

Devastating El Niño events to double this century

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Extreme El Niño events, that can kill tens of thousands of people, will be twice as common this century because of climate change. The finding adds to the evidence that global warming will cause ever more extreme weather.

The El Niño Southern Oscillation (ENSO) is one of the most powerful phenomena controlling global weather. An El Niño happens when warm water spreads across the surface of the Pacific, pushing rainfall to the east and causing [floods in the Americas and drought in Australia](#). An El Niño can also [bring flooding and drought to parts of Africa](#) because of knock-on effects in the Indian Ocean. El Niños alternate with La Niñas, which have the opposite effects.

But despite ENSO's massive influence, until recently there was no consensus on whether climate change would affect it. The problem is that climate models disagree on whether Pacific temperatures will fluctuate more in the future.

To resolve this problem, [Wenju Cai](#) of the CSIRO in Melbourne, Australia, and colleagues took a different tack. They defined extreme El Niños according to their impacts on weather, rather than the changes in sea surface temperature.

Wild weather

Defining an extreme El Niño as one with a massive reorganisation of rainfall, where the usually dry regions in South America experience a tenfold increase in rain, they found that climate models do agree after all. The models suggest that extreme El Niños should now be happening twice as often: about once every decade since 1990 and continuing until 2090. In the previous 100 years it was once every 20 years.

"The reason is quite simple," says Cai. The eastern Pacific is warming faster than the western Pacific. As a result, even if surface temperature fluctuations stay the same as today, peak temperatures will still happen more often in the east. Since rainfall follows peak temperature, big disruptions to rainfall will be more common.

There is a chance that climate change has contributed to recent extreme El Niños, Cai says. The study did not examine that directly, but the mechanisms that will cause the increased frequency – warmer waters in the east – are already in play to some degree.

At any rate ENSO seems to be changing. Last year researchers reconstructed how ENSO altered since 1590, and found the cycle was more intense between 1979 and 2009 than at any earlier time ([Climate of the Past, doi.org/q28](#)).

Floods and droughts

Cai's finding comes just months after another paper, which showed that in the future even

normal El Niños will have more severe drying and wetting effects ([Nature](#), doi.org/n9n).

"Together, I think these two papers are changing what we think is interesting about El Niño," says [Dietmar Dommenges](#) of Monash University in Melbourne, Australia. "People have been looking at it in terms of sea surface temperature but maybe that's not so important. What is really important is the rainfall."

The last major El Niño, during 1997 and 1998, is [estimated](#) to have caused up to \$45 billion in damage and [killed 23,000 people](#). It brought flooding to the Americas and Africa, tropical cyclones to Pacific islands, and droughts and wildfires to Australia and south-east Asia.

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