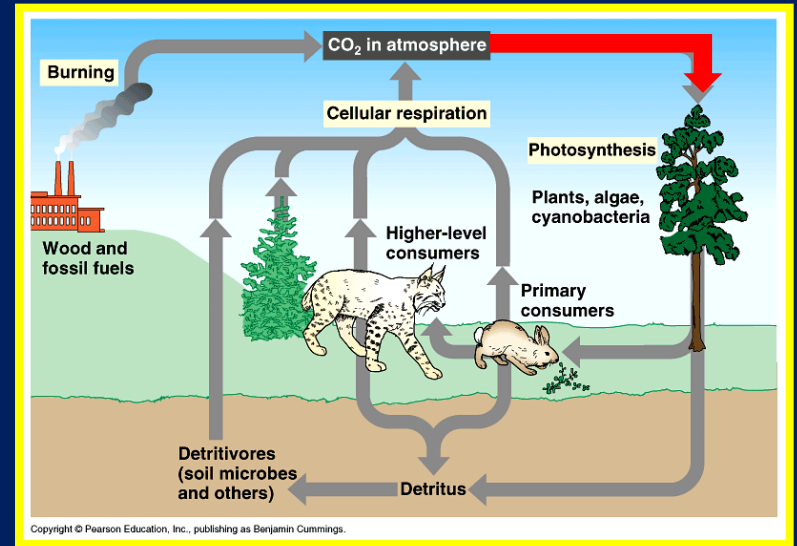
Greenhouse Effect

Light waves pass through the glass in a greenhouse, turn into infra-red heat waves that cannot escape.



Carbon Cycle

Carbon dioxide, CO_2 , is removed from the atmosphere through photosynthesis.



Organic waste, rich in carbon, that is not decomposed is buried and converted into fossil fuel.

Human Impact on Carbon Cycle

Combustion of Fossil
Fuels



Slash and Burn
Deforestation

Decreased Photosynthesis
and
Decreased Storage of CO₂



Carbon Dioxide Residence Time

After 100 years, only 50% of any carbon dioxide amount is removed from the atmosphere. After 200 years, only 25% is removed from the atmosphere.

1 gallon of gas = 6 lbs CO₂

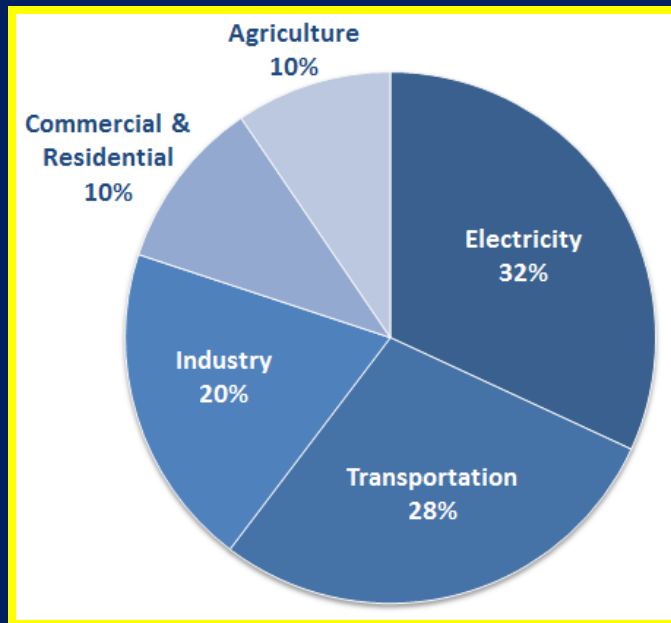
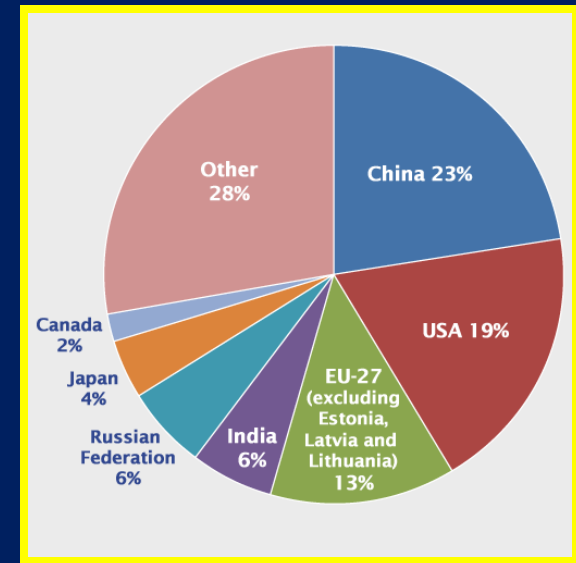
1 year = 15,000 miles

20 miles /gallon = 7.5 tons CO₂



Sources of CO₂ in the Atmosphere

Currently, China emits the most carbon dioxide, followed by the United States.



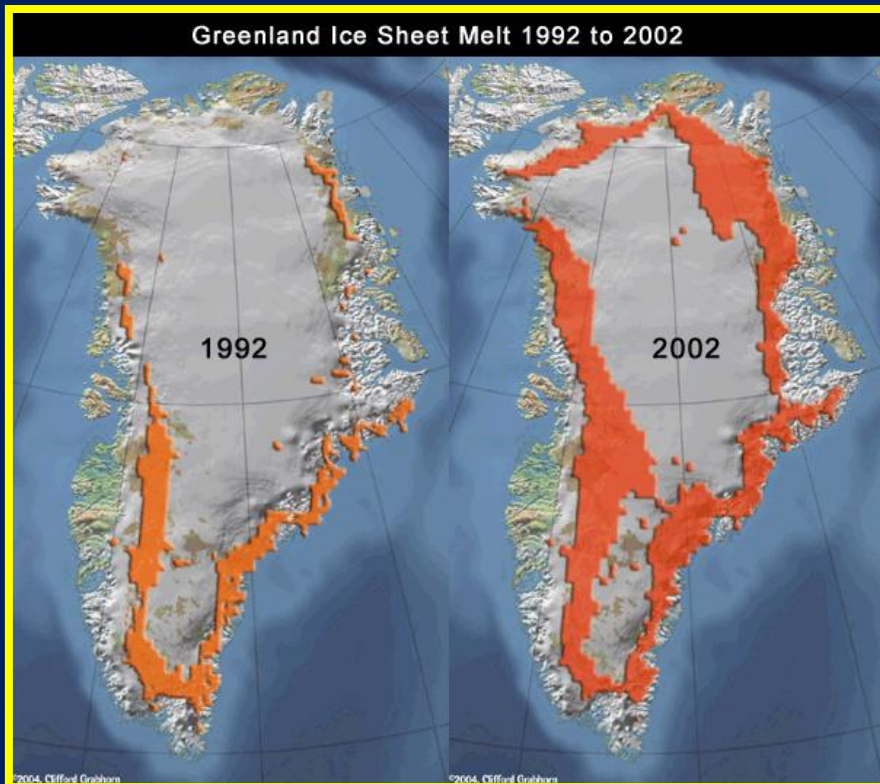
United States

Burning of Coal for Electricity

Transportation

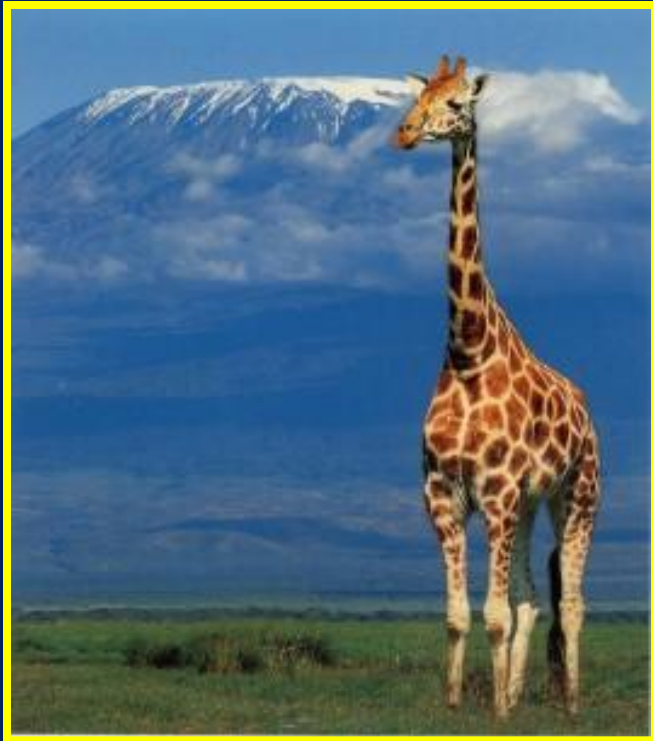
Impacts of Global Climate Change

Melting Ice Sheets in Greenland and Antarctica



Impacts of Global Climate Change

Glacial ice caps melting



1912 (Average area of snow: 12 km²)



1970 (Average area of snow: 5 km²)



2000 (Average area of snow: 2.5 km²)



2007 (Average area of snow: 1.5 km²)

The ice cap in Kilimanjaro is 85% smaller than it was in 1912.

Impacts of Climate Change

The permafrost in the Tundra is melting making the ground and buildings unstable.

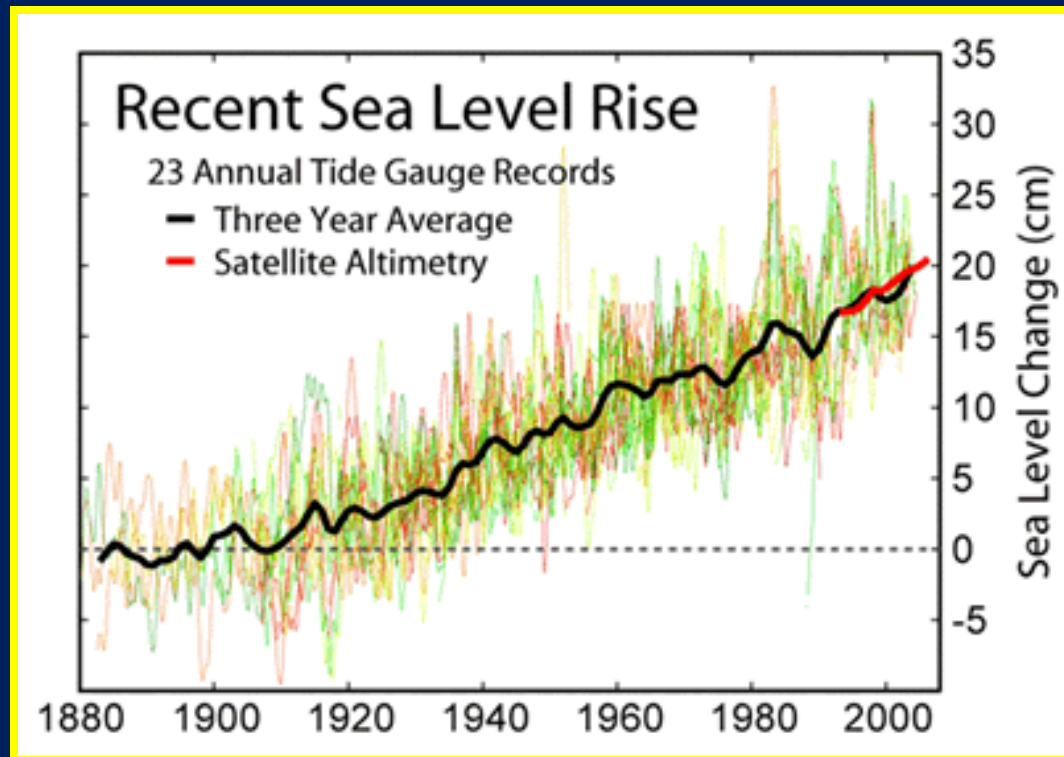


Alaskan Permafrost Melting



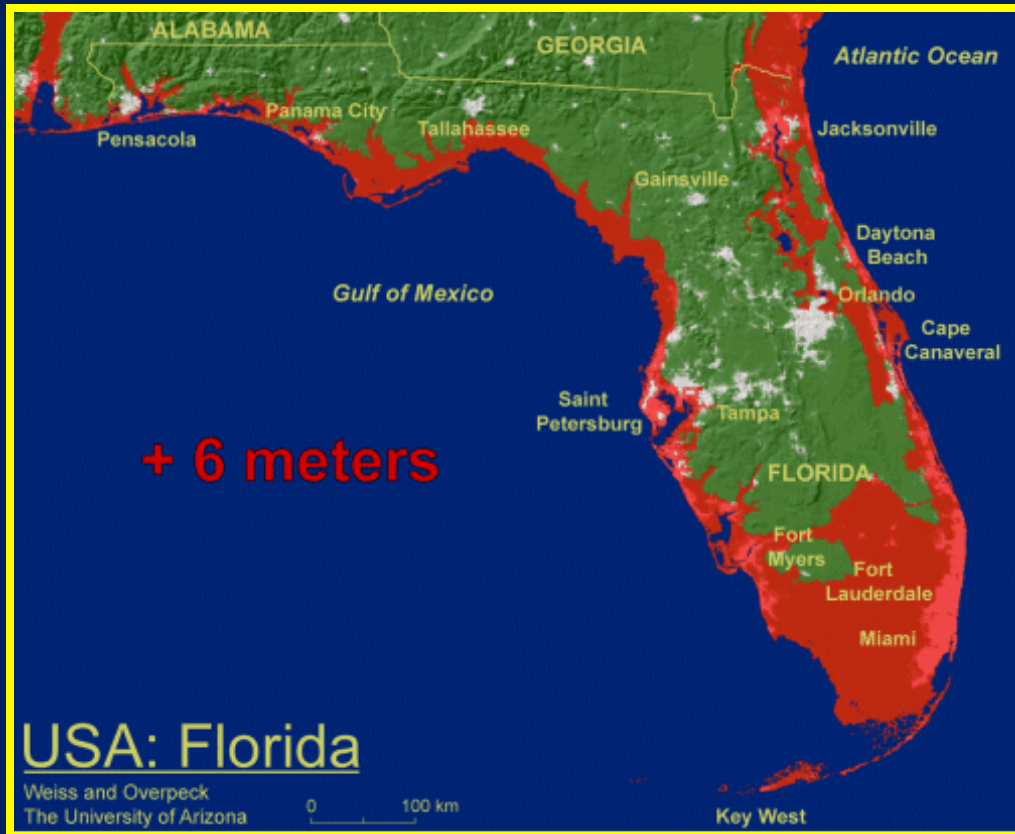
Impacts of Climate Change

Sea level has already risen 6 – 8 inches during the past century. This historical rate of rise was greater than any other persistent, century-scale trend during the past 2,100 years.



Impacts of Climate Change

At the rate the ice sheets are melting, sea level could rise anywhere between 3 meters and 16 meters, within the next couple of hundred years, displacing millions of people.



Most major cities, around the world, are situated along the coast.

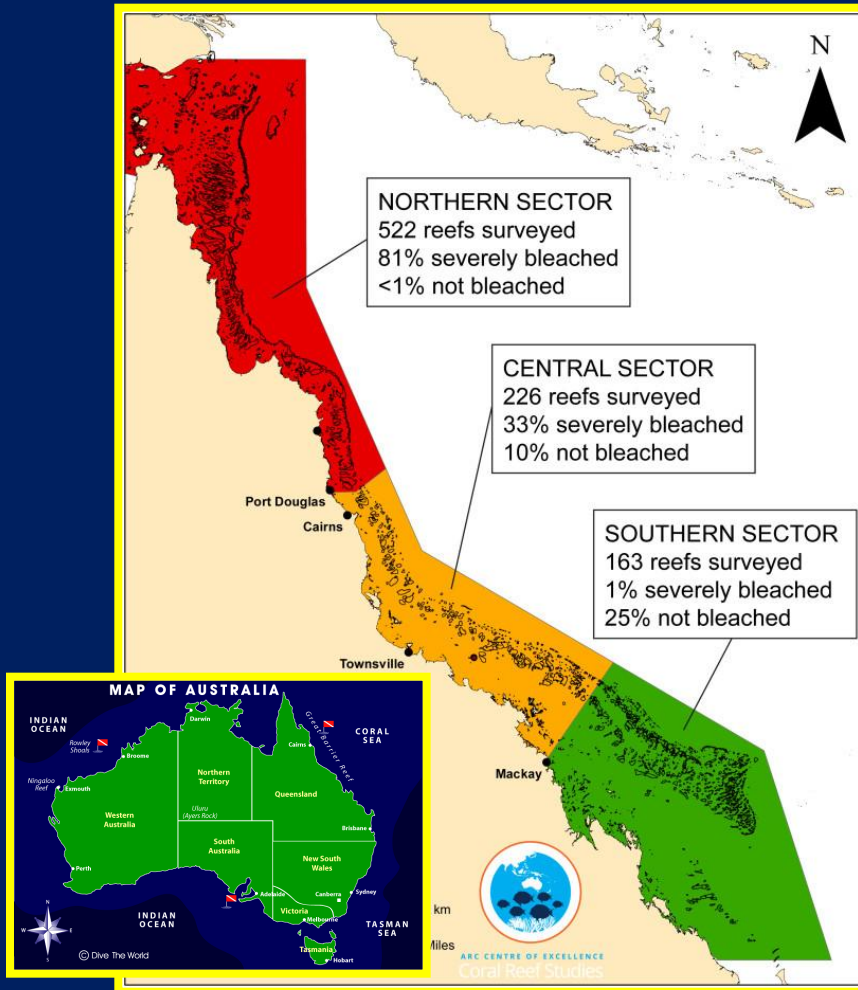
Impacts of Climate Change

Many island nations are near sea level. These islands may be completely underwater with even a small rise in sea level.



Impacts of Climate Change

Increased ocean temperatures also leads to more coral bleaching events.



Extreme Weather

Extreme weather events such as large storms and heat waves will be more frequent and more intense.

SCIENCE
CONNECTIONS →

EXTREME WEATHER & CLIMATE CHANGE

→ Strongest Scientific Evidence Shows Human-Caused Climate Change Is Increasing Heat Waves and Coastal Flooding



TORNADOES HURRICANES



SEVERE
DROUGHTS



EXTREME
PRECIPITATION
EVENTS



COASTAL
FLOODING



HEAT
WAVES

← Limited
Evidence

Strong
Evidence

→ Strongest
Evidence

Impacts of Climate Change

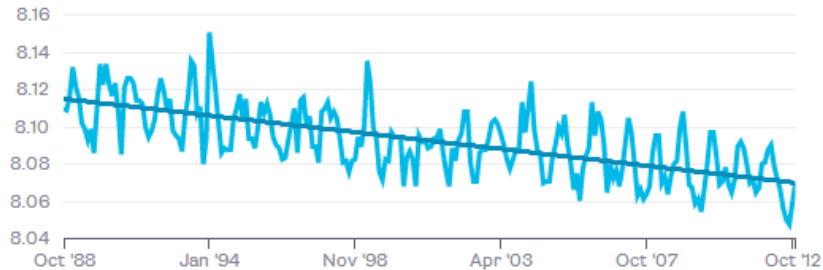
Changes in the climate may cause some species to go extinct as the seasonal changes affect migration patterns, length of hunting seasons, or changes in habitat.



Impacts of Climate Change

...the Ocean Becomes More Acidic

Calculated mean seawater pH



Source: Hawaii Ocean Time-Series Program (with funding from the National Science Foundation)

Increased levels of CO₂ are being absorbed by ocean waters resulting in a change in ocean pH levels leading to ocean acidification.

Lower pH levels in the ocean inhibits shell growth in marine animals and can cause reproductive disorders in fish.

OCEAN ACIDIFICATION Impacts on Sea Life

Corrodes Shellfish and Coral



Source: David L. Schwager/National Geographic Society

CLIMATE CENTRAL