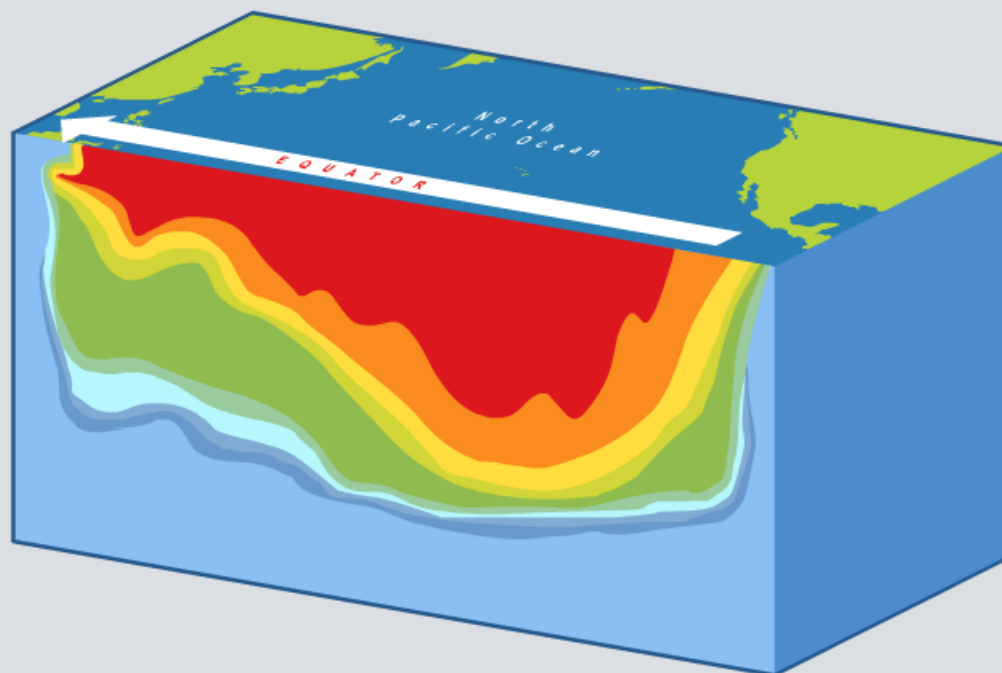


ENSO



What is ENSO?

ENSO stands for **El Niño Southern Oscillation**. It refers to all changes in water temperature and sea level air pressure in the Pacific Ocean.



Temperatures in the Pacific Ocean “**oscillate**,” or swing, between extremes. This cycle is the Earth’s way of maintaining a natural **equilibrium**, or balance, between these extremes.

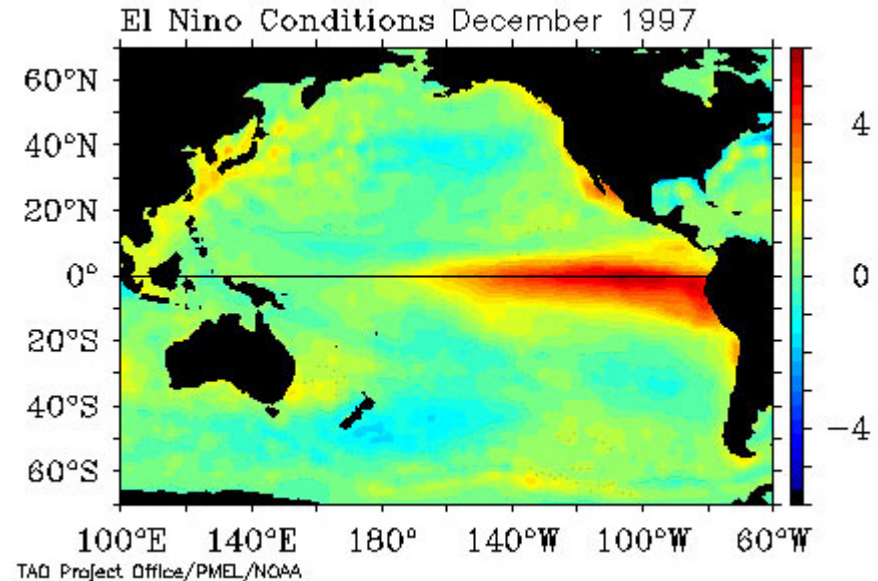
Changes in ocean surface temperature disrupt air currents and pressure systems, which can affect weather patterns around the world.



Normally, the Pacific is warm in the west and cool in the east. The ENSO cycle includes both **warming** and **cooling** events.

El Niño occurs when warm water built up in the west moves east, **warming** the surface waters of the Pacific.

La Niña is when cool water from the east moves west, **cooling** the surface waters of the Pacific.

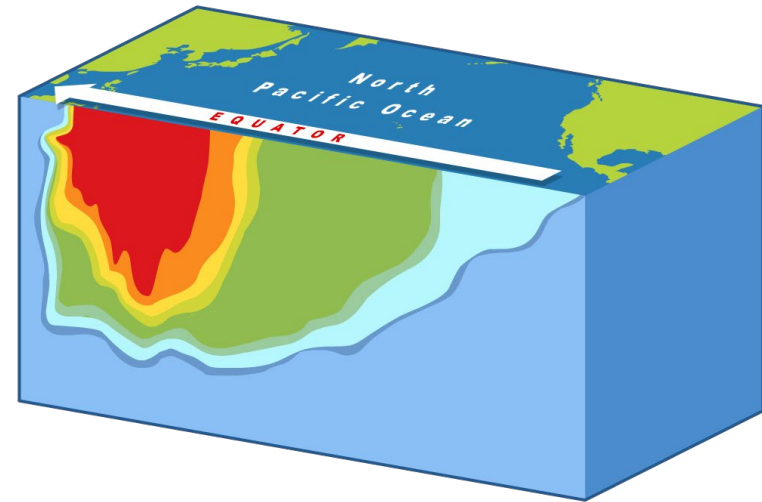


El Niño and La Niña are part of the Earth's way of maintaining temperature and pressure equilibrium in the Pacific Ocean.

Normally, strong Pacific winds move cool water from eastern equatorial regions to the west, where the water is warmer.

Because warm water takes up more space than cold, the western Pacific is usually about half a meter higher and 8°C warmer than it is in the east.

Scientists define ocean temperature differences with an imaginary line called a **thermocline**, which marks the divide between warm upper ocean layers and the cold, deeper water below.

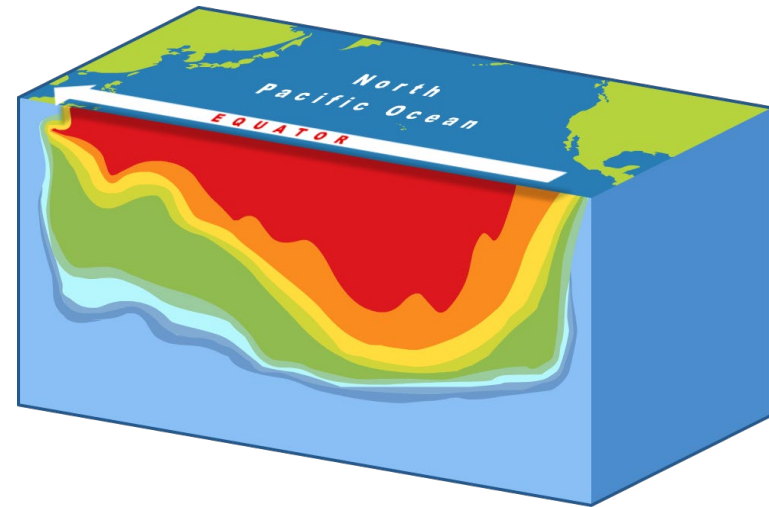


Under normal conditions, the thermocline is deep in the western Pacific and shallow in the east.



During an El Niño event, the westerly winds weaken, allowing warm water to move east, heating the surface waters off the coast of the Americas.

The thermocline flattens as surface temperatures grow warmer across the Pacific. Upwelling no longer brings cold water to the surface. These temperature changes disrupt normal air and ocean currents.



El Niño ends when the Earth's rotation naturally moves water away from the equator, bringing cold water closer to the surface and strengthening westerly winds once more.

Formation of El Niño



Changes in weather patterns

Warm ocean surface water adds heat and moisture to the air above it. This warm, moist air rises, producing areas of **low pressure** and thunderstorm activity.

Cold water cools the air above it. This cool, dry air sinks, creating **high-pressure** areas with no precipitation.



An El Niño event changes the distribution of warm and cold water in the Pacific, therefore changing the high and low pressure areas in the atmosphere. These changes influence the wind patterns, or **jet streams**, that affect the weather around the world.



The redistribution of high and low pressure systems caused by an El Niño event can result in significant changes in global weather.

In general, El Niño causes **increased precipitation** in western South America, Central America, and the southern United States.

Temperatures are higher and precipitation is lower in the northern United States and Canada.

There is **below average precipitation** in Africa, Asia and Australia, which can result in serious droughts.



Peru and its neighbors often receive the first and worst effects of El Niño. Increased precipitation causes flooding and landslides, which can destroy entire villages. Disruptions in the upwelling of deep, nutrient-rich water kills the anchovies that are a major staple of the Peruvian economy.



1982-3 saw one of the worst El Niños on record. Major floods and landslides swept the western coast of the Americas, while droughts led to loss of crops and even famine in Africa, India, Asia and Australia.



Fill in the blanks



Stages of El Niño

