



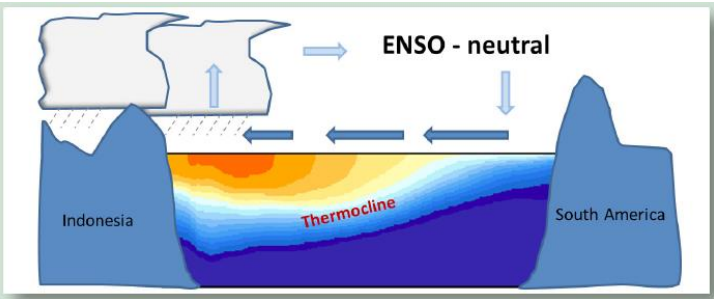
# El Niño and its Impacts on The Republic of Palau



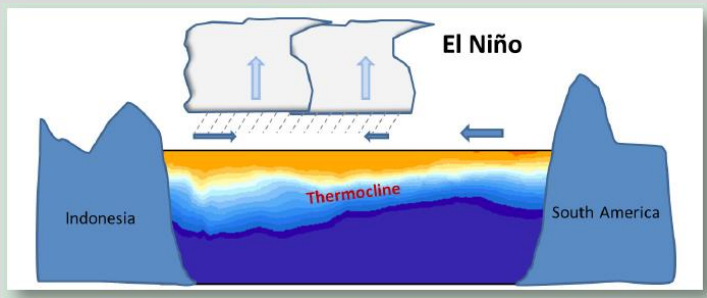
## What is El Niño?

The El Niño – Southern Oscillation (ENSO) is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean and the patterns of sea level pressure, lower- and upper-level winds, and tropical rainfall across the Pacific basin. On periods ranging from about two to seven years, the surface waters across a large swath of the tropical Pacific Ocean warm or cool by anywhere from 1°C to 3°C, compared to normal. This irregular oscillation between warm and cool patterns, referred to as the ENSO cycle, directly affects rainfall distribution in the tropics and can have a strong influence on weather across the Pacific basin. **El Niño** and **La Niña** are the extreme phases of the ENSO cycle; between these two phases is a third phase called **ENSO-neutral**.

**ENSO-neutral:** Under normal conditions strong trade winds blow from the east along the equator, pushing warm water into the western Pacific Ocean.



**El Niño** conditions occur when abnormally warm waters build in tropical region of the central and eastern Pacific Ocean and are usually associated with a weakening of the easterly trade winds, sometimes even reversing to westerlies. Consequently, tropical rains that usually fall over Indonesia move eastward; sea level decreases in the western Pacific; and the vertical, thermal structure of the ocean and coastal and upwelling currents are changed.



The **Thermocline** is a layer of water in which there is an abrupt change in temperature separating the warmer surface water from the colder deep water.

El Niño in Palau	
<b>Rainfall</b>	<b>Less</b>
more at first, but then very much less; longer and drier dry-season	↓
<b>Trade Winds</b>	<b>Less</b>
weaker, with occasional westerly winds	↓
<b>Tropical Cyclones</b>	<b>Less</b>
reduced risk, as more storms form closer to the Dateline	↓
<b>Sea Level</b>	<b>Less</b>
much lower at first, then gradually recovering	↓
<b>Ocean Conditions</b>	<b>Less</b>
cooler at and below the surface	↓
See back page for more details	

**Every El Niño is a little bit different!**  
**El Niño** conditions can start to develop as early as May or June and typically reaches maximum strength during December; the conditions then subside towards normal conditions by June of the following year. However, the evolution and duration, strength and impacts of individual El Niño events can vary, in some cases greatly. This makes constant monitoring and awareness extremely important for decision makers across multiple sectors.

## El Niño and Rainfall in Palau

With modified rainfall patterns, El Niño poses the threat of major drought for Palau. Rainfall during the El Niño year is lower than average from November to April. After August, the monthly rainfall begins a rapid decline, sinking to well below average by November of the El Niño year. The level of these dry conditions depends on the intensity of the El Niño event, with severe drought affecting Palau in the years after the strong events such as 1982 and 1997 El Niño. Recovery to average rainfall is delayed until the September after the El Niño for much of the country.

## El Niño and Tropical Cyclones in Palau

El Niño tends to shift the development of tropical cyclones over the western Pacific eastward, away from the Philippines and western Micronesia and towards the central Pacific. This makes for reduced risk of Tropical Cyclone (TC) activity in Palau during the TC season of El Niño year.

## El Niño and Sea Level in Palau

In Palau, sea levels are much lower than normal during strong El Niño years — the amount commensurate with the strength of the El Niño. This is very distinct from the time of onset of events (e.g., June of the El Niño year) and continues up to March of the year after El Niño with significant rises by June of the year after El Niño.

## El Niño and Ocean Conditions in Palau

During El Niño, ocean waters tend to warm in the central and eastern Pacific at both the surface and subsurface. In Palau, cooler than normal ocean waters are commonly observed during strong El Niño's, reducing fish populations as they migrate east with the warmer water.

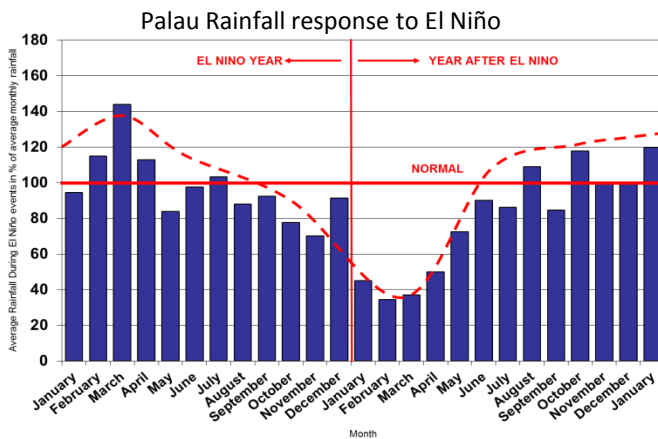
### What does El Niño mean to you?

- **If you are a water manager**, expect adverse impacts on water availability, including increased demand on groundwater resources due as catchments and surface water sources dry up due to reduced rainfall.
- **If you are a disaster manager**, prepare for prolonged drought and potential damage to infrastructure due to coastal flooding and tropical cyclone activity in the year after El Niño.
- **If you are involved in public health**, prepare for reduced freshwater quality and quantity, increased dehydration, depleted food supplies, and water and vector-borne diseases.
- **If you are a coastal and ocean resource manager**, expect an increased risk of coral bleaching and potential changes in tuna catch as tuna habitat migrates away from its regular location.
- **If you are involved in agriculture**, expect adverse impacts on crop production due to drought and increased grassland fires and that these affects might linger as a result of seawater inundation of cropland.
- **If you are involved with the recreation and tourism**, drought and ecosystem impacts may negatively affect recreation and tourism; the Rock Islands may turn yellow and other tourist spots may be heavily stressed.

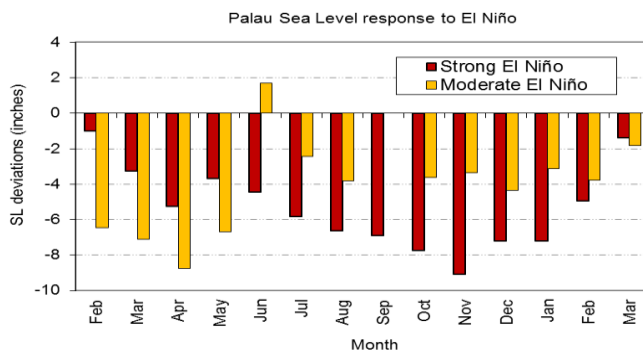
### For Additional Information go to

- **Weather Station Office (WSO) Koror:** <http://www.prh.noaa.gov/koror/>
- Pacific ENSO Applications Climate (PEAC) Center: <http://weather.gov/peac/>
- NOAA Climate Prediction Center (CPC): <http://www.cpc.ncep.noaa.gov/>
- NOAA National Centers for Environmental Information (NCEI)

Also, Contact the Pacific Region Climate Officer,  
Pacific ENSO Applications Climate Center, [peac@noaa.gov](mailto:peac@noaa.gov)



### Monthly rainfall during El Niño.



### Monthly sea level variations during El Niño.

