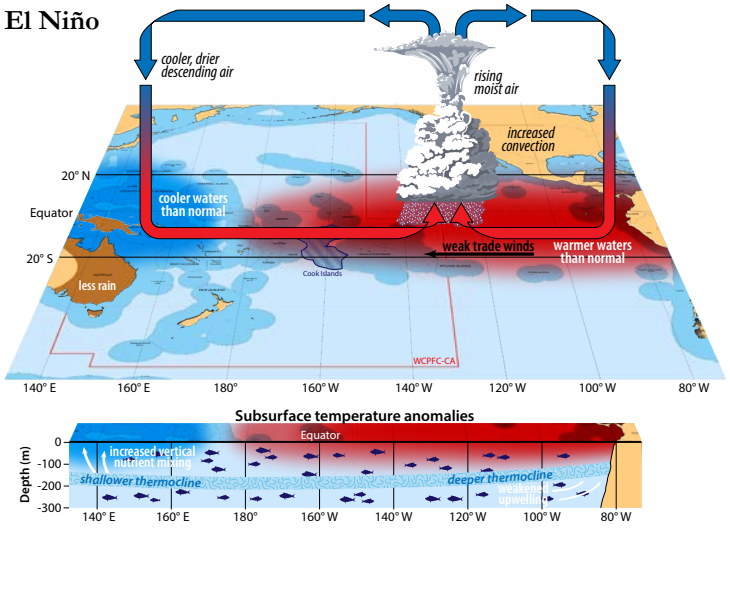
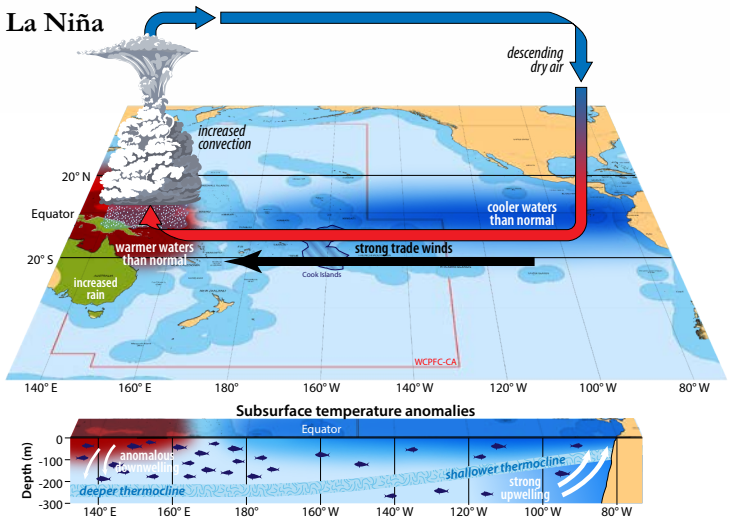
El Niño, La Niña, climate change and oceanic fisheries: Cook Islands

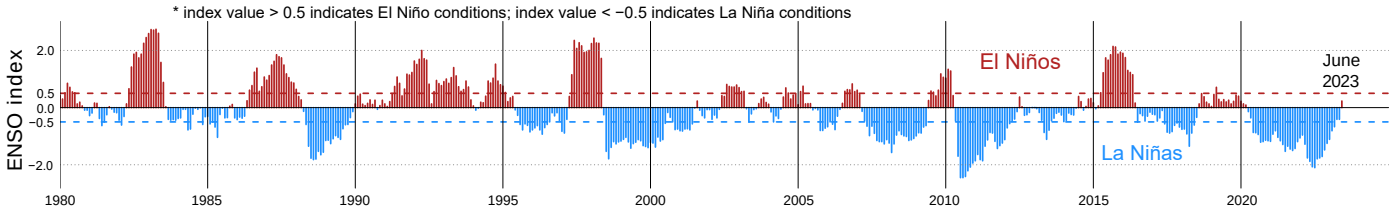
What are El Niño and La Niña?

El Niño and La Niña are climate patterns that have profound effects on the climate and oceanic resources of the Pacific. El Niño conditions usually include warmer than average waters across the mid-Pacific, weakened trade winds and more rain in the eastern Pacific and less rain in the western Pacific. La Niña conditions are generally the opposite of El Niño, with warmer surface waters in the western Pacific and higher rainfall.

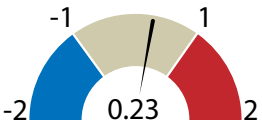




The history of El Niño and La Niña events

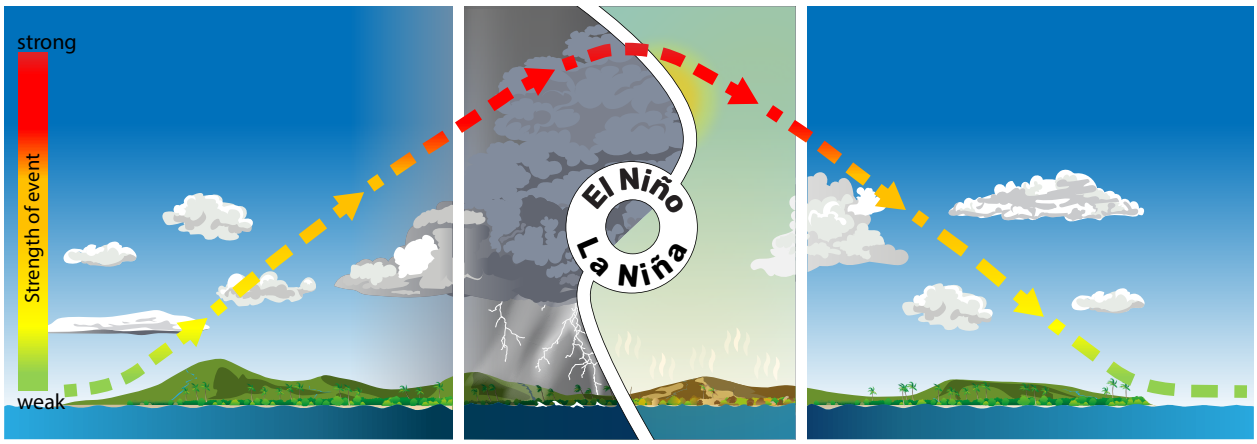


The occurrence of either climate pattern is often referred to as an ENSO event, and one or the other typically occurs every 2–7 years and lasts 12–15 months, though no two events are ever the same! Since 2000, there have been seven recognised El Niño and seven La Niña events. Note that either El Niño and La Niña events may occur consecutively and do not necessarily alternate. When an ENSO event occurs, it follows a general timeline of beginning between May and September, peaking in October to January and ending between February and June.



Current ENSO status (June 2023)

Life cycle of an ENSO event



May–Sep
Event starts

Oct–Jan
Mature phase

Feb–Jun/Sep
Event ends

How do ENSO events impact Cook Islands?

Previous ENSO events show that the northern and southern regions of Cook Islands are impacted differently.

El Niño impacts in Cook Islands

On climate	North	South
temperatures	↑	↓
rainfall	↑	↓
cyclones	↑	↑
On fisheries		
coral bleaching	↑	↑
albacore catches	↑	↓
purse seine fishing	↑	=

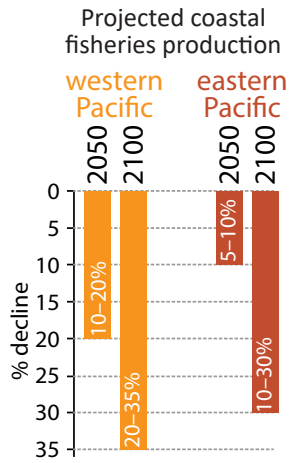
La Niña impacts in Cook Islands

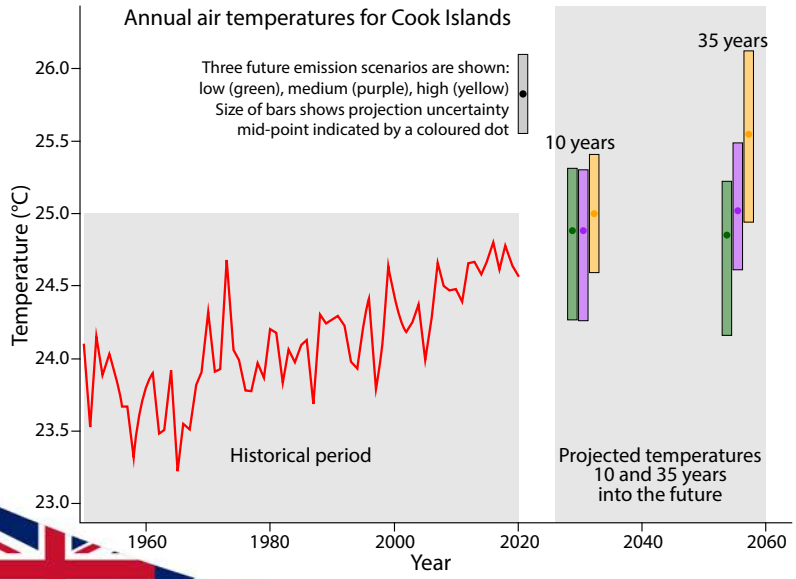
On climate	North	South
temperatures	↓	↑
rainfall	↓	↑
cyclones	↓	↓
On fisheries		
coral bleaching	=	=
albacore catches	↓	↓
purse seine fishing	↓	=

During past El Niño events, warmer surface waters in the vicinity of northern Cooks have moved skipjack eastward into northern Cook Islands and led to increased purse seine catches; La Niña events have led to lower catches as skipjack tuna, in particular, become more concentrated west of Cook Islands. Longline catches of albacore decline across the entire Cook Islands EEZ during La Niña episodes. Coral bleaching activity, with potential to negatively impact reef fish populations and increase rates of ciguatera, is significantly increased during El Niño events but decreases greatly during La Niña events.

How is climate change expected to impact Cook Islands?

Many changes to the oceanic environment of Cook Islands are projected over the next 20–50 years given the present pace of greenhouse gas emissions. These include warming of the oceans by 1–3°C, an increase in ocean acidification leading to greater bleaching, an increase in sea level, more frequent and intense cyclones and possibly stronger and more frequent El Niño and La Niña events. Climate models, using varying levels of greenhouse gas emissions, are used to produce estimates of future changes in the distribution and abundance of the major tuna and pelagic fisheries in the Pacific. Projected changes for Cook Islands are generally less extreme than those for other countries given its location in the central Pacific. The latest models suggest the following changes for the central Pacific and Cook Islands EEZ by 2050:





Bigeye tuna, mostly caught by longline, projected to decrease slightly throughout present distribution

central Pacific ↓ **Cook Islands** =

Yellowfin tuna taken in both purse seine and longline fisheries, projected to be stable overall but with a shift in biomass from the western to eastern Pacific

central Pacific = **Cook Islands** ↑

Skipjack tuna, caught by purse seine, projected to decrease in the western Pacific and increase in the central and eastern Pacific

central Pacific ↑ **Cook Islands** ↑

Albacore tuna, mostly caught by longline, response to climate change is most difficult to predict; most likely biomass will increase in the central and eastern Pacific

central Pacific ↑ **Cook Islands** ↑

COOK ISLANDS