

Ocean currents vital for distributing heat could collapse by midcentury, study says

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The sun rises over fishing boats in the Atlantic Ocean, Sept. 8, 2022, off of Kennebunkport, Maine. A system of ocean currents that carries heat northward across the North Atlantic could collapse during this century, according to a new study, and scientists have said before such a collapse could cause catastrophic sea-level rise and extreme weather across the globe. Credit: AP Photo/Robert F. Bukaty, File

A system of ocean currents that transports heat northward across the North Atlantic could collapse by mid-century, according to a new study, and scientists have said before that such a collapse could cause catastrophic sea-level rise and extreme weather across the globe.

In recent decades, researchers have both raised and downplayed the specter of Atlantic current collapse. It even prompted a movie that strayed far from the science. Two years ago the United Nations Intergovernmental Panel on Climate Change said any such catastrophe is unlikely this century. But the new study published in *Nature Communications* suggests it might not be as far away and unlikely as mainstream science says.

The Atlantic meridional overturning circulation is a vital system of ocean currents that circulates water throughout the Atlantic Ocean, according to the [National Oceanic and Atmospheric Administration](#). It's a lengthy process, taking an estimated 1,000 years to complete, but [has slowed](#) even more since the mid-1900s.

A further slowdown or complete halting of the circulation could create more [extreme weather](#) in the Northern Hemisphere, [sea-level rise](#) on the East Coast of the United States and drought for millions in southern Africa, scientists in Germany and [the U.S.](#) have said. But the timing is uncertain.

In the new study, Peter and Susanne Ditlevsen, two researchers from Denmark, analyzed [sea surface temperatures](#) in the North Atlantic between 1870 and 2020 as a proxy, meaning a way of assessing, this circulation. They found the system could collapse as soon as 2025 and as late as 2095, given current global greenhouse gas emissions. This diverges from the prediction made by the Intergovernmental Panel of Climate Change in 2021, which said the collapse isn't likely to occur this century.

"There are large uncertainties in this study, in many prior studies, and in climate impact assessment overall, and scientists sometimes miss important aspects that can lead to both over and underprediction of impacts," Julio Friedmann, chief scientist at Carbon Direct, a carbon management company, said in a statement. "Still, the conclusion is obvious: Action must be swift and profound to counter major climate risks."

Stefan Rahmstorf, co-author on a 2018 study on the subject, published [an extensive analysis](#) of the Ditlevsen's study on RealClimate, a website that publishes commentary from climate scientists. While he said that a tipping point for the collapse of the Atlantic meridional overturning circulation is "highly uncertain," he also called the IPCC estimate conservative.

"Increasingly the evidence points to the risk being far greater than 10% during this century," he wrote, "...rather worrying for the next few decades."

More information: Peter Ditlevsen et al, Warning of a forthcoming collapse of the Atlantic meridional overturning circulation, *Nature Communications* (2023). [DOI: 10.1038/s41467-023-39810-w](https://doi.org/10.1038/s41467-023-39810-w)

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