

Oceanographers call for immediate carbon cuts, common marine heat wave terminology

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Credit: Patrick Hendry via Unsplash

Over the past 200 years, the ocean and atmosphere have been accumulating massive amounts of carbon dioxide as factories, automobiles, airplanes and more churn out the powerful greenhouse gas.

Two articles published in *Nature* by University of Hawai‘i at Mānoa oceanographers provide a reality check on the limitations of carbon

dioxide removal and a warning that marine heat waves need clear definitions so communities can adapt.

Limitations of carbon dioxide removal

In all the scenarios assessed by the United Nations' Intergovernmental Panel on Climate Change, nations around the world must dramatically and rapidly reduce their dependence on [fossil fuels](#) in order to limit [global warming](#) to 1.5°C–2°C above pre-industrial levels. Further, the paths to limit warming also require the removal of carbon dioxide from the atmosphere, using methods that are still in the early stages of development.

David Ho, oceanography professor at the UH Mānoa School of Ocean and Earth Science and Technology (SOEST), wrote in his *Nature* article, "We must stop talking about deploying [carbon dioxide removal] as a solution today, when emissions remain high—as if it somehow replaces radical, immediate emission cuts. We have to shift the narrative as a matter of urgency."

This is critical, he points out, over the next few years, as pressure mounts to develop technology-based climate solutions. Instead, Ho advocates for rapid decarbonization of global energy systems, especially since the effectiveness of carbon dioxide removal depends on emissions being low.

"Humanity has never removed an atmospheric pollutant at a global, continental or, even, regional scale—we have only ever shut down the source and let nature do the clearing up," he wrote, in a warning about not relying on carbon dioxide removal in case it does not work. "We must slow the carbon clock to a crawl before we can turn it back."



Credit: Xavier Coiffic via Unsplash

Clarifying marine heat waves

In the same issue of *Nature*, Malte Stuecker and Brian Powell, professors in the SOEST Department of Oceanography, and their co-authors, all members of the U.S. NOAA Marine Ecosystem Task Force, identified the need for clearer definitions of marine heat waves so coastal communities could adapt to these events and [resource managers](#) can better prioritize mitigation strategies.

"Clearly communicating baselines for assessing [ocean warming](#) is essential for understanding [extreme events](#) and how they will affect

[marine ecosystems](#) and livelihoods in the future," the co-authors wrote.

The researchers highlight that the term "marine heat wave" is currently being used to refer to two different phenomena—short lasting extreme events and long-term warming trends. They note that the communication breakdown is "having real-world consequences" and worry that "the public might become desensitized to the real threat of marine heat waves."

When it comes to changes in surface ocean temperature, the authors recommend using the phrase "long-term temperature trends" to describe the relatively slow changes in ocean temperature that occur over decades or longer—primarily due to anthropogenic greenhouse gasses increasing.

In contrast, they recommend only using the term "marine heat wave" to describe ocean temperature changes that are transient and extremely warm relative to the expected conditions for a given place and time, as defined by an evolving, recent climatological reference period.

Finally, use of the term "total heat exposure" is recommended to describe the combination of long-term warming and [marine heat waves](#).

The paper notes, "by adopting our suggested ocean temperature communication framework, scientists will be able to better equip marine resource decision makers to assess and prepare for risks associated with different types of ocean temperature change."

These publications highlight the complexities and also the need for accuracy and data-driven decision making as community members, resource managers, innovators, politicians and investors all come to the table to ensure a more stable climate path for future generations.

More information: David T. Ho, Carbon dioxide removal is not a

current climate solution—we need to change the narrative, *Nature* (2023). [DOI: 10.1038/d41586-023-00953-x](https://doi.org/10.1038/d41586-023-00953-x)

Dillon J. Amaya et al, Marine heatwaves need clear definitions so coastal communities can adapt, *Nature* (2023). [DOI: 10.1038/d41586-023-00924-2](https://doi.org/10.1038/d41586-023-00924-2)

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