

Chapter 16 Climate



Climate is the characteristic weather of a region.

What is the difference between weather and climate?

The main difference is time.

Climate is determined by averaging the weather over a period of time.



Climate is what we expect, weather is what we get.

Factors that affect the climate include:

Latitude

Topography

Location of Lakes and Oceans

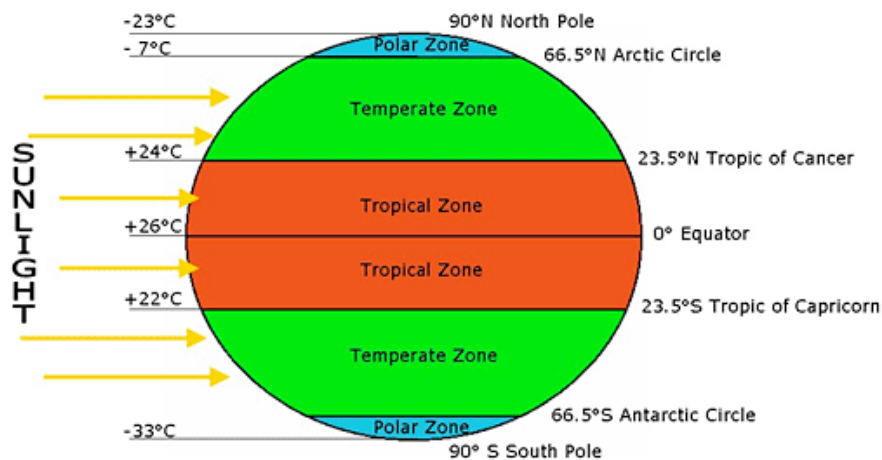
Amount of Moisture

Global Wind Patterns

Ocean Currents

Location of Air Masses

Latitude



Due to the curved surface of the Earth, different latitudes receive a different amount of radiation from the sun. The latitudes with the most radiation (Tropical) are warmer, while the least radiation are cold.

Mountains and Oceans, topographic features, affect climate.

Oceans: Sea and land breeze
(Water heats quicker and cools faster)

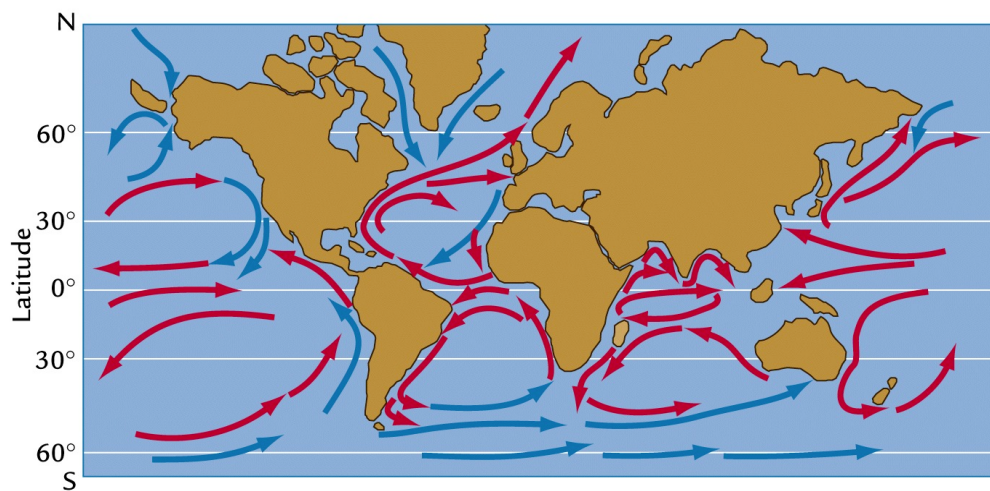
Some coastal cities are cooler in the summer and warmer in the winter.



"The coldest winter I ever spent was a summer in San Francisco." Mark Twain (not)

Warm ocean currents originate near equator, flow to higher latitudes and warm the areas they pass.

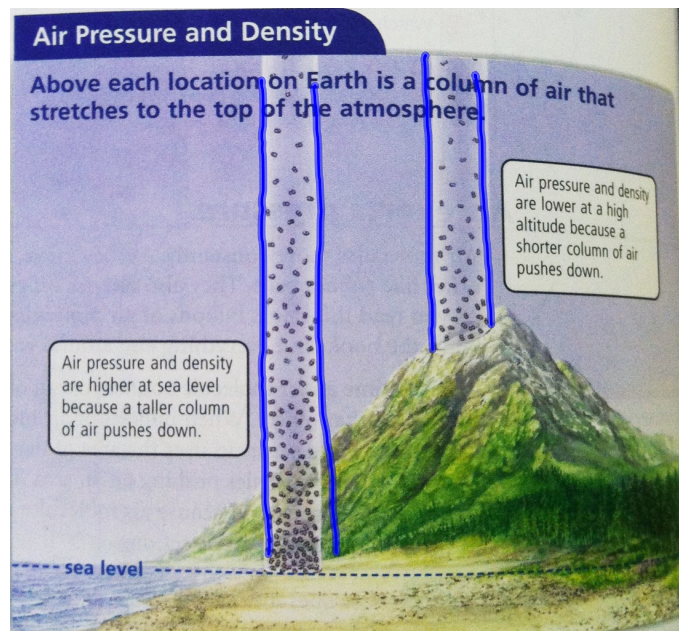
As the warm currents cool, they flow to lower latitudes and cool the area they pass.



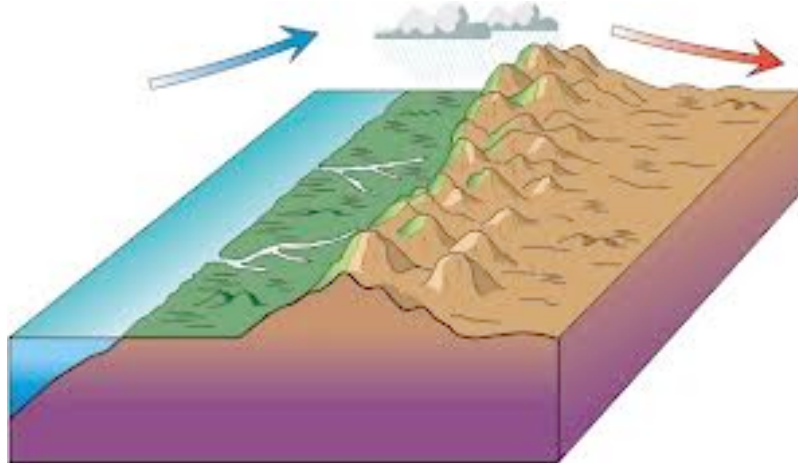
Winds blowing over oceans contain more moisture, thus cause wetter climates.



Climates are cooler in mountainous regions due to the higher altitudes inability to hold less air molecules



As the wind pushes up one side of the mountain, it cools and causes precipitation. When it descends to the other side, it heats up and dries the land causing deserts.



Cities affect climate

Cement and asphalt heat and radiate heat

Pollution traps air

Skyscrapers are similar to mountain barriers



Cities are typically 10 degrees warmer in the summer than surrounding areas

Based on what you learned, why is Las Vegas a desert?



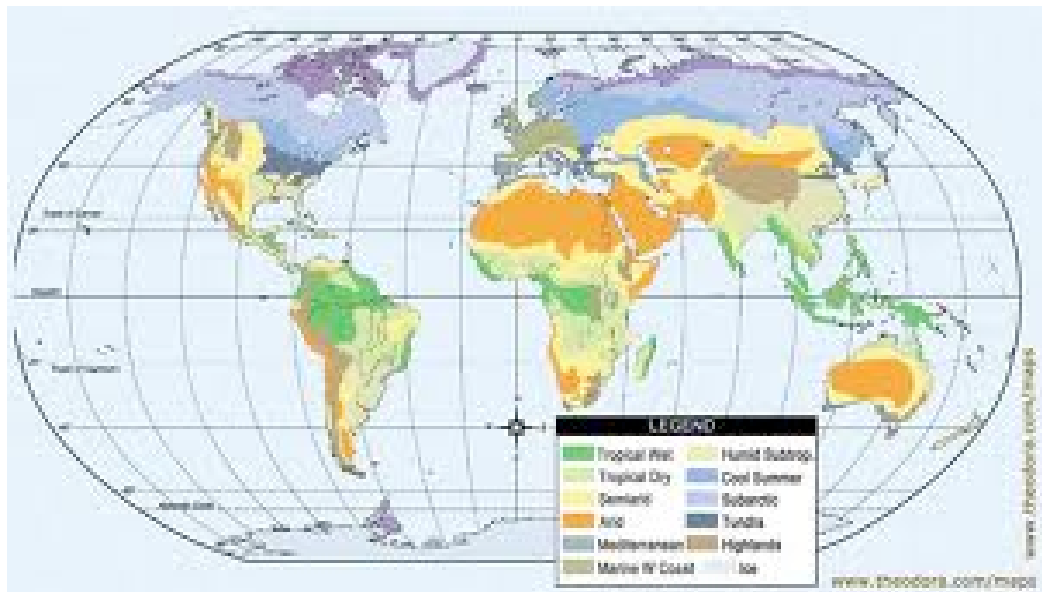
Based on what you learned, describe the climate in Venezuela ?



Writing Tracker

It is raining today - tell me why?

Hint: Think about the weather
(temperature and precipitation)
this week....



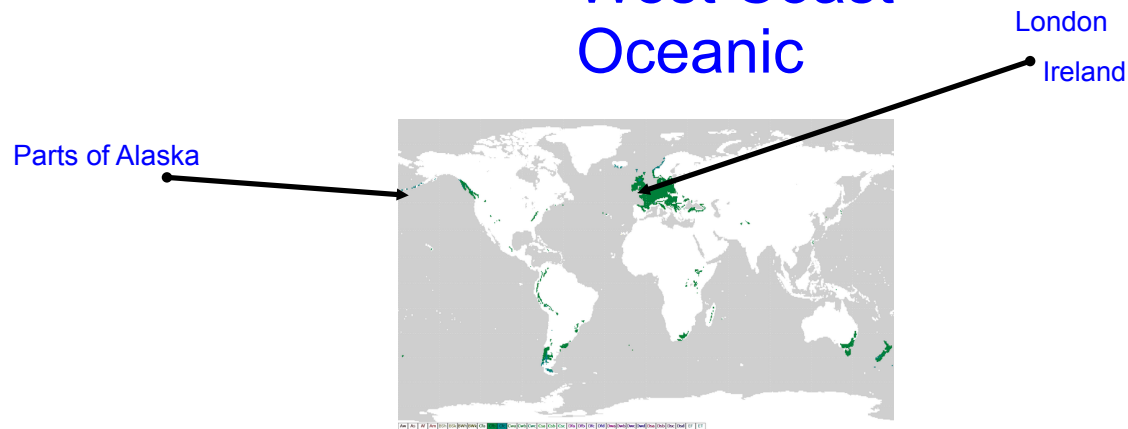
Supplemental Material
16.1 Climate

What is the difference between Maritime and Continental climates with regard to ocean currents?

Explain how interaction between ocean and atmosphere influence global and regional climates.

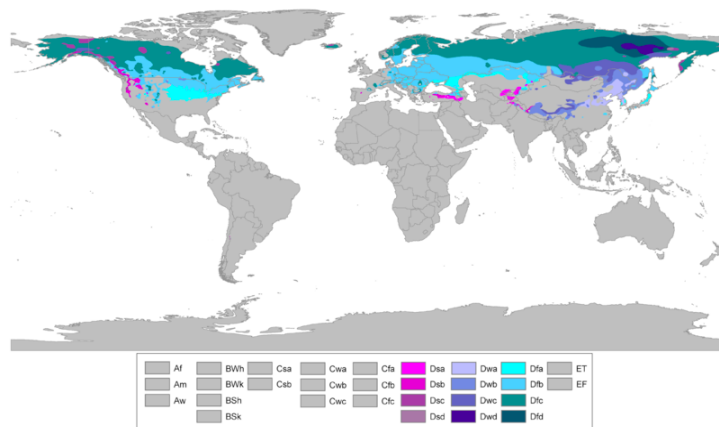
Maritime Climates

AKA: Marine
West Coast
Oceanic



Typically in middle latitudes
West coast of continents
Warm (not hot) summers
Cool (not cold) winters
Even precipitation

Continental Climates



Hot summers, rain

Cold winters, snow

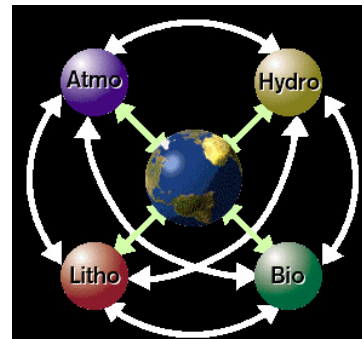
Found only in Northern Hemisphere

Why?

Caused by lack of water or ocean nearby.

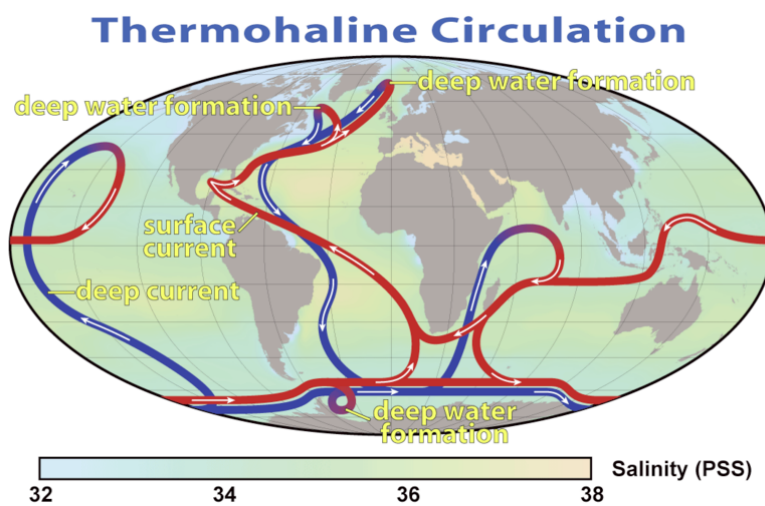
Interaction between Ocean and Atmosphere

- ✓ Ocean Currents cause heat transfer
- ✓ Evaporation
- ✓ Precipitin
- ✓ Climate Zones
 - Thermohaline Circulation
 - Boundary Currents
 - CO₂ Reservoir



Remember our Earth Systems?

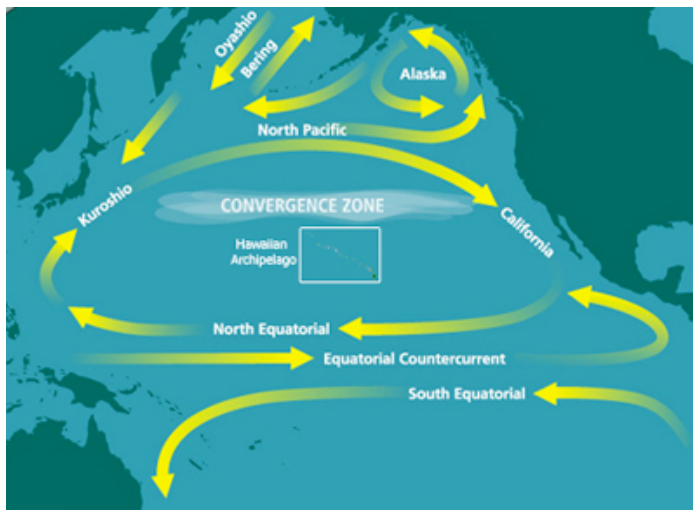
Thermohaline Circulation (THC)
AKA: Great Ocean Conveyor



thermo - Temperature
-haline Salt

Movement of current due to temperature and salinity (amount of salt in water)

Boundary Currents



Two Types:
Western
Eastern

Ocean currents that are affected by the coastline.

Chapter 16

Text Pages 452-457

ENRICHMENT

• What Is Climate?

Compare the Climate

You know that latitude is one of the most important factors that affects climate. The tropical climate in places near the equator is very different from the temperate climate of the United States.

Most places near the equator have about the same weather all year. Warm, moist air masses bring hot weather, high humidity, and daily rains to these tropical areas. Temperatures hardly vary from the average of 26°C. Annual rainfall is usually at least 150 centimeters. A great variety of trees grow in the wet conditions of the tropical rain forests. Many grow as tall as 60 meters and form a dense canopy. The ground is dark and shady with little undergrowth. Dense impenetrable jungle with thick undergrowth is found only along riverbanks and

other places where the sun reaches. Vast areas of rain forests have been cleared for timber, agriculture, and mining.

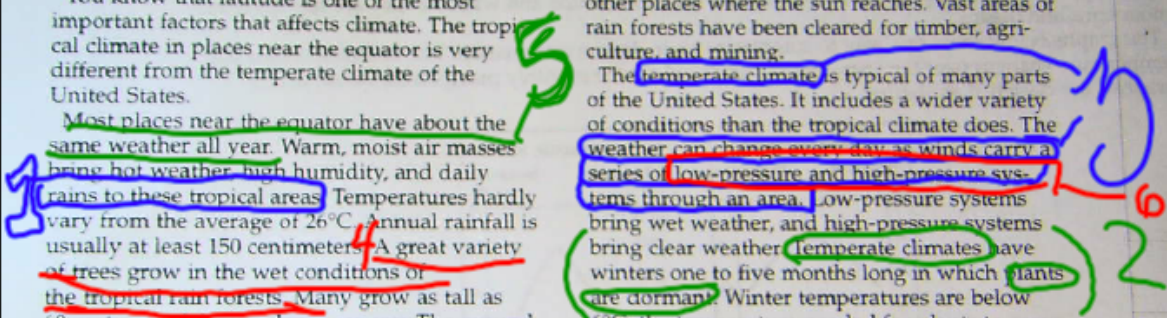
The temperate climate is typical of many parts of the United States. It includes a wider variety of conditions than the tropical climate does. The weather can change every day as winds carry a series of low-pressure and high-pressure systems through an area. Low-pressure systems bring wet weather, and high-pressure systems bring clear weather. Temperate climates have winters one to five months long in which plants are dormant. Winter temperatures are below 6°C, the temperature needed for plants to grow. Temperate regions cover only 7 percent of the world's land, but more than 40 percent of Earth's people live in them.

Identify in the space that follows which climate you are living in if you observe the conditions described in each sentence below. Tell how you know.

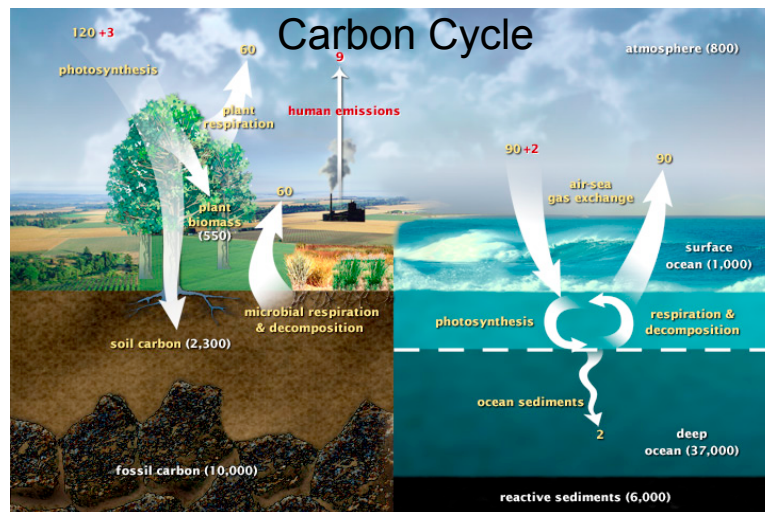
1. It rains hard here every afternoon. _____

2. There are no leaves on the trees and the plants in the garden look dead. _____

3. If you don't like the weather, wait a day or two and it will change. _____



The Ocean is Major CO₂ Reservoir



The ocean absorbs a substantial amount of carbon.

Writing Tracker

Pick one of the following:

A) What is the difference between Maritime and Continental climates with regard to ocean currents?

B) Explain how interaction between ocean and atmosphere influence global and regional climates.



A change in the distribution of weather patterns. It may be a change in average weather conditions, or result in more or fewer extreme weather events.



This change is over periods ranging from decades to millions of years. It can be catastrophic or gradual.

Climate Change
is a result of

Human Interaction or Natural Occurrences

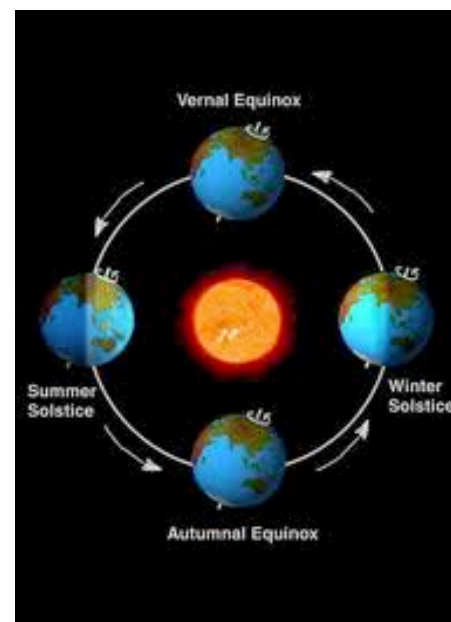
Global Warming

- Seasons
- El Nino

Catastrophic Events

Seasons are short term climate changes
Occur due to changes in the amount of
solar radiation (sunlight) an area receives

Caused by variations in
daylight
temperature
weather patterns



El Nino- Southern Oscillation:

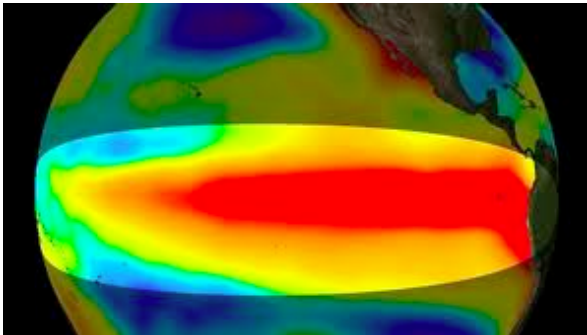
Climate event, not a storm

Quasi periodic: recurrences but unpredictability

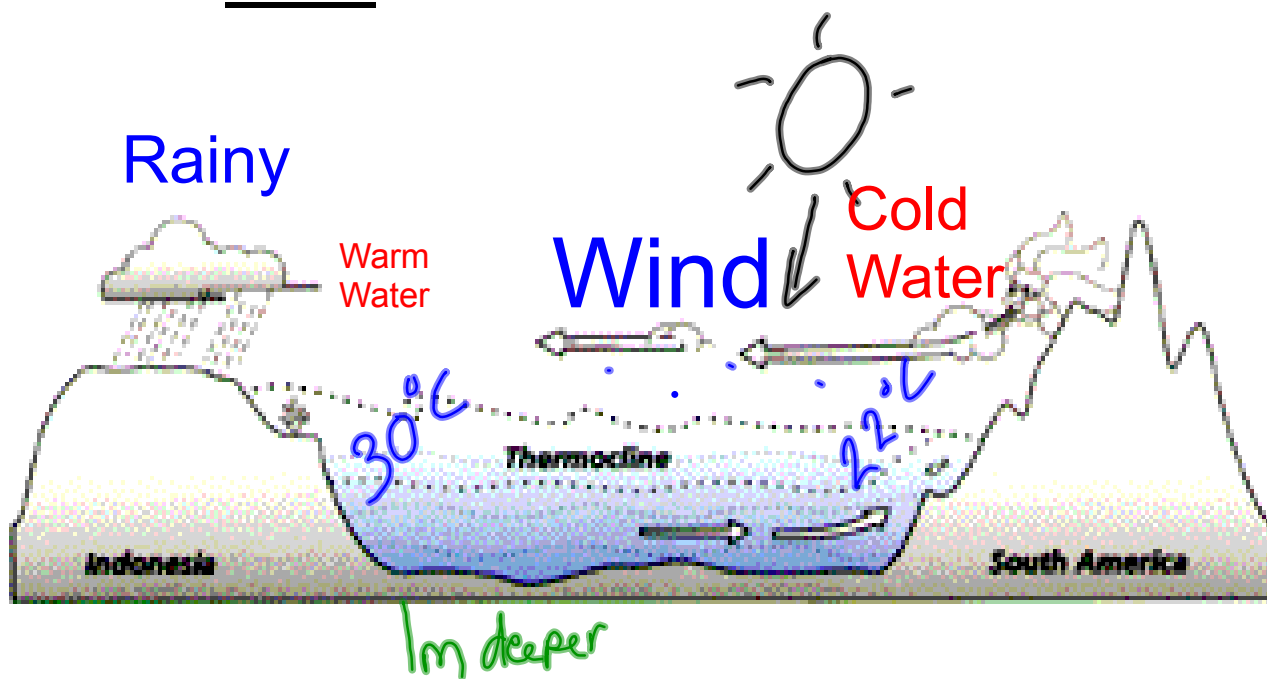
Occurs about every 5 years

Starts in the Tropical Pacific Ocean

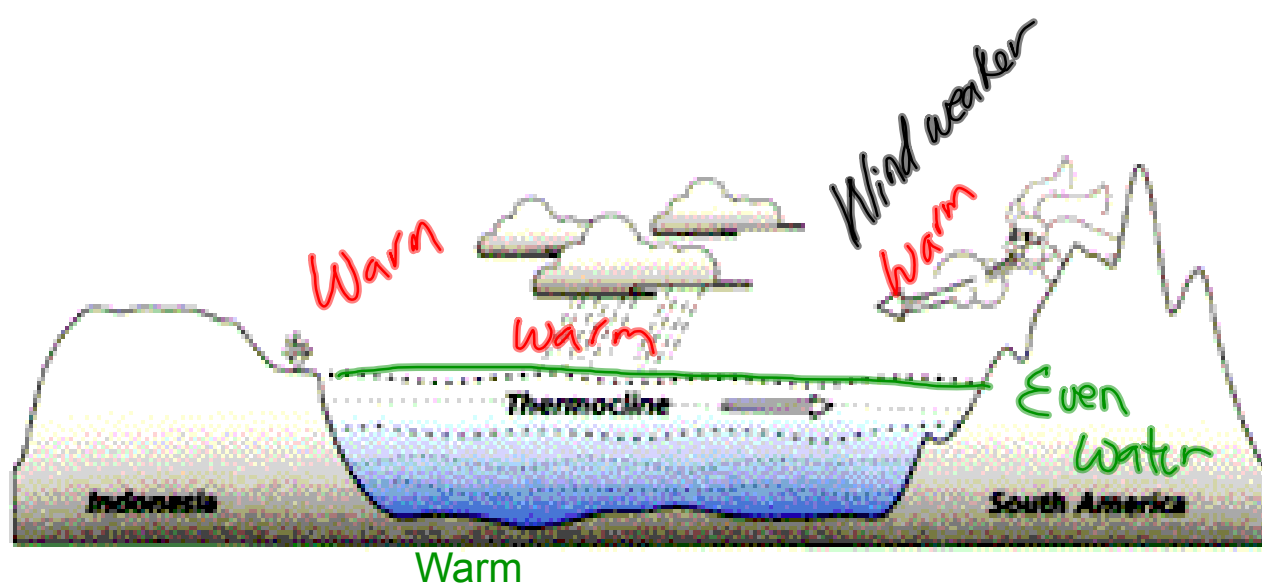
Is a see-saw pattern of high and low pressure due to temperature.



Non El Nino Conditions



El Nino Conditions



Western Indonesia



Tropical Rainforest



Drought

Eastern

South America
Peru



Desert



Flood



Catastrophic Events

Meteorite



dust and smoke

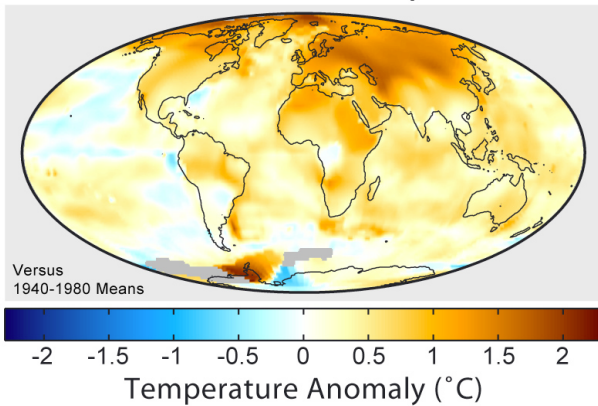


Volcano

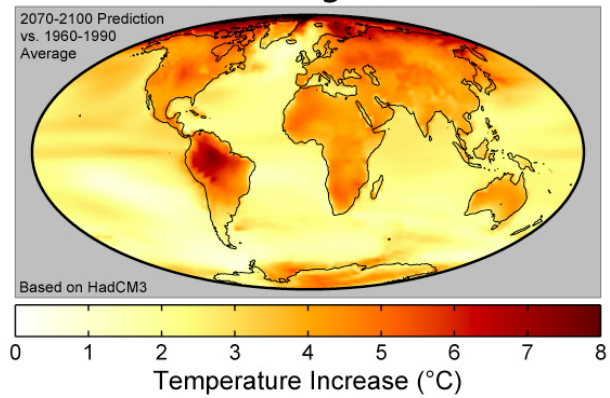
A significant climate change could be the result of meteorite, volcanic eruptions and changes in the amount of sunlight.

Global Warming

1999-2008 Mean Temperatures

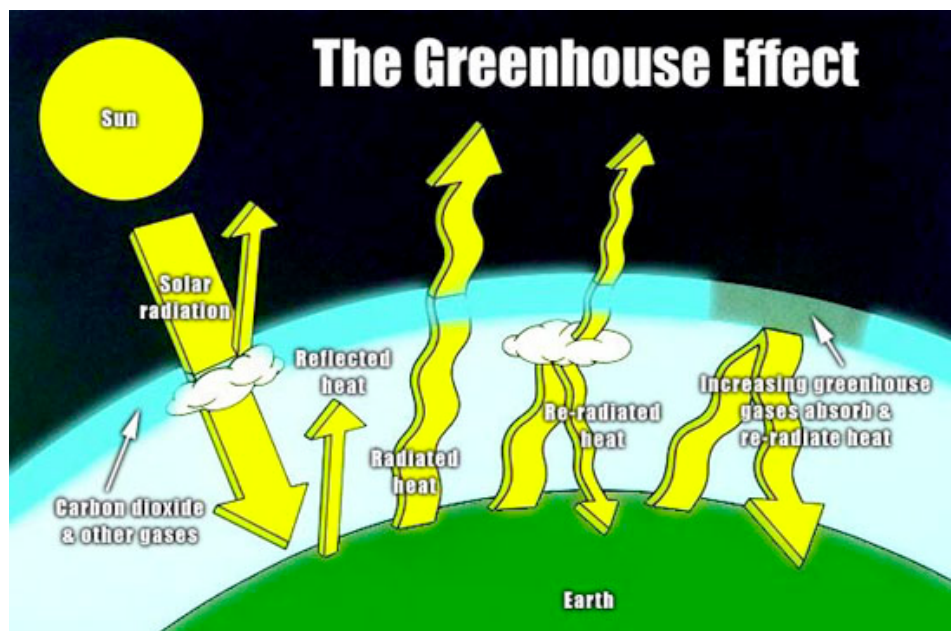


Global Warming Predictions



The concentration of greenhouse gasses has contributed to a rise in average global atmospheric **temperature**.

Greenhouse Effect



The natural heating caused by gases in the atmosphere trapping heat

Global Warming is caused from Global Warming

Greenhouse Gases

