

Natural Climate Change



Essential Standard 2.6

Analyze patterns of global climate change over time.

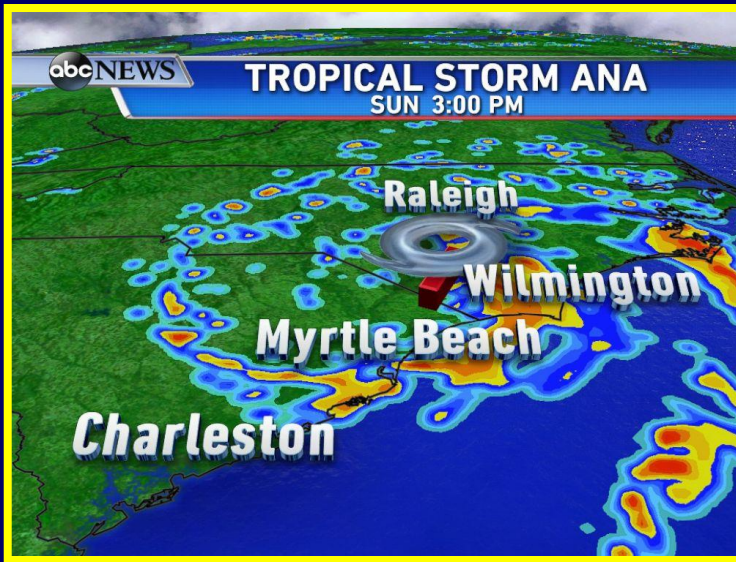
Learning Objective 2.6.1

Differentiate between weather and climate.

Learning Objective 2.6.2

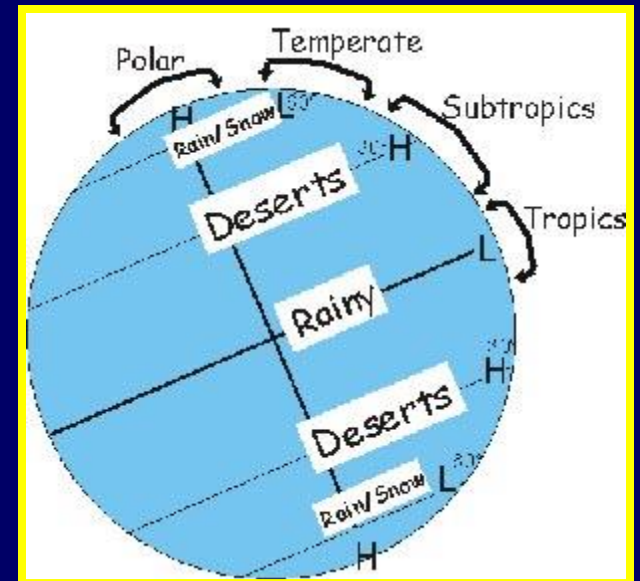
Explain changes in global climate due to natural processes.

Weather Vs. Climate



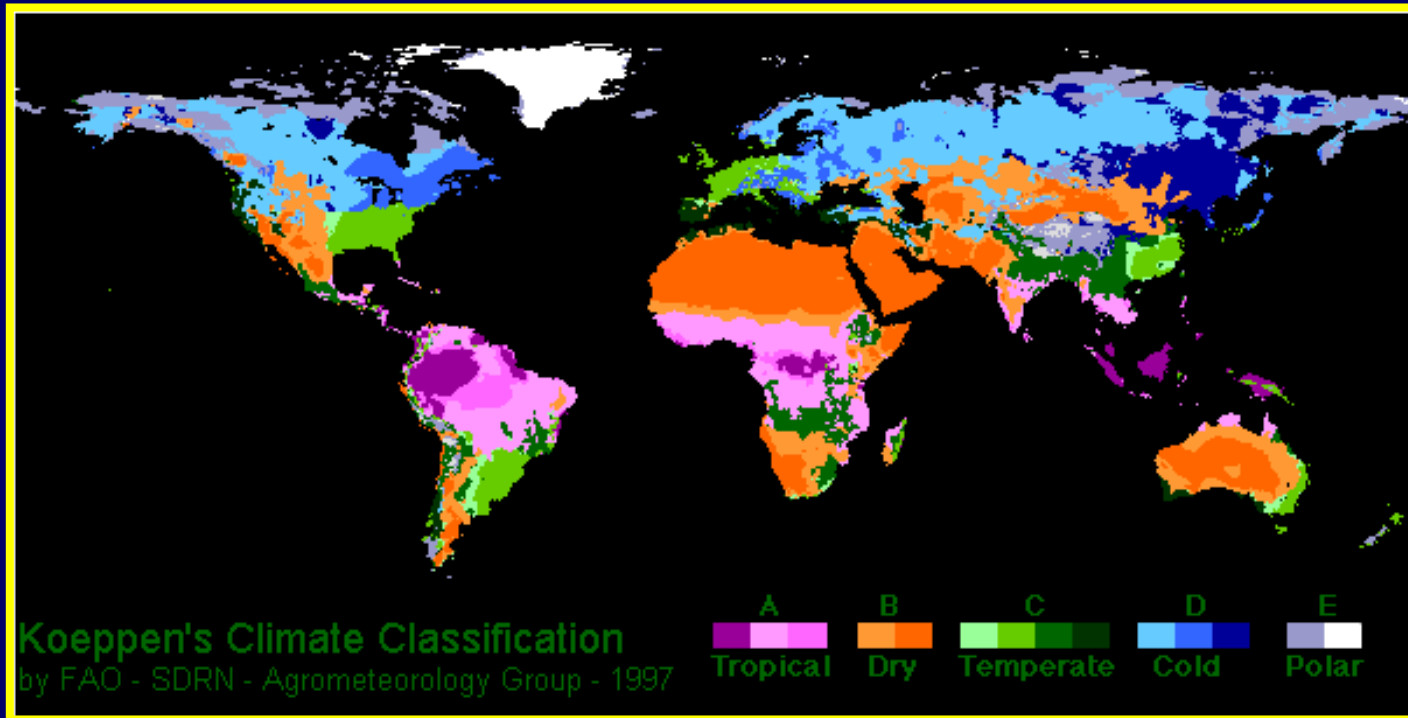
Weather is the current state of the atmosphere.

Climate refers to long-term weather patterns for a particular area over the course of 30 years or more.



Koepfen Classification System

The Koepfen Classification System uses precipitation and temperature to classify climates.



Koeppen Classification System

Tropical climates have consistently high temperatures and abundant rainfall.



Dry climates have low amounts of rainfall and can be arid, deserts, or semi-arid, steppes.

Koeppen Classification System

Temperate climates have four distinct seasons without extreme variations in temperature.



Koeppen Classification System



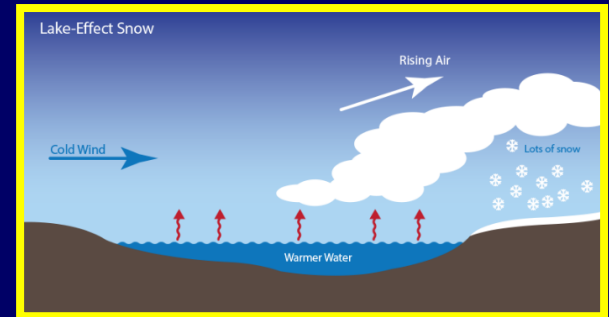
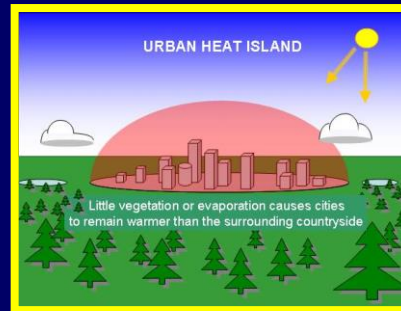
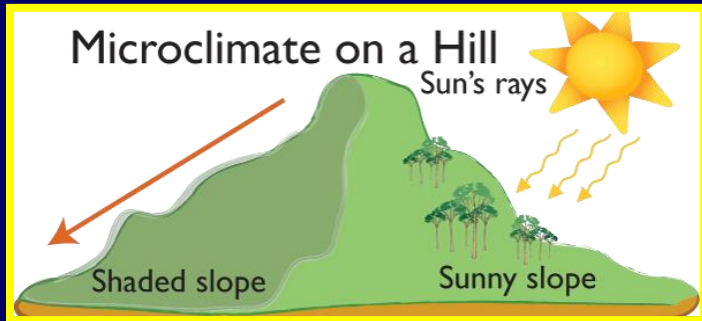
Cold climates experience rapid and extreme changes in temperatures with short summers and long winters.

Polar climates are the coldest regions on Earth with very little precipitation.



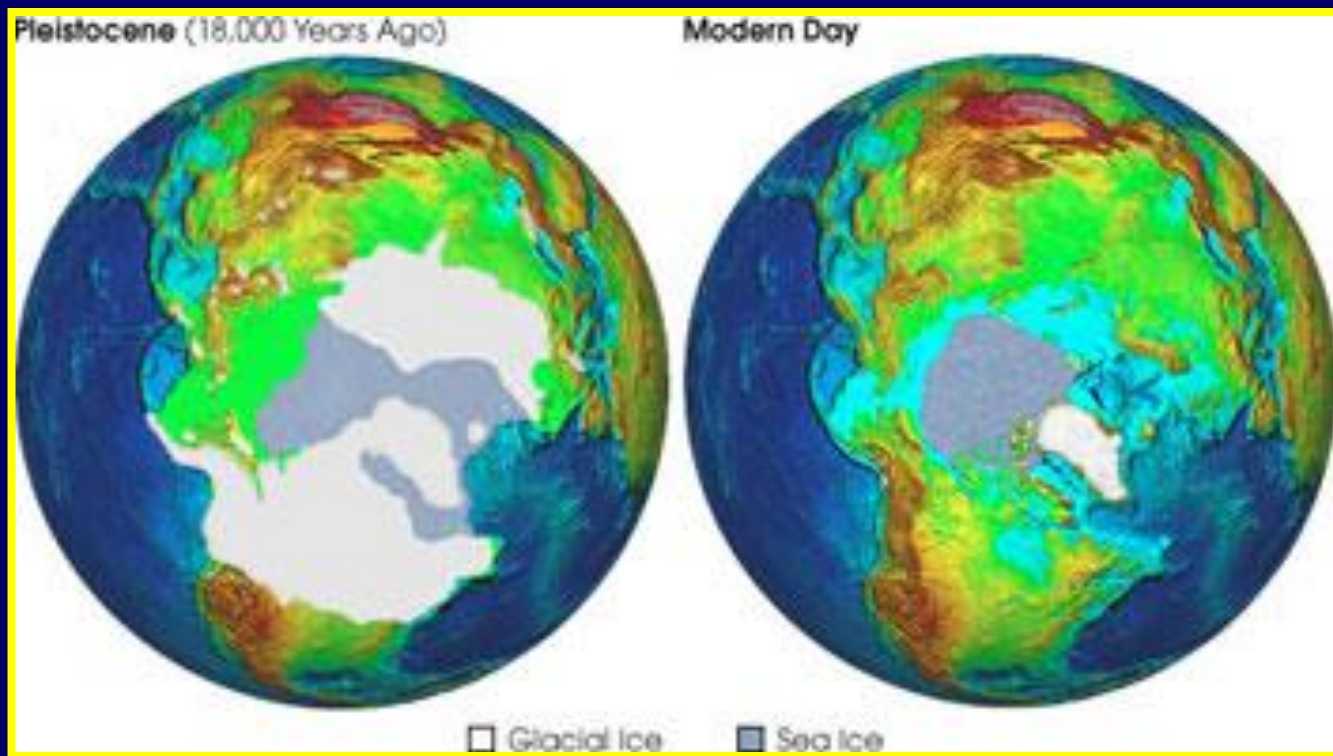
Microclimates

A localized climate that differs from the main regional climate is called a microclimate.



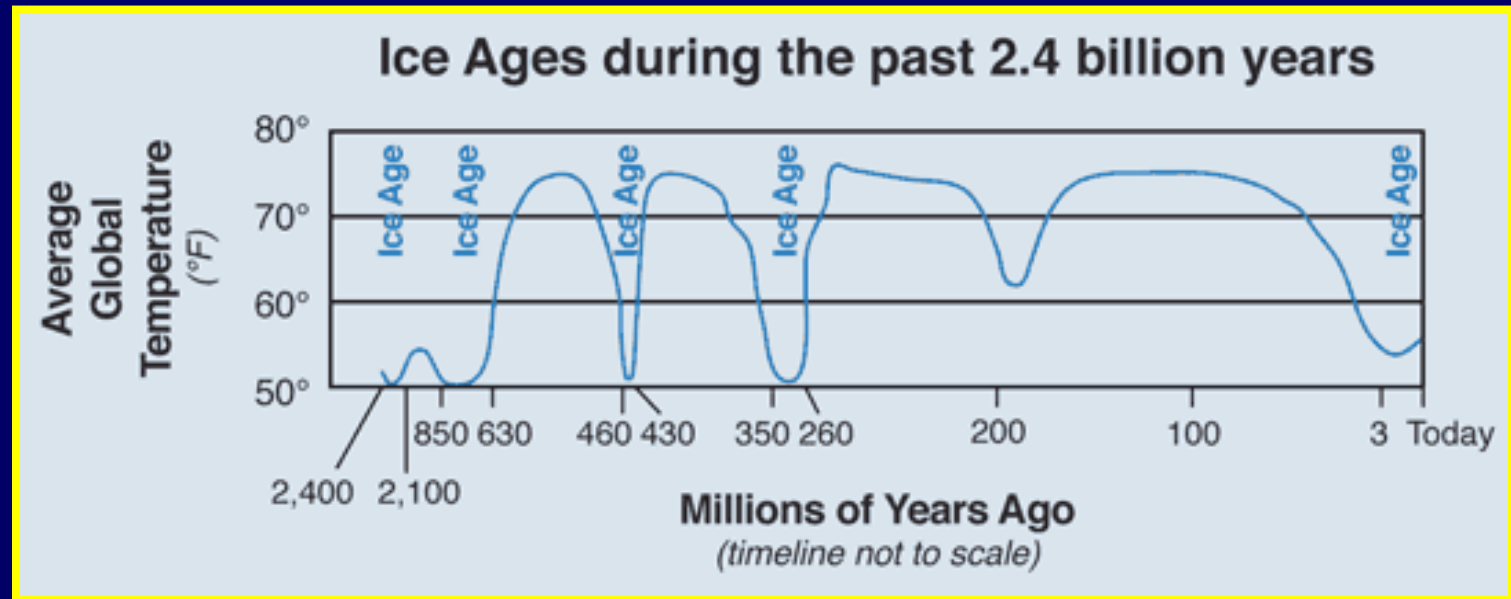
Natural Causes of Climatic Changes

Throughout Earth's history, studies show that climates have always been and currently are in a constant state of change.



Ice Ages

Over the past 2.5 billions years, several ice ages have occurred.



During periods of extensive glacier coverage, called ice ages, global temperatures have decreased by 5°C.

Cause of Ice Ages

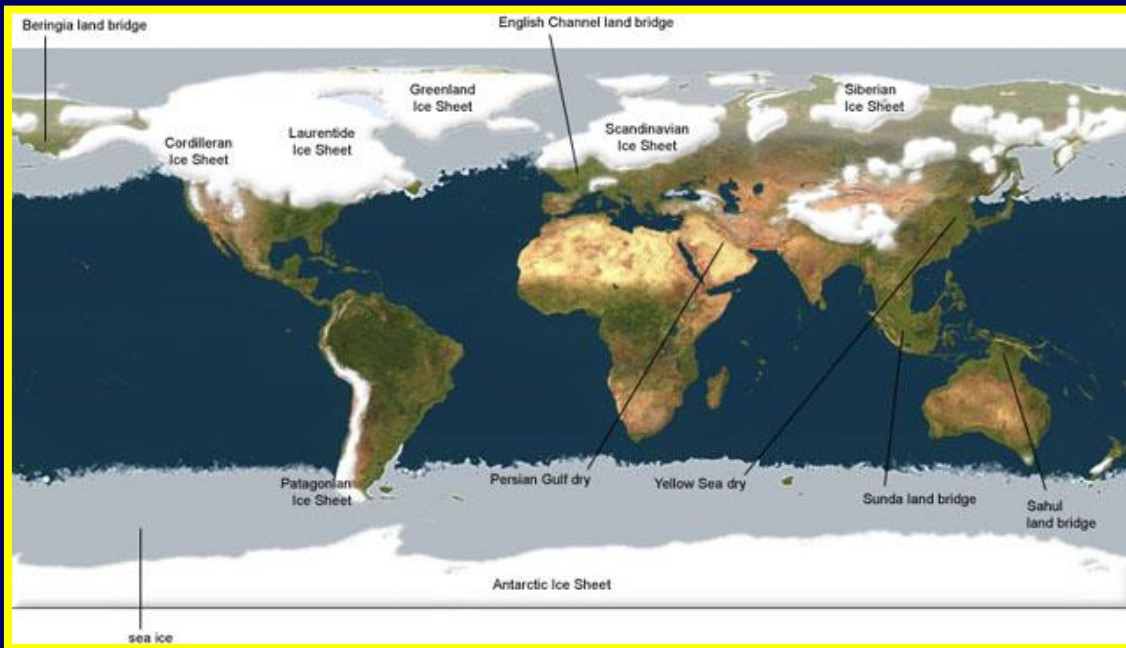
Plate tectonics plays a role because the location of continents affect global circulation of ocean currents that help balance heat around the globe.



The last ice age occurred right after plate tectonics helped to form the land bridge between North America and South America, resulting in shifting ocean currents.

Last Glacial Retreat

The most recent large glacial retreat occurred about 10,000 years ago.

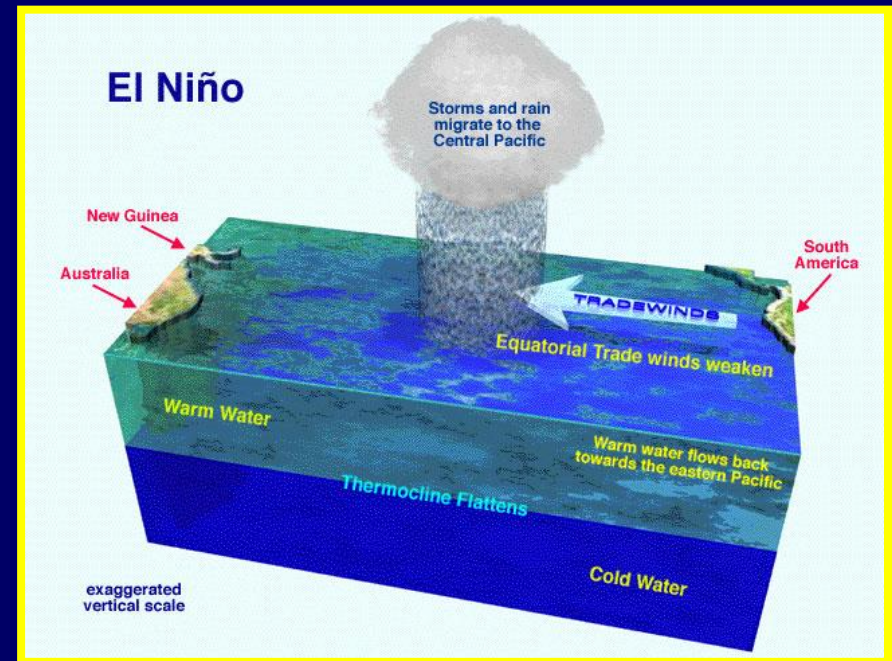
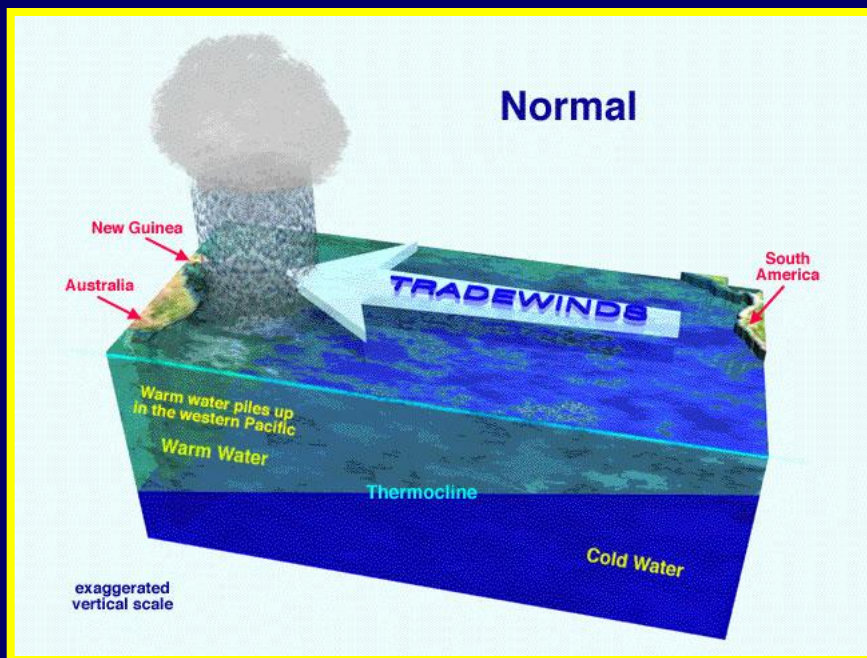


Glaciers used to cover large portions of North America, Europe, and Asia.

The Great Lakes and Niagara Falls were formed as these glaciers retreated.

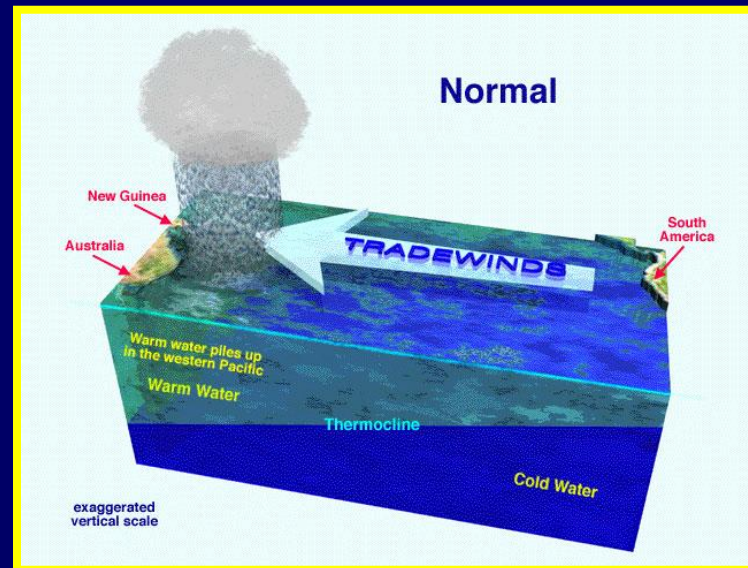
El Nino

El Nino is a change in wind patterns and surface currents that occurs in the Pacific Ocean and affects weather patterns around the globe.



Normal Conditions

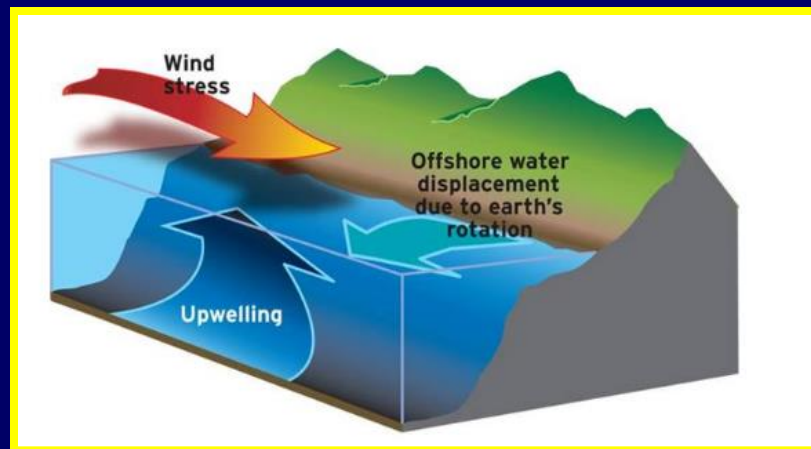
Normally, the Trade Winds push warm surface water from South America towards Indonesia and Australia.



The warm water generates warm, moist air and creates tropical rainforests in Indonesia and Australia.

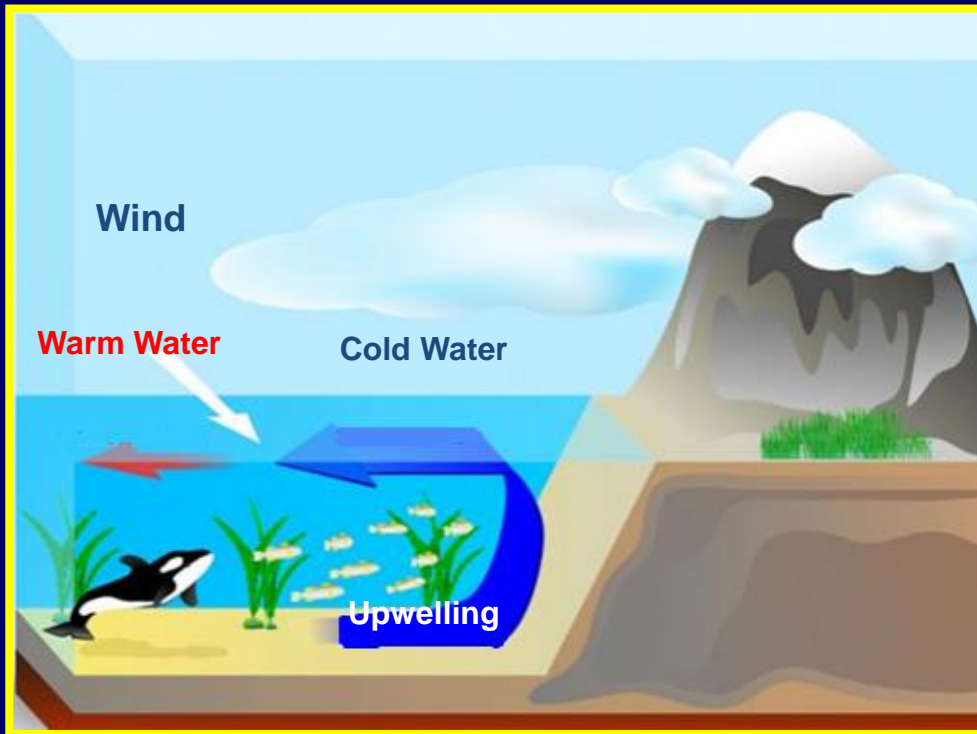
Normal Conditions

As the warm surface currents are pushed westward, cold water current from deeper down in the ocean, rises up to the surface to replace them, on the eastern side of the Pacific Ocean, in a process called upwelling.



Normal Conditions

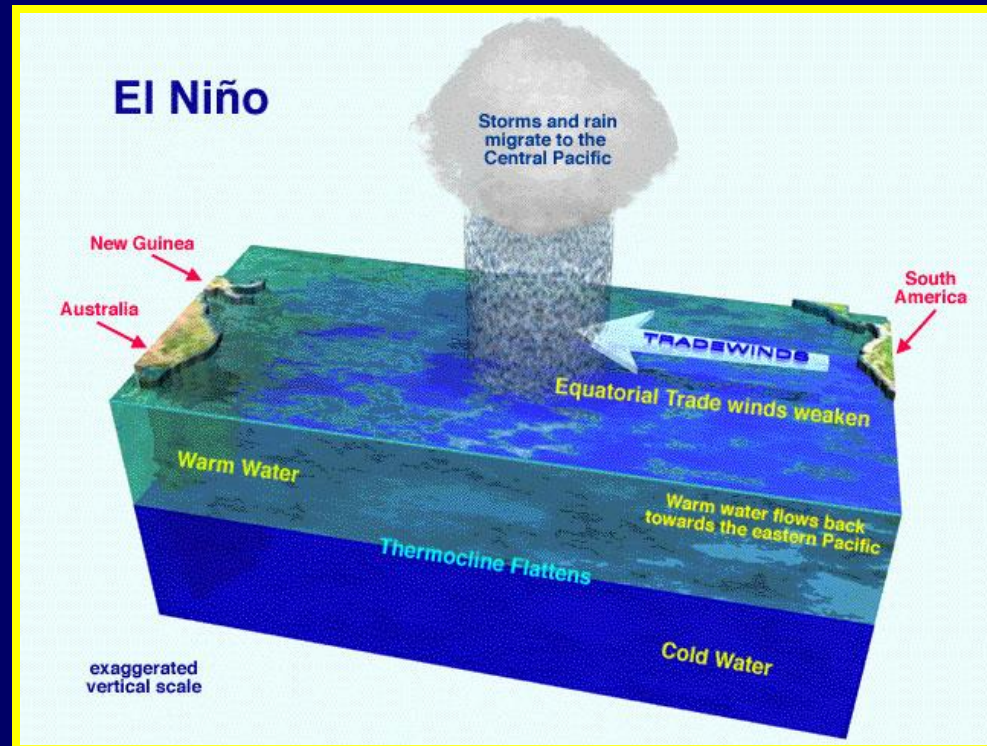
As animals eat or excrete waste, the left-over materials float down to the bottom of the ocean, making the deep ocean currents very nutrient rich.



The cool, nutrient rich water that rises to the surface, during upwelling, supports very diverse, abundant fish populations off the coast of South America.

El Niño

During El Niño, the strength of the Trade Winds weaken, more the warm surface water remains on the eastern side and less cold water, from deep in the ocean, rises to the surface.



El Nino

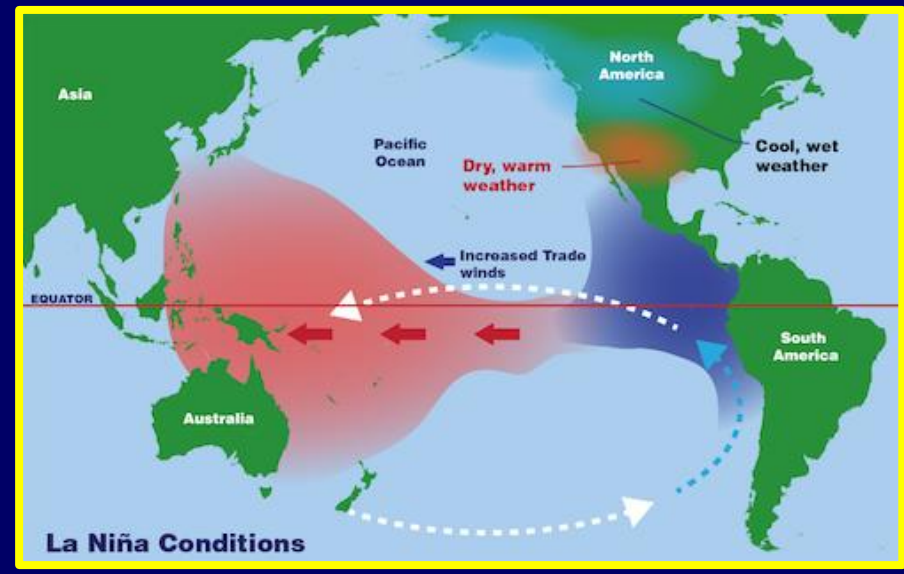
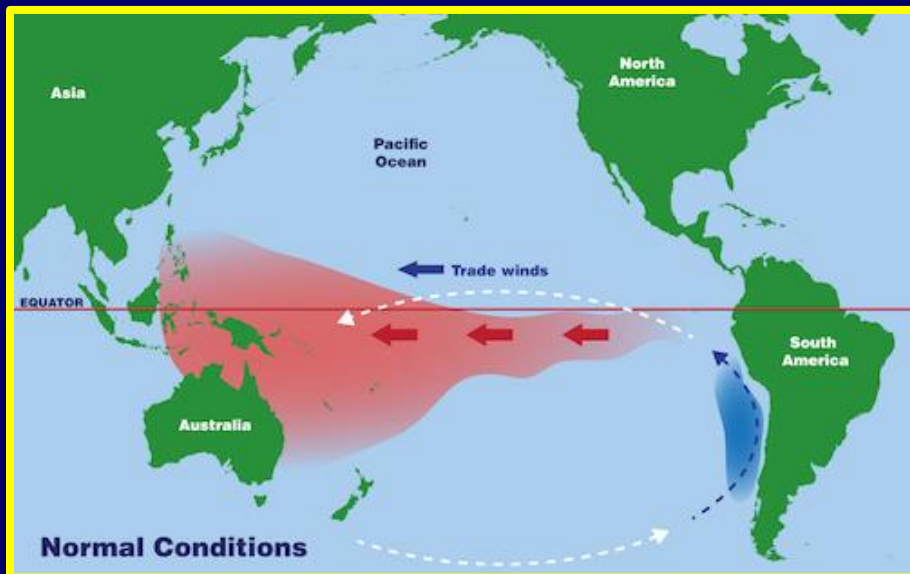
Not only does upwelling off the coast of South America stop, but the warm surface waters create lots of rain and flooding all along the coast of South America.



At the same time, Australia and Indonesia experience drought conditions and wildfires.

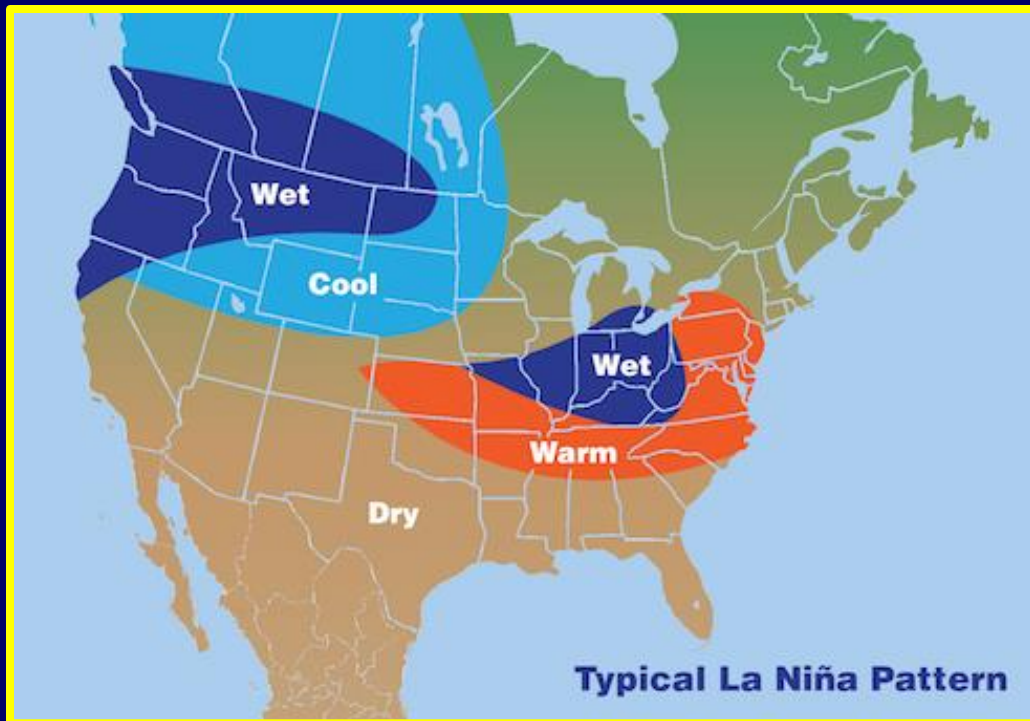
La Nina

La Nina is the cool phase of the ENSO climate and occurs when the trade winds are stronger than normal resulting in cooler ocean temperatures on the western side of the Pacific ocean.



La Nina

The cooler ocean temperatures result in less cloud formation and drier conditions on the west coast of the United States.

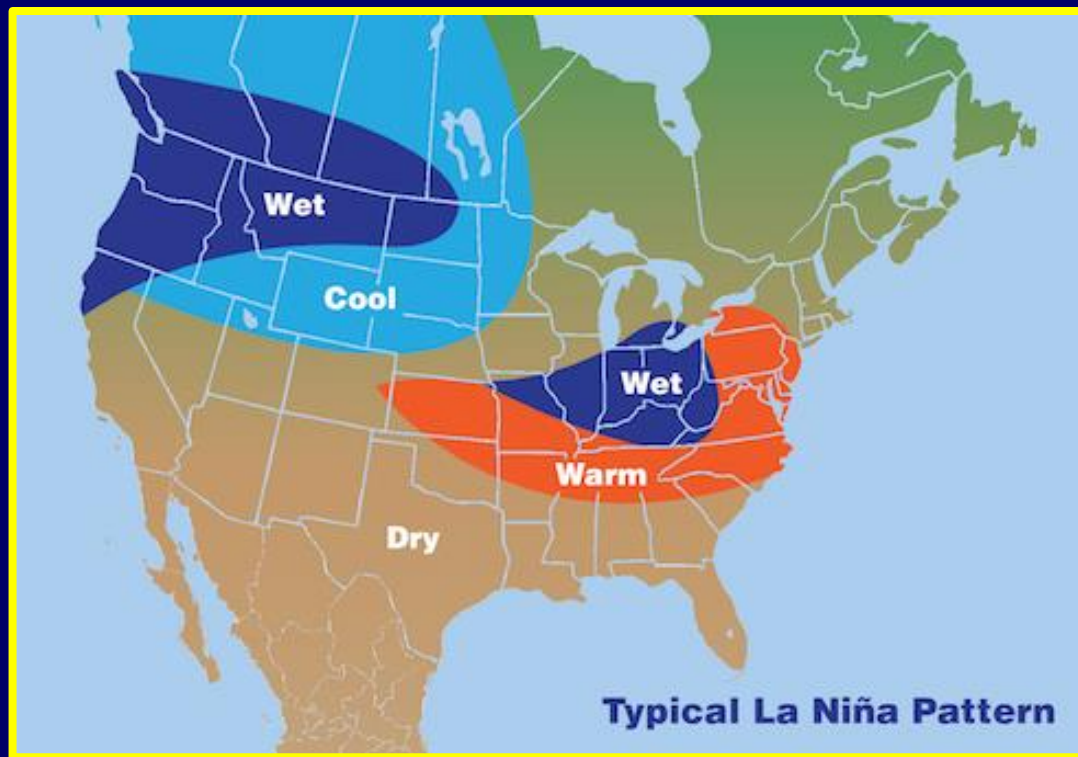


Drought

Wildfires

La Nina

On the east coast of the U.S., the weather is warmer than normal and result in more frequent hurricanes.



The End

