Weather and Climatology
(207 E)

Second level / Environmental Sciences Students (Credit Hours)

Under supervision

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Climate Change

Outlines

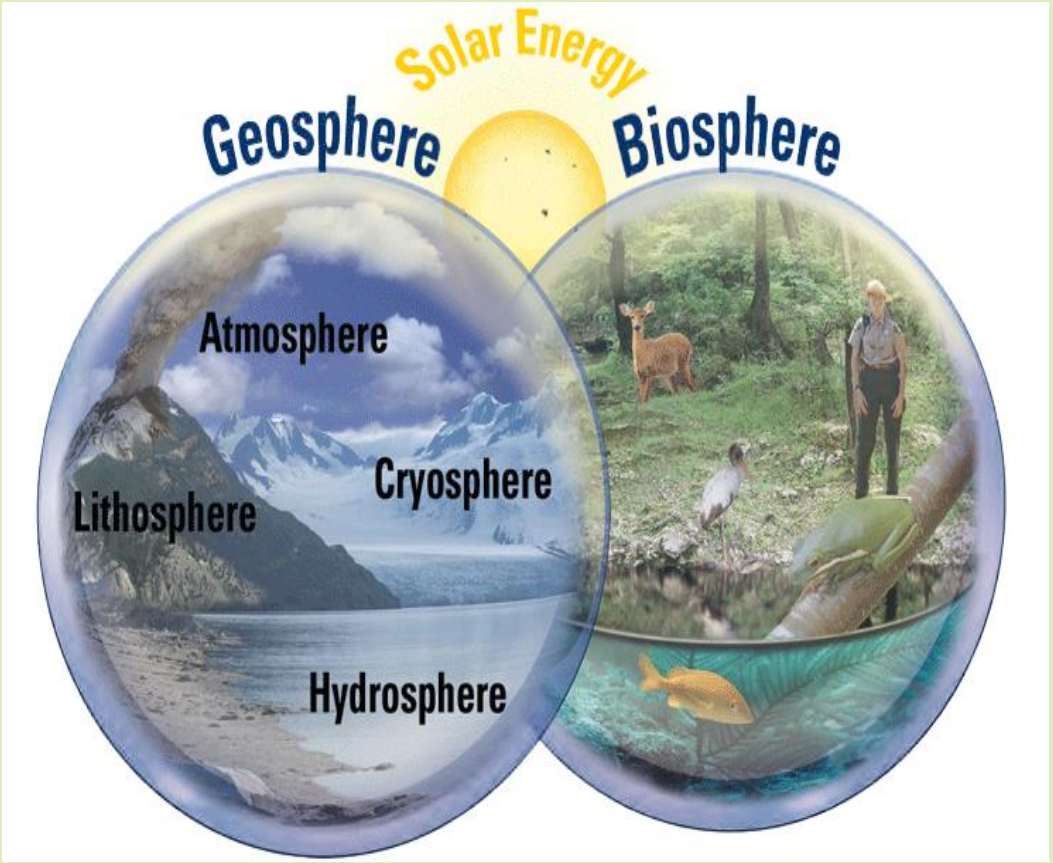
What is the Climate Change?

Causes

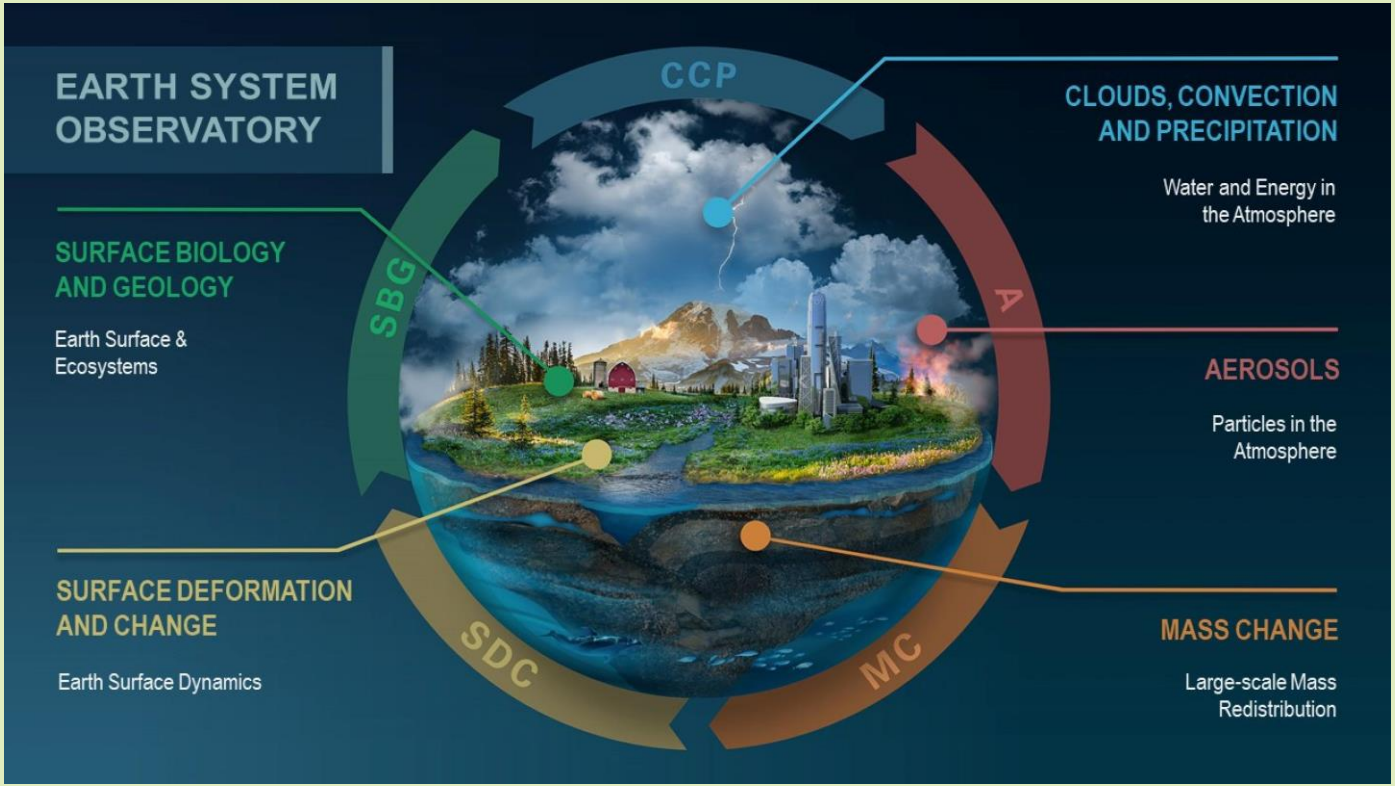
Impacts

Mitigation and Adaptation

Our planet


Solar Energy
Geosphere
Biosphere
Atmosphere
Cryosphere
Lithosphere
Hydrosphere

Our planet


EARTH SYSTEM OBSERVATORY
CCP
CLOUDS, CONVECTION AND PRECIPITATION
Water and Energy in the Atmosphere
SBG
SURFACE BIOLOGY AND GEOLOGY
Earth Surface & Ecosystems
A
AEROSOLS
Particles in the Atmosphere
SURFACE DEFORMATION AND CHANGE
Earth Surface Dynamics
SDC
MC
MASS CHANGE
Large-scale Mass Redistribution

Weather and Climate

Weather

The mix of events that happen each day in our atmosphere

Weather isn’t the same all around the world

It is different in different parts of the world and changes over minutes, hours, days, and weeks.

Most weather happens in the part of Earth’s atmosphere that is closest to the ground (the troposphere)

Weather and Climate

Weather

Factors that can change the atmosphere in a certain area

Air pressure,

Wind Speed and Direction

Humidity,

Temperature,

Together, they determine what the weather is like at a given time and location.

Weather and Climate

Climate

Describes what the weather is like over a long period of time in a specific area.

Different regions can have different climates

Looking at

averages of precipitation, temperature, humidity, sunshine, wind, and other measures of weather that occur over a long period in a particular place.

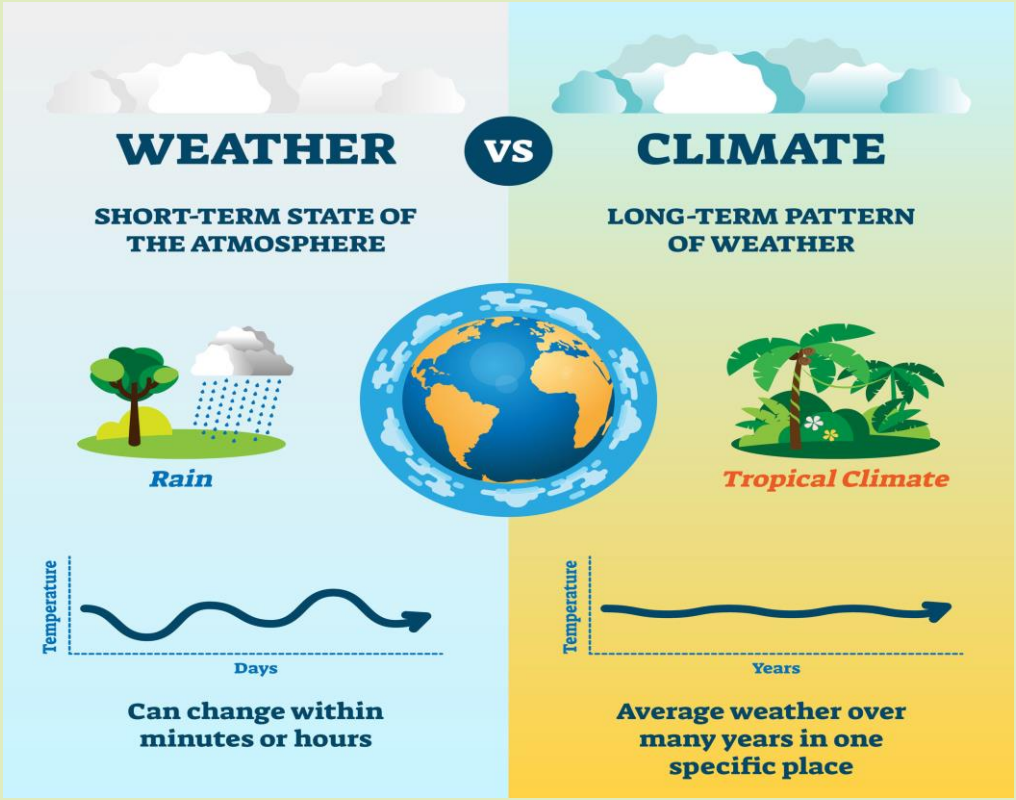
Weather and Climate

Weather

tells you what to wear each day.

Climate

tells you what types of clothes to have in your closet.

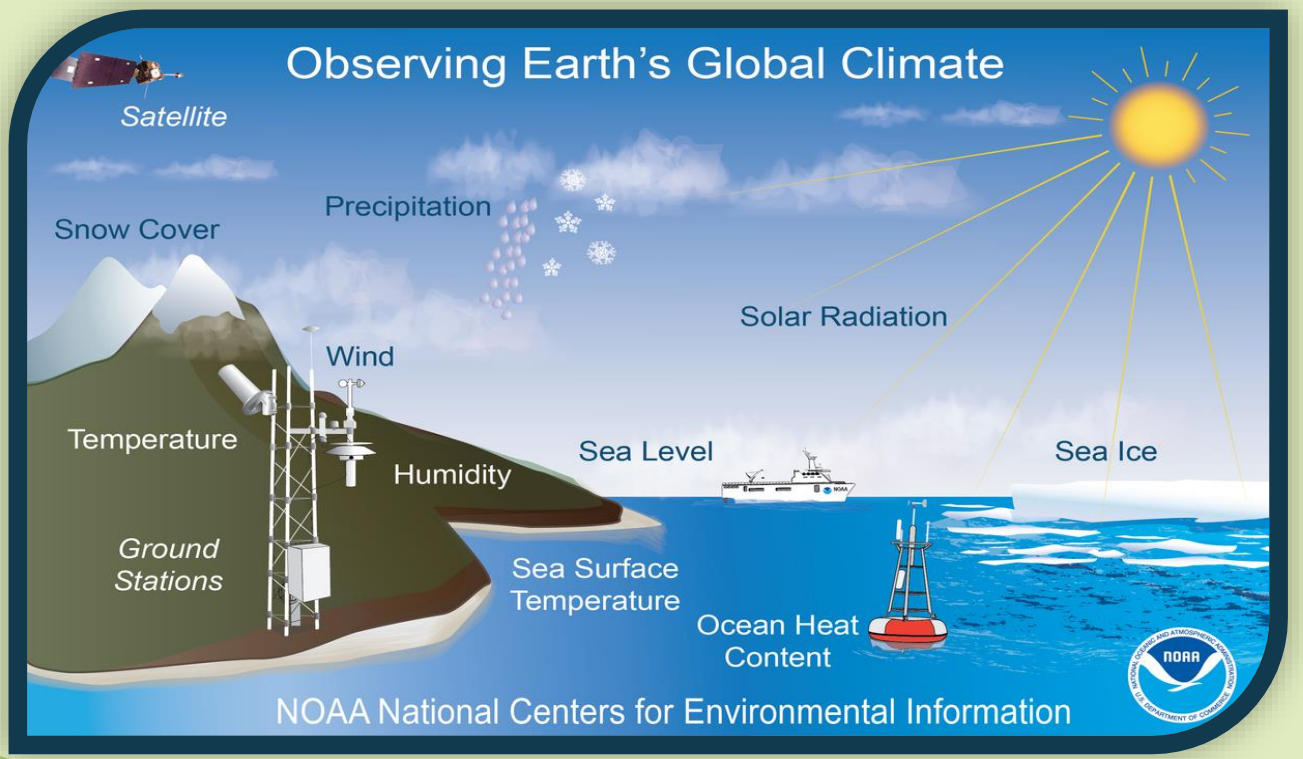


Global climate

Global climate is a description of the climate of a planet as a whole, with all the regional differences averaged

It depends on the amount of energy received by the sun and the amount of energy that is trapped in the system and, these amounts are different for different planets.

Scientists who study Earth's climate look at the factors that affect our planet as a whole.



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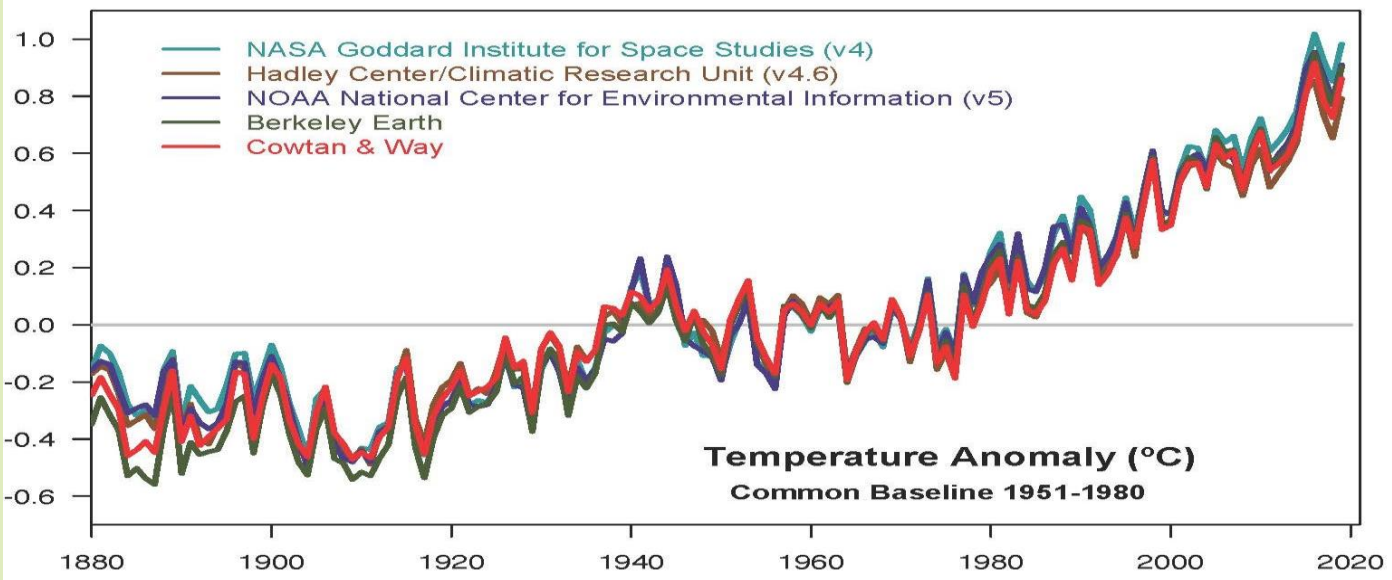
What is the Climate Change?

What is the Climate Change?

Climate change is a change in the average temperature and cycles of weather over a long period of time.



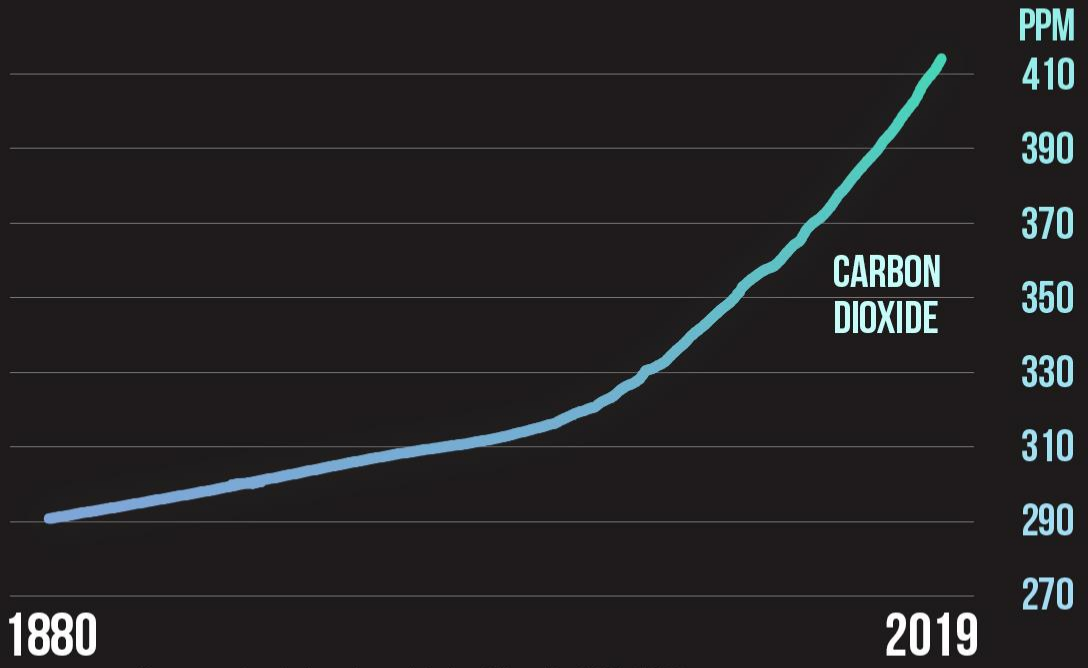
Potter, Sean; Cabbage, Michael; McCarthy, Leslie (19 January 2017). "NASA, NOAA Data Show 2016 Warmest Year on Record Globally" (Press release). NASA. Retrieved 20 January 2017.

What is the Climate Change?

- Carbon dioxide (CO_2), methane (CH_4) and water vapour (H_2O) are **greenhouse gases** that are found in the atmosphere.
- Energy travels from the Sun to the Earth as short wave radiation. It does not interact strongly with the greenhouse gas molecules so it reaches the Earth's surface.
- The Earth's surface emits long wavelength radiation which interact with the greenhouse gas molecules.
- The greenhouse gas molecules absorb some of the energy, trapping it in the atmosphere.
- This process keeps the Earth warm and is essential for life.
- The higher the proportion of greenhouse gases in the atmosphere, the more radiation is absorbed.
- This causes a rise in the temperature of the Earth and is known as the **greenhouse effect.**
- This increase in temperature drives **climate change.**

The Greenhouse Effect

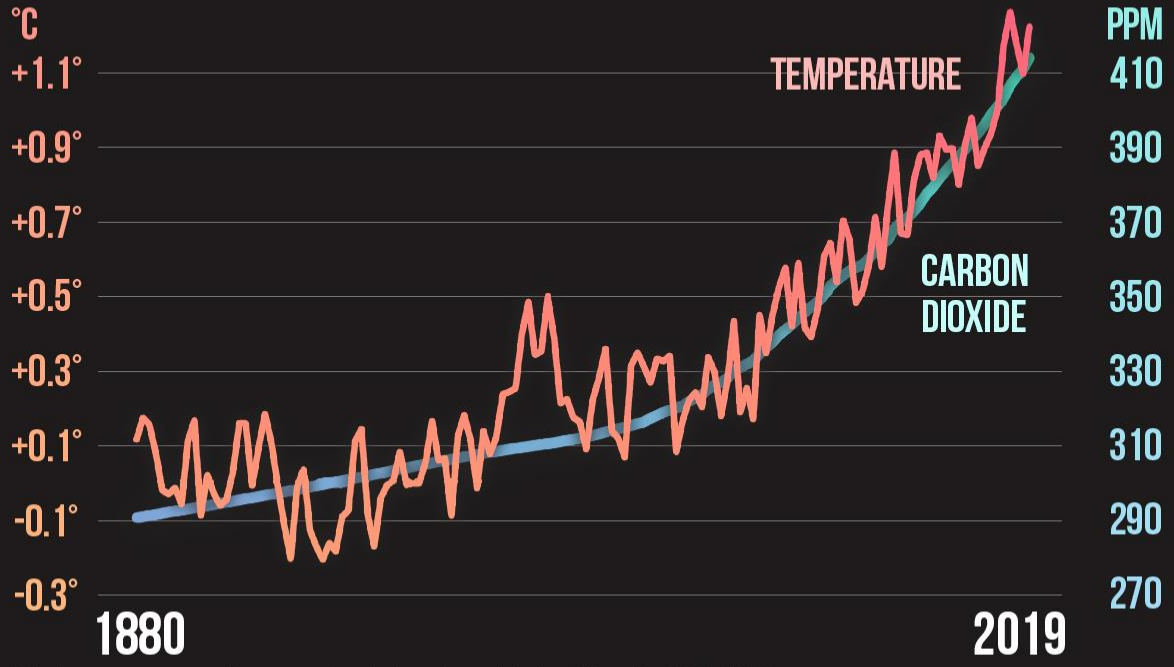
GLOBAL
TEMPERATURE & CARBON DIOXIDE



Global temperature anomalies averaged and adjusted to early industrial baseline (1881-1910)
Global annual average carbon dioxide
Source: NASA GISS, NOAA NCEI, ESRL

CLIMATE CENTRAL

GLOBAL TEMPERATURE & CARBON DIOXIDE



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CLIMATE CENTRAL