

ENVIRONMENT

## Record Saharan dust plume cloaks Caribbean as health warnings issued. Miami may dodge worst

BY SARAH LOFTUS AND JACQUELINE CHARLES

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NASA forecasts show dust plumes traveling over the Caribbean

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NASA forecasts show dust plumes traveling over the Caribbean and changing direction in the Gulf of Mexico. Colors represent how much dust is in the air, with purple representing higher concentrations. BY NASA/GMAO



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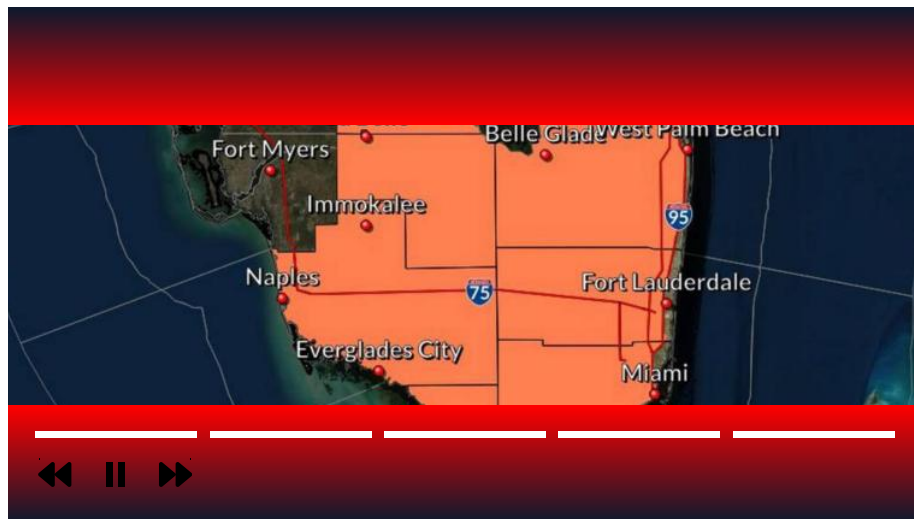
Scientists have been monitoring atmospheric dust on the easternmost Caribbean island of Barbados since 1965. The plume currently drifting over the Caribbean into the Gulf of Mexico is nothing like they've ever seen.

In Haiti, fully cloaked this week under a cloud of hot Saharan dust, residents report the panoramic view of the capital Port-au-Prince had vanished. The gray haze also has brought a

particular smell, like stepping into a wood shop. With the declining air quality, health agencies throughout the Caribbean have urged residents to take precautions and stay indoors if they have a respiratory or related illness.

“This is one of the most intense dust events that we’ve ever seen in that area,” said Joseph Prospero, emeritus professor at the University of Miami Rosenstiel School of Marine and Atmospheric Science. Prospero founded the [observatory in Barbados](#) where they measured the record-breaking plume. He started measuring dust from the Rosenstiel campus on Virginia Key in Miami in 1974.

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The dust can impact health because its small size means it can get into people’s lungs and potentially the bloodstream. About a third to a half of Saharan dust particles are smaller than the [fine particle classification](#) of 2.5 micrometers, or roughly 40 times smaller than a grain of fine beach sand.

Early in the week, a thick haze blanketed Jamaica and temperatures hit a scorching 102.2

Fahrenheit.

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The country's health minister, Christopher Tufton tweeted, "As we struggle to deal with the health impact of the Saharan dust over Jamaica, let us also remind ourselves that there is life saving value in this natural [phenomenon]."

One upside of such dust clouds is that they historically have tamped down the formation of tropical storms and hurricanes in the Caribbean, at least temporarily. The dust clouds can also create sunsets of vibrant color.

### AN ANNUAL EVENT

The Saharan dust consists of tiny mineral particles picked up from North Africa and carried by winds across the Atlantic Ocean, about [a mile](#) above sea level. The dust migrates each year, reaching South America in winter and Central and North America in summer, but the amount of particles in this dust plume is unprecedented in the Caribbean.

<http://carob.rsmas.miami.edu/images/out-fullsize.gif>

[Long-term records](#) from Barbados and Miami can be valuable for figuring out how climate conditions might influence these dust plumes, but the current plume is still a bit of a mystery.

“There’s still a lot we don’t understand about how climate affects the dust transport,” said Cassandra Gaston, an assistant professor at the University of Miami Rosenstiel School. Droughts in Africa and climate cycles like El Niño and La Niña can affect how much dust makes it across the ocean, she said.

The second highest dust concentrations the scientists have measured occurred in the early 1980s, when the Sahel region of Africa was experiencing a drought. But there’s no drought right now, said Paquita Zuidema, a professor at the University of Miami Rosenstiel School. Scientists are wondering how the plume became so large.

“It takes a week roughly to go from the coast of Africa into the Caribbean,” Prospero said about the dust cloud. Usually it gets thinned out as rain and other factors remove particles. “But this thing is really amazing in the way it’s maintained its integrity and cohesiveness over this entire period.”

The observatories in Miami and Barbados have instruments that measure how much sunlight is blocked by particles in the air. Researchers can track this visibility measurement from their computers, which is how they first observed the record-breaking dust concentrations.

“We can see the change between the background, which is mainly just sea salt particles, and then the dust when it comes in. It’s really dramatic,” said Gaston.

Gaston and doctoral student Anne Barkley are analyzing dust trapped on air filters to find out what’s in it and which regions of Africa it came from. The filters sit on top of towers in Barbados and Miami. Air gets sucked through them with a pump.

The filters become a brownish red color because the dust has a lot of iron in it, said Gaston. Iron and other nutrients in the dust, like phosphorus, are important for feeding microbes in the ocean and [fertilizing the Amazon rain forest](#) and other cloud forests in the Caribbean.

At the Miami observatory, Zuidema measures the height of the dust using a [lidar instrument](#). The instrument can distinguish particle size and shape, allowing researchers to tell the difference between Saharan dust and other particles normally in the air. Unlike round sea salt particles, dust particles are all different shapes, said Zuidema.

Higher dust particles move farther, so height measurements can help with forecasting. Zuidema is also interested in how much of the dust comes down to the surface, where it impacts people and the environment.

## **RED TIDE IMPACTS?**

Dust touching down in the Gulf of Mexico could potentially spark a red tide bloom. Iron in the dust can feed cyanobacteria called [Trichodesmium](#), also known as sea sawdust because of their brown and chunky appearance. The cyanobacteria convert nitrogen gas into a more palatable form of nitrogen nutrients. They also end up excreting about half of that nitrogen into the water, said Cynthia Heil, director of the Red Tide Institute at the Mote Marine Laboratory. The excess nitrogen can then feed red tide algae.

Several events would have to align for a red tide bloom to occur, though. Enough dust would need to make it into the Gulf, which would require rain, said Prospero. Then, mild upwelling would need to bring additional nutrients from deeper water to the surface, since red tide algae need more than just nitrogen.

“We’ve been seeing a lot of *Trichodesmium* out there already,” said Heil. She suspects more *Trichodesmium* to grow based on the large size of the incoming dust cloud, but doesn’t have enough information yet to predict whether upwelling will create the right conditions for a red tide bloom. The Fish and Wildlife Research Institute publishes [updates](#) about red tide blooms in coastal Florida.

*Sarah Loftus is a [Mass Media Fellow](#) with the American Association for the Advancement of Science, sponsored by the Heising-Simons Foundation.*

*Jacqueline Charles, the Miami Herald Caribbean correspondent, contributed to this story.*





This satellite photo provided by the National Oceanic and Atmospheric Administration, NOAA, shows a cloud of dust coming from the Sahara desert arriving to the Caribbean Monday, June 22, 2020. The massive cloud of dust is blanketing the Caribbean as it heads to the U.S. with a size and concentration level that meteorologists say hasn't been seen in roughly half a century. (NOAA via AP) AP

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