

El Niño events

The frequency of extreme El Niño events is projected to increase for a further century after global mean temperature is stabilised at 1.5°C above pre-industrial levels.

Research published on 24 July in *Nature Climate Change* by an international team shows that if warming was halted to the aspirational 1.5°C target from the Paris Agreement, the frequency of extreme El Niño events could continue to increase, due to a continuation of faster warming in the eastern equatorial Pacific.

CSIRO* researcher and lead author Dr Guojian Wang said the growing risk of extreme El Niño events did not stabilise in a stabilised climate.

Said Dr Wang: *‘Currently the risk of extreme El Niño events is around five events per 100 years. This doubles to approximately 10 events per 100 years by 2050, when our modelled emissions scenario (RCP 2.6) reaches a peak of 1.5°C warming. After this, as faster warming in the eastern equatorial Pacific persists, the risk of extreme El Niño continues upwards to about 14 events per 100 years by 2150. This result is unexpected and shows that future generations will experience greater climate risks associated with extreme El Niño events than seen at 1.5°C warming.’*

The research was based on five climate models that provided future scenarios past the year 2100. Models were run using the Intergovernmental Panel on Climate Change’s lowest emissions scenario (RCP2.6), which requires negative emissions late in the century.

Director of the Centre for Southern Hemisphere Oceans Research and report co-author, Dr Wenju Cai, said that this research continues important work on the impacts of climate change on the El Niño-Southern Oscillation which is a significant driver of global climate.

He commented: *‘The most severe previous extreme El Niño events occurred in 1982/83, 1997/98 and 2015/16, years associated with worldwide climate extremes. Extreme El Niño events occur when the usual El Niño Pacific rainfall centre is pushed eastward toward South America, sometimes up to 16,000 kilometres, causing massive changes in the climate. The further east the centre moves, the more extreme the El Niño. This pulls rainfall away from Australia bringing conditions that have commonly resulted in intense droughts across the nation. During such events, other countries like India, Ecuador, and China have experienced extreme events with serious socio-economic consequences.’*

Dr Cai added that while previous research suggested that extreme La Niña events would double under a 4.5°C warming scenario, results indicated that under a scenario of climate stabilisation (i.e. 1.5°C warming) there was little or no change to these La Niña events.

This research was conducted by staff at the Hobart based Centre for Southern Hemisphere Oceans Research, an international collaboration between CSIRO, Qingdao National Laboratory for Marine Science and Technology, the University of New South Wales, and the University of Tasmania.

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*Commonwealth Scientific and Industrial Research Organisation. See also: www.csiro.au

Picture caption

CSIRO's research vessel Investigator. This vessel supports Australia's atmospheric, oceanographic, biological and geosciences research from the tropical north to the Antarctic ice-edge with the waters of the Indian, Pacific and Southern Oceans to:

- *undertake deep sea oceanography;*
- *map and study the geology of Australia's marine estate to underpin resource exploration;*
- *monitor and better understand Australia's fisheries, and*
- *learn more about Australia's weather patterns and large ocean processes.*