

# Extreme waves set to get bigger and more frequent due to climate change

June 11 2020

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Water waves are localized excitations in the water, that in many aspects behave like particles, having velocities and energy, interacting, and so on. In materials, certain excitations can behave even more like particles, with all sorts of tunable properties: quasi-particles. Credit: Pixabay/CC0 Public Domain

A warming planet will cause stronger storm winds triggering larger and more frequent extreme waves over the next 80 years, with largest increases shown in the Southern Ocean, according to new research.

Researchers at the University of Melbourne have simulated Earth's changing climate under different wind conditions, recreating thousands of simulated storms to evaluate the magnitude and frequency of extreme events.

The study found that if global emissions are not curbed there will be an increase of up to 10 percent in the frequency and magnitude of extreme waves in extensive [ocean](#) regions.

In contrast, researchers found there would be a significantly lower increase where effective steps are taken to reduce emissions and dependence on fossil fuels. In both scenarios, the largest increase in magnitude and frequency of extreme waves is in the Southern Ocean.

University of Melbourne infrastructure engineering researcher Professor Ian Young warns that more storms and extreme waves would result in rising sea levels and damage to infrastructure.

"Around 290 million people across the world already live in regions where there is a one percent probability of flood every year," Professor Young said.

"An increase in the risk of extreme wave events may be catastrophic, as larger and more frequent storms will cause more flooding and coastline erosion."

University of Melbourne Postdoctoral Fellow in Ocean Wave Modelling and lead researcher Alberto Meucci said the study shows that the Southern Ocean region is significantly more prone to extreme wave increases with potential impact to Australian, Pacific and South American coastlines by the end of 21st century.

"The results we have seen present another strong case for reduction of

emissions through transition to [clean energy](#) if we want to reduce the severity of damage to global coastlines," Mr Meucci said.

The research was funded via ARC grants and led by researchers from Melbourne School of Engineering at the University of Melbourne in collaboration with CSIRO Oceans and Atmosphere in Hobart and the IHE-Delft Institute for Water Education in the Netherlands.

The study was published today in *Science Advances*.

**More information:** Alberto Meucci et al. Projected 21st century changes in extreme wind-wave events, *Science Advances* (2020). [DOI: 10.1126/sciadv.aaz7295](https://doi.org/10.1126/sciadv.aaz7295)

Provided by University of Melbourne

Citation: Extreme waves set to get bigger and more frequent due to climate change (2020, June 11) retrieved 25 April 2024 from <https://phys.org/news/2020-06-extreme-bigger-frequent-due-climate.html>

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