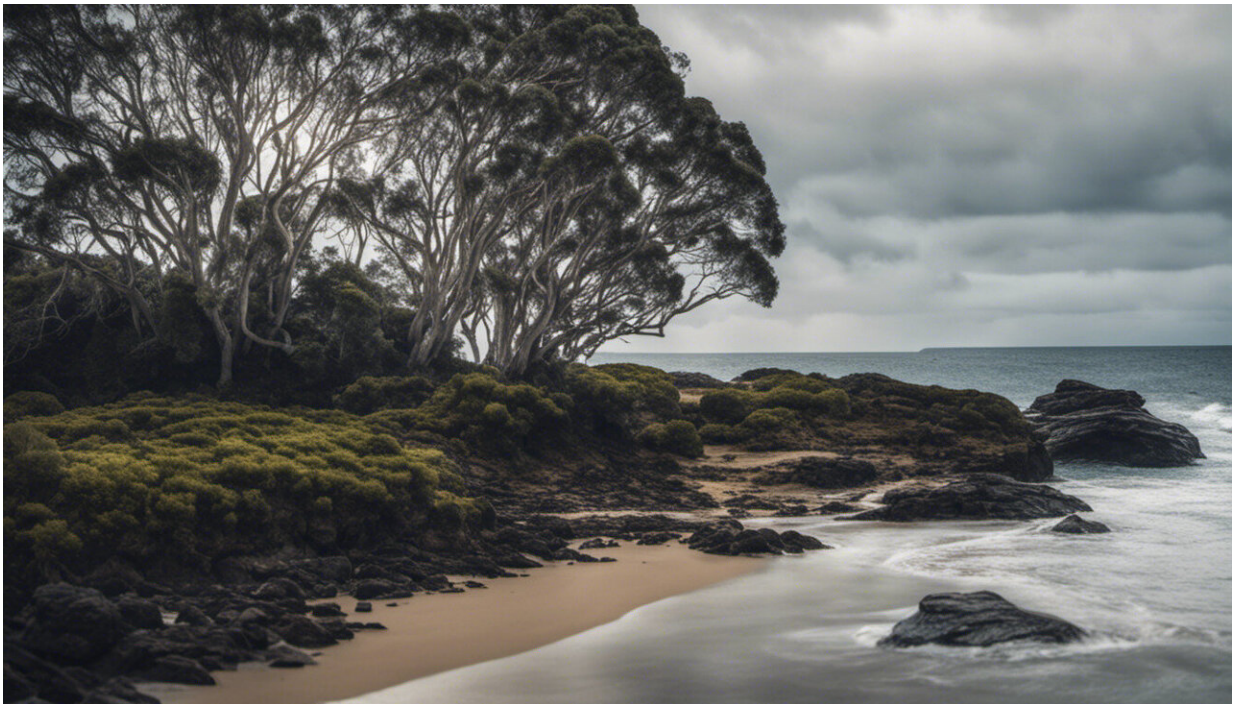


# If El Niño is expected, why hasn't it yet been declared in Australia?

July 18 2023, by Lilly Matson

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The world recorded its hottest ever week two weeks ago. At the same time, the UN's weather agency declared a global El Niño.

Following the declaration from the UN, the World Meteorological Organization and the U.S. Government weather agency also confirmed

that the climate event is happening—but despite these announcements, Australia's Bureau of Meteorology is yet to issue a statement confirming El Niño.

Associate Professor Andrea Taschetto, a climate scientist from UNSW Science's Climate Change Research Center, explains why there's some discrepancy in the declarations, what a year of El Niño means for Australia and the different ways El Niño can manifest.

"After three years of wet La Niña cycles, it looks as though we're headed for a strong El Niño event," says A/Prof Taschetto. "But confirming an El Niño event requires persistent measurements of a number of metrics that the Australian Bureau of Meteorology is still waiting to see."

## **What is El Niño?**

Taschetto: The simple definition of El Niño is a warm condition in the tropical Pacific. The tropical Pacific has cycles that happen every three to seven years that we call the El Niño Southern Oscillation (ENSO). The warm phase of the cycle is called El Niño and the cool phase is La Niña.

## **What causes El Niño?**

Under what we would call "normal" conditions we have [trade winds](#) in the equatorial Pacific, blowing from South America to Australia. And these winds pile up [warm water](#) around Australia while you have upwelling of cold water close to South America.

During an El Niño event the trade winds, that blow east to west, weaken—and this leads to less water being pushed to Australia and less upwelling of cold water near South America. This means that the central

and east Pacific warms more than expected.

## **How do these ocean changes impact atmosphere?**

Importantly, if there are changes in the ocean, then the atmosphere responds to it. And that reinforces the circulation in the ocean, like a positive feedback loop.

So when [sea surface temperatures](#) in the central and eastern tropical Pacific Ocean become substantially warmer than average, this causes a shift in atmospheric circulation.

The region of cloud development, thunderstorms and rainfall that we associate with the north of Australia move eastward to the central Pacific, leaving drier conditions than usual in Australia.

## **How will an El Niño episode impact Australia?**

An El Niño event results in an increased chance for dry weather, meaning the frequency of droughts can increase due to below [average rainfall](#), especially in the eastern half of Australia, over a region spanning from the Northern Territory going south to Victoria and Tasmania.

Due to the lack of cloud cover, it also means there is an increased chance of frost, but the rain deficit is the main characteristic of an El Niño event.

## **How does El Niño affect other places globally?**

El Niño causes a shift in what we know as The Walker Circulation, which is the vertical movement of air along the equatorial Pacific, where

warm air rises over the Indonesian Seas and descends over the east Pacific. The shift in this circulation can trigger massive waves in the atmosphere. And those waves can travel towards the poles and affect other regions globally. This means it can have an impact, even, for example, in sea ice cover in Antarctica.

An El Niño event also impacts South America. So not only the countries that are close to the warming waters, such as Ecuador and Peru, which tend to see increased rainfall, but also Northeast Brazil, on the other hand, which then experiences dry conditions with less rainfall.

## **Is every El Niño the same?**

It was the beginning of the 2000s that scientists discovered that El Niños can manifest in different ways.

A strong El Niño event would result in the maximum warming in the eastern side of the tropical Pacific, closer to South America, but these strong events don't necessarily have the biggest impact on the Australian climate. What are considered "moderate" El Niño events on the other hand—also known as El Niño Modoki events—seem to have a greater impact on Australian rainfall.

## **Why hasn't the Bureau of Meteorology declared an El Niño yet?**

The reason that forecasting agencies have discrepancies in announcing ENSO events is that there are a number of different metrics they monitor—from subsurface water temperatures to cloud cover in the western Pacific ocean.

The Bureau of Meteorology (BOM) hasn't declared annual Niño yet

because one of the metrics, which is the difference in [atmospheric pressure](#) between Tahiti and Darwin, is still not behaving in the way that we'd expect a classic El Niño to. This [pressure difference](#), which is linked to the weakening of the trade winds, is a key metric for measuring an El Niño, and the trend needs to persist for weeks before we can be sure an El Niño is happening.

## What does El Niño have to do with climate change?

ENSO is a natural phenomenon in our climate system. So it's not related to the extreme weather changes that we've seen last 100 years due to climate change. ENSO has always occurred and will continue occurring. However, the way that it will manifest in the future might be slightly different, because there is this background warming.

There are a few studies showing that extreme El Niño events and extreme La Niña events can become more frequent in the future, due to the increase in greenhouse gases.

Provided by University of New South Wales

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