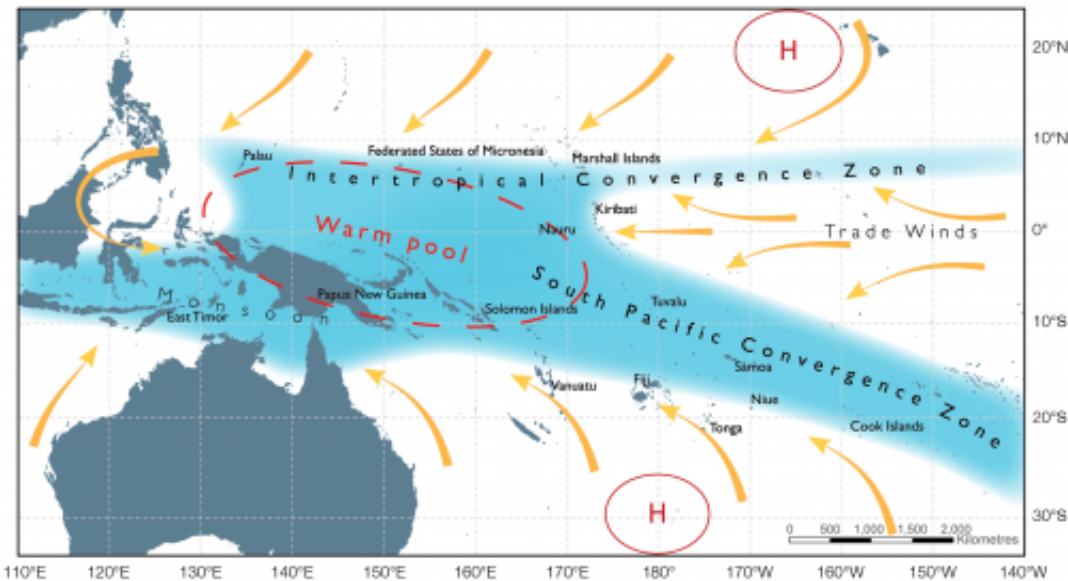


Warming causes more extreme shifts of the Southern Hemisphere's largest rain band

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The South Pacific rain band is largest and most persistent of the Southern Hemisphere spanning the Pacific from south of the Equator, south-eastward to French Polynesia.

(Phys.org) -- South Pacific countries will experience more extreme floods and droughts, in response to increasing greenhouse gas emissions, according to a paper out today in the journal *Nature*.

The changes will result from the South Pacific rain band responding to greenhouse warming. The South Pacific rain band is largest and most persistent of the [Southern Hemisphere](#) spanning the Pacific from south

of the Equator, south-eastward to [French Polynesia](#). Occasionally, the rain band moves northwards towards the Equator by 1000 kilometres, inducing [extreme climate events](#).

The international study, led by CSIRO [oceanographer](#) Dr Wenju Cai, focuses on how the frequency of such movement may change in the future. The study finds the frequency will almost double in the next 100 years, with a corresponding intensification of the rain band.

Dr Wenju and colleagues turned to the extensive archives of general [circulation models](#) submitted for the fourth and fifth IPCC Assessments and found that increases in [greenhouse gases](#) are projected to enhance equatorial Pacific warming. In turn, and in spite of disagreement about the future of El Niño events, this warming leads to the increased frequency of extreme excursions of the rain band.

During moderate El Niño events with warming in the equatorial eastern Pacific, the rain band moves north-eastward by 300 kilometres. Countries located within the bands' normal position such as Vanuatu, Samoa, and the southern Cook Islands experience forest fires and droughts as well as increased frequency of tropical cyclones, whereas countries to which the rain band moves experience extreme floods.

"During extreme El Niño events, such as 1982/83 and 1997/98, the band moved northward by up to 1000 kilometres. The shift brings more severe extremes, including cyclones to regions such as French Polynesia that are not accustomed to such events," said Dr Cai, a scientist at the Wealth from Oceans Flagship.

A central issue for community adaptation in Australia and across the Pacific is understanding how the warming atmosphere and oceans will influence the intensity and frequency of extreme events. The impact associated with the observed extreme excursions includes massive

droughts, severe food shortage, and coral reef mortality through thermally-induced coral bleaching across the South Pacific.

"Understanding changes in the frequency of these events as the climate changes proceed is therefore of broad scientific and socio-economic interest."

More information: More extreme swings of the South Pacific Convergence Zone due to greenhouse warming, *Nature*, 2012.

Provided by CSIRO

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