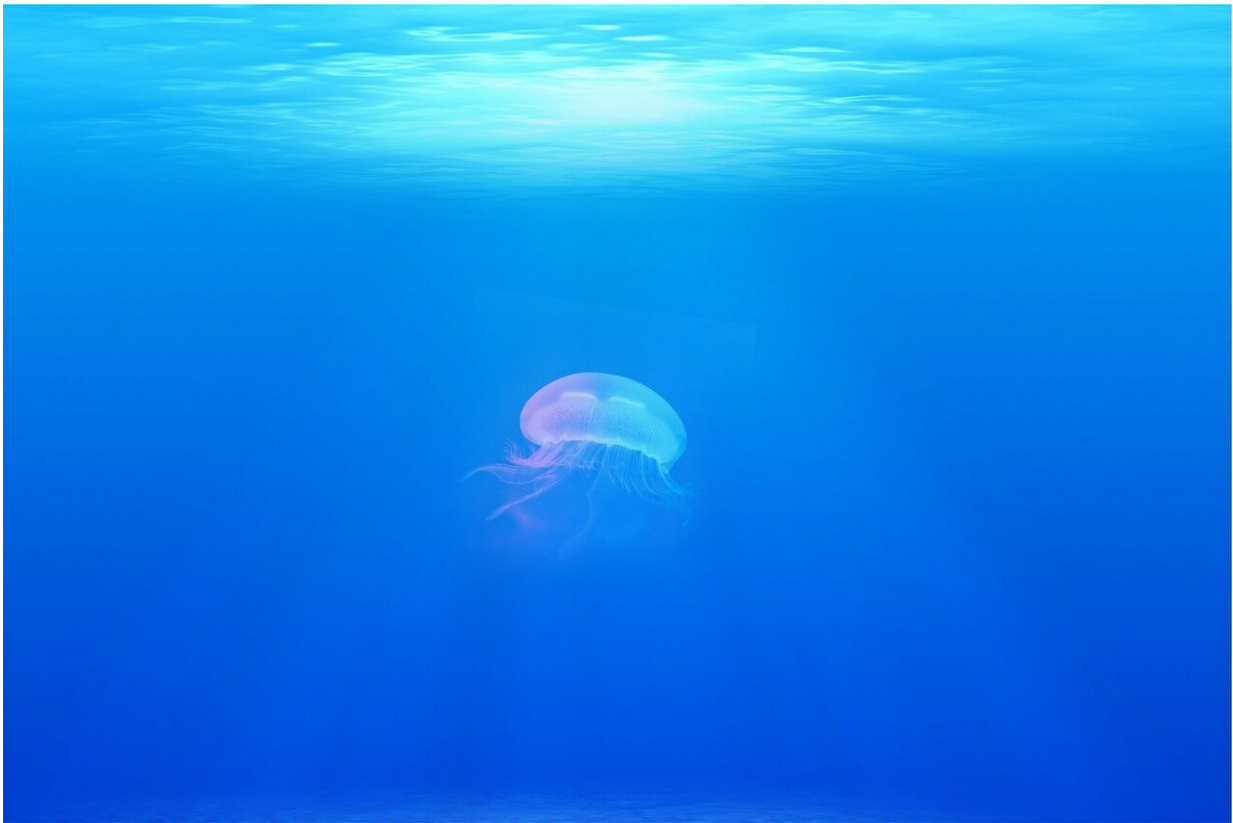


Oceans are growing hotter, triggering global weather disasters

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Heat searing enough to knock out mobile phones. Wildfire smoke that turns the skies an apocalyptic orange. Flash floods submerging towns in upstate New York and Vermont.

This grim procession of recent disasters is being driven in part by climate change. But there's one particular facet of global warming that's providing potent fuel to make [extreme weather](#) even more intense: record-hot oceans.

Global ocean surface temperatures in June were the highest in 174 years of data, with the emergence of the El Niño weather pattern piling onto the long-term trend. Near Miami, coastal Atlantic waters are pushing 90F (32C.)

Hot oceans are amplifying weather-driven catastrophes that are claiming lives and inflicting massive economic damages—a cost that could rise to \$1 trillion per year in the coming decades, according to marine scientist Deborah Brosnan. They're also accelerating [climate change](#). As water temperatures rise, oceans lose their ability to serve a vital function: absorb the world's excess heat.

"Warming ocean temperatures will—and currently are having—huge impact on land," said Brosnan, founder of environmental risk consultancy Deborah Brosnan & Associates. "Strange and dangerous weather patterns will be the norm in places where they've never happened before and at higher frequency."

In recent decades, global seas soaked up 90% of the warming caused by greenhouse gases. As oceans heat up, they trigger a vicious circle of higher land temperatures, which in turn contribute to hotter seas.

That's setting off a cascade of climate impacts, including stronger storms, rising sea levels and the loss of coral reefs and other marine life. As water temperatures climbed, they've had impacts that extend to the most remote places on Earth. Antarctic sea ice reached its lowest June extent on record despite winter being underway there, according to the U.S. National Centers for Environmental Information.

But the impact of sizzling seas has hit closer to home for millions around the globe, often with catastrophic results. Hurricanes and typhoons are among the most salient examples of extreme weather fueled by warm oceans. Soaring [water temperatures](#) supercharge storms by adding moisture to the atmosphere—and there are signs that's already happening.

Global accumulated cyclone energy—a measure of storms' collective power—was almost twice the normal value for June. Earlier this year, Tropical Cyclone Freddy set a preliminary record as the longest-lasting tropical cyclone ever recorded. The storm formed near Australia and crossed the Indian Ocean before making landfall in East Africa and killing hundreds. Freddy put out as much power as all the storms in an average North Atlantic hurricane season. It was followed in April by Tropical Cyclone Ilsa, which roared into Western Australia with the strongest winds on record in the area prior to landfall.

The world is currently in the grips of an El Niño, a natural climate pattern characterized by warmer-than-normal waters in the eastern tropical Pacific. That shifts weather patterns around the globe, though it also typically creates wind conditions that tamp down on storms in the Atlantic. But hot Atlantic ocean temperatures could change that.

Though the North Atlantic hurricane season doesn't usually reach its peak until September, it's already seen an active start with two storms churning at the same time in June, the first time that's happened in more than five decades.

This year could see more storm activity than normal. The hot ocean temperatures are a major reason why Phil Klotzbach, author of the closely watched Colorado State University hurricane outlook, boosted his forecast for this year's Atlantic hurricane season to 18 named storms from 14 in June.

"While we're likely to have a moderate to potentially even strong El Niño event for the peak of Atlantic hurricane season, the extremely warm Atlantic is likely to mitigate" the [wind conditions](#) that can rip apart storms, he said.

Rainfall from everyday summer storms has also been juiced by hot seas, unleashing destruction far from the coast. Flooding across the U.S. Northeast in July killed one woman in New York, closed rail lines and devastated Vermont, causing as much as \$5 billion in losses. The freak [storm](#) tapped into a deep vein of moisture stretching all the way from the Atlantic.

Warm oceans also contribute to the other end of the extreme-weather spectrum: droughts and wildfires. Winds in the upper atmosphere known as the jet stream are influenced by the ocean below, and hot seas can cause them to bend in extreme ways. That results in areas of high pressure that can trap hot air in place for weeks—a phenomenon known as heat domes.

In Texas, blistering conditions have sent power demand to record highs. The sizzling heat has extended to Europe, where temperatures on the Italian island of Sardinia touched 115F (46C) last week and nearly toppled Europe's all-time high. Scorching weather is also blanketing Asia, with temperatures in Tokyo soaring to nearly 16F (9C) above the seasonal average.

This shift in the jet stream kept storms away from Canada, leading to drought and the nation's worst wildfire season on record. A haze from the Canadian blazes descended on New York City in June, creating hazardous air quality, and later drifted across the Atlantic to Europe.

"This pattern has been in place most of the winter and spring, and it is responsible for the storms out west, persistent dry conditions where the

fires are raging, and the winds bringing the smoke to the Eastern Seaboard," said Jennifer Francis, a climate scientist at the Woodwell Climate Research Center in Massachusetts.

Bone-dry conditions are lowering water levels on the Mississippi and Ohio Rivers in the U.S. and the Rhine and the Danube in Europe, raising the prospect of shipping problems on important freight routes. The drought is also threatening global supplies of crops including sugar cane and rice.

As oceans heat up, they are also less able to absorb CO₂ from the atmosphere, said Brosnan. That could create a cycle of warming oceans, more carbon dioxide in the atmosphere and, as a result, ever-more extreme weather.

The problem of warming oceans ultimately only has one solution, according to Michael Mann, a climate scientist at the University of Pennsylvania: Cut greenhouse gas emissions.

"The large factor here, at a global scale, is the ongoing warming from carbon pollution," Mann said. "It's the steady overall [ocean](#) heating we should be most concerned about. It will continue until carbon emissions reach zero."

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