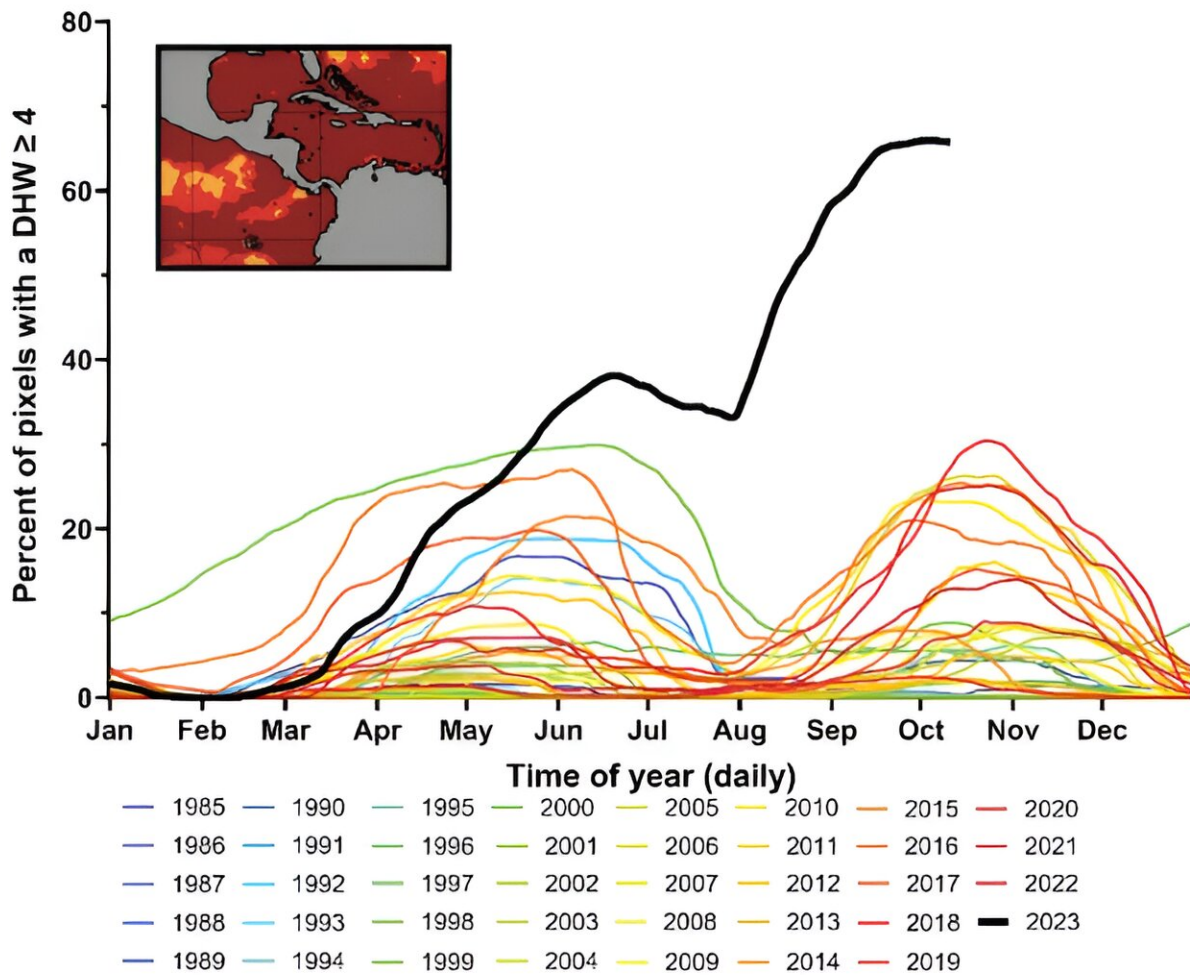


Coral reefs in peril from record-breaking ocean heat

December 9 2023



NOAA Coral Reef Watch version 3.1 data as annual plots (1985–2023) of the daily percentage of ocean pixels with Degree Heating Weeks (DHW) ≥ 4 (when coral bleaching is likely to occur) for latitude 5° S to 30° N and longitude 60° W to 105° W (study region displayed in map inset). Note that around 70% of the

entire ocean in this region had accumulated coral bleaching level heat stress by October, more than twice the previous record. Credit: *Science* (2023). DOI: 10.1126/science.adk4532

Record breaking marine heat waves will cause devastating mass coral bleaching worldwide in the next few years, according to a University of Queensland coral reef scientist.

The alarming finding is the result of an international study led by UQ's Professor Ove Hoegh-Guldberg of UQ's School of the Environment, who is currently attending the COP28 climate change meetings in Dubai. This research is published in [Science](#).

"We were shocked to find heat stress conditions started as much as 12 weeks ahead of previously recorded peaks and were sustained for much longer in the eastern tropical Pacific and wider Caribbean," Professor Hoegh-Guldberg said.

"Historical data suggests the current marine heat waves will likely be the precursor to a global mass [coral bleaching](#) and mortality event over the next 12 to 24 months, as the El Niño phase of El Niño-Southern Oscillation or ENSO continues.

"Across July 2023, Earth experienced its warmest days on record since 1910, as well as the warmest month ever recorded for [sea surface temperatures](#).

"This puts immense pressure on vital but fragile tropical ecosystems, such as [coral reefs](#), mangrove forests, and seagrass meadows.

"For example, a coral reef in the Florida Keys called Newfound Harbor

Key accumulated [heat stress](#) almost 3 times the previous record and it occurred 6 weeks ahead of previous peaks."

Professor Hoegh-Guldberg said the findings come at a [critical point](#) in protecting global biodiversity, with commitment to [climate change mitigation](#) slipping in many nations.

"The latest environmental information indicates that we're well off-track when it comes to keeping global surface temperatures from reaching a very dangerous condition by mid to late this century," he said.

"Frankly, we're hurtling in the opposite direction.

"Compounding this is the fact these devastating impacts appear to be rolling into a vast record-breaking global event."

Professor Hoegh-Guldberg said that without serious and swift action, the persistence of coral reefs beyond the next few decades is in serious jeopardy.

"Our study shows that ENSO is a major determinant of the fate of the world's coral reefs," he said.

"Rising sea temperatures, coupled with other stressors such as [ocean acidification](#) and pollution, have severely weakened their resilience.

"This puts coral reefs and a quarter of the ocean's biodiversity at serious risk of annihilation."

Professor Hoegh-Guldberg said efforts to introduce of heat-tolerance genes into the natural coral population have shown promise, but the reality of scaling these efforts remains logistically challenging.

"Given the complex and interconnected nature of marine ecosystems such as coral reefs, a comprehensive approach is necessary for mitigating the impacts of changing oceanic conditions," he said.

"The importance of reducing our emissions is underscored in our findings, where massive changes to oceanic warming are set to destroy coral reefs and many other ecosystems.

"With this in mind, there are extremely tough discussions underway at the COP28 climate meetings."

More information: Ove Hoegh-Guldberg et al, Coral reefs in peril in a record-breaking year, *Science* (2023). [DOI: 10.1126/science.adk4532](https://doi.org/10.1126/science.adk4532)

Provided by University of Queensland

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