

Encyclopedic Entry

La Niña

El Niño-Southern Oscillation (ENSO)

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La Niña is a [climate](#) pattern that describes the cooling of surface ocean waters along the [tropical](#) west coast of South America. [La Niña](#) is considered to be the counterpart to [El Niño](#), which is [characterized](#) by unusually warm ocean temperatures in the [equatorial](#) region of the Pacific Ocean.

Together, La Niña and El Niño are the "cold" (La Niña) and "warm" (El Niño) phases of the [El Niño-Southern Oscillation \(ENSO\)](#). ENSO is series of linked [weather](#)- and ocean-related [phenomena](#). Besides unusually warm or cool sea-surface temperatures, ENSO is also characterized by changes in [atmospheric pressure](#).

La Niña events sometimes follow El Niño events, which occur at irregular intervals of about two to seven years. The local effects on weather caused by La Niña ("little girl" in Spanish) are generally the opposite of those associated with El Niño ("little boy" in Spanish). For this reason, La Niña is also called anti-El Niño and El Viejo (the old man in Spanish).

Scientists use the [Oceanic Niño Index](#) to measure the deviations from normal sea-surface temperatures that El Niño and La Niña produce in the [east-central Pacific Ocean](#). La Niña events are indicated by sea-surface temperature decreases of more than .5 degrees Celsius (.9 degrees Fahrenheit) for at least five successive three-month seasons.

La Niña is caused by a build-up of cooler-than-normal waters in the tropical Pacific, the area of the Pacific Ocean between the Tropic of Cancer and the Tropic of Capricorn. Unusually strong, eastward-moving [trade winds](#) and ocean [currents](#) bring this cold water to the surface, a process known as upwelling.

[Upwelling](#) can cause a drastic drop in sea-surface temperature. Coastal sea-surface temperatures near Ecuador and Peru dropped nearly 4 degrees Celsius (7 degrees Fahrenheit) during the 1988-89 La Niña event.

Effects of La Niña

Both El Niño and La Niña affect patterns of rainfall, atmospheric pressure, and global atmospheric circulation. [Atmospheric circulation](#) is the large-scale movement of air that, together with ocean currents, distributes [thermal energy](#) on the surface of the Earth. These changes are the main sources of variability in climate for many areas worldwide.

La Niña is characterized by lower-than-normal air pressure over the western Pacific. These low-pressure zones contribute to increased rainfall.

Rainfall associated with the summer [monsoon](#) in Southeast Asia tends to be greater than normal, especially in northwest India and Bangladesh. This generally benefits the Indian [economy](#), which depends on the monsoon for [agriculture](#) and [industry](#).

However, strong La Niña events are associated with [catastrophic floods](#) in northern Australia. The 2010 La Niña event [correlates](#) with one of the worst floods in the history of Queensland, Australia. More than 10,000 people were forced to [evacuate](#), and damage from the disaster was estimated at more than \$2 billion.

La Niña events are also associated with rainier-than-normal conditions are over southeastern Africa and northern Brazil.

La Niña is also characterized by higher-than-normal pressure over the central and eastern Pacific. This results in decreased [cloud](#) production and rainfall in that region. Drier-than-normal conditions are observed along the west coast of tropical South America, the Gulf Coast of the United States, and the pampas region of southern South America.

La Niña usually has a positive impact on the fishing industry of western South America. Upwelling brings cold, [nutrient-rich](#) waters to the surface. Nutrients include plankton eaten by fish and [crustaceans](#). Higher-level [predators](#), including high-value fish species such as sea bass, prey on the crustaceans.

La Niña events may last between one and three years, unlike El Niño, which usually lasts no more than a year. Both phenomena tend to peak during the Northern Hemisphere winter.

Monitoring La Niña

Scientists collect data about El Niño and La Niña using a number of technologies. The [National Oceanic and Atmospheric Administration \(NOAA\)](#), for instance, operates a network of buoys which measure sea-surface temperature, air temperature, currents, winds, and [humidity](#). The buoys are located in about 70 locations, from the Galapagos Islands to Australia. These buoys transmit data to researchers and [meteorologists](#) every day.

Using buoy [data](#) in [conjunction](#) with visual information they receive from [satellites](#), scientists are able to more accurately predict ENSO and visualize its development and impact around the globe.

VOCABULARY

Term	Part of Speech	Definition
abundant	<i>adjective</i>	in large amounts.
agriculture	<i>noun</i>	the art and science of cultivating the land for growing crops (farming) or raising livestock (ranching).
atmospheric circulation	<i>noun</i>	large-scale movement of air that helps distribute thermal energy (heat) on the surface of the Earth.
atmospheric pressure	<i>noun</i>	force per unit area exerted by the mass of the atmosphere as gravity pulls it to Earth.
buoy	<i>noun</i>	floating object anchored to the bottom of a body of water. Buoys are often equipped with signals.
catastrophic	<i>adjective</i>	very bad.
characterize	<i>verb</i>	to describe the characteristics of something.
climate	<i>noun</i>	all weather conditions for a given location over a period of time.
cloud	<i>noun</i>	visible mass of tiny water droplets or ice crystals in Earth's atmosphere.
conjunction	<i>noun</i>	combination of items, events, or ideas.
correlate	<i>verb</i>	to bring different sets of data into order, or establish a relationship or connection between them.
crustacean	<i>noun</i>	type of animal (an arthropod) with a hard shell and segmented body that usually lives in the water.
current	<i>noun</i>	steady, predictable flow of fluid within a larger body of that fluid.
data	<i>plural noun</i>	(singular: datum) information collected during a scientific study.

drastic	<i>adjective</i>	severe or extreme.
economy	<i>noun</i>	system of production, distribution, and consumption of goods and services.
El Nino	<i>noun</i>	irregular, recurring weather system that features a warm, eastern-flowing ocean current in the eastern Pacific Ocean.
El Nino-Southern Oscillation (ENSO)	<i>noun</i>	climate pattern in which coastal waters become warmer in the eastern tropical Pacific (El Nio), and atmospheric pressure decreases at the ocean surface in the western tropical Pacific (Southern Oscillation).
equatorial	<i>adjective</i>	having to do with the equator or the area around the equator.
evacuate	<i>verb</i>	to leave or remove from a dangerous place.
flood	<i>noun</i>	overflow of a body of water onto land.
humidity	<i>noun</i>	amount of water vapor in the air.
indicate	<i>verb</i>	to display or show.
industry	<i>noun</i>	activity that produces goods and services.
La Nina	<i>noun</i>	weather system that includes cool ocean temperatures in the eastern Pacific Ocean.
meteorologist	<i>noun</i>	person who studies patterns and changes in Earth's atmosphere.
monsoon	<i>noun</i>	seasonal change in the direction of the prevailing winds of a region. Monsoon usually refers to the winds of the Indian Ocean and South Asia, which often bring heavy rains.
National Oceanic and Atmospheric Administration (NOAA)	<i>noun</i>	U.S. Department of Commerce agency whose mission is to "understand and predict changes in climate, weather, oceans, and coasts; to share that knowledge and information with others, and; to conserve and manage coastal and marine ecosystems and resources."
nutrient	<i>noun</i>	substance an organism needs for energy, growth, and life.
Oceanic Nino Index	<i>noun</i>	set of data used by scientists to measure the differences in normal sea surface temperatures.
Pampas	<i>noun</i>	flat grasslands of South America.
phenomena	<i>plural noun</i>	(singular: phenomenon) any observable occurrence or feature.
plankton	<i>plural noun</i>	(singular: plankton) microscopic aquatic organisms.
predator	<i>noun</i>	animal that hunts other animals for food.
satellite	<i>noun</i>	object that orbits around something else. Satellites can be natural, like moons, or made by people.
temperature	<i>noun</i>	degree of hotness or coldness measured by a thermometer with a numerical scale.
thermal energy	<i>noun</i>	heat, measured in joules or calories.
trade wind	<i>noun</i>	winds that blow toward the Equator, from northeast to southwest in the Northern Hemisphere and from southeast to northwest in the Southern Hemisphere.
transmit	<i>verb</i>	to pass along information or communicate.

tropical	<i>adjective</i>	existing in the tropics, the latitudes between the Tropic of Cancer in the north and the Tropic of Capricorn in the south.
upwelling	<i>noun</i>	process by which currents bring cold, nutrient-rich water to the ocean surface.
weather	<i>noun</i>	state of the atmosphere, including temperature, atmospheric pressure, wind, humidity, precipitation, and cloudiness.

For Further Exploration

Articles & Profiles

- National Geographic Magazine: El Niño—Nature's Vicious Cycle

Websites

- NOAA: La Niña Page



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