

Hurricane Michael leaves 'unimaginable destruction'

2 hours ago



Media caption

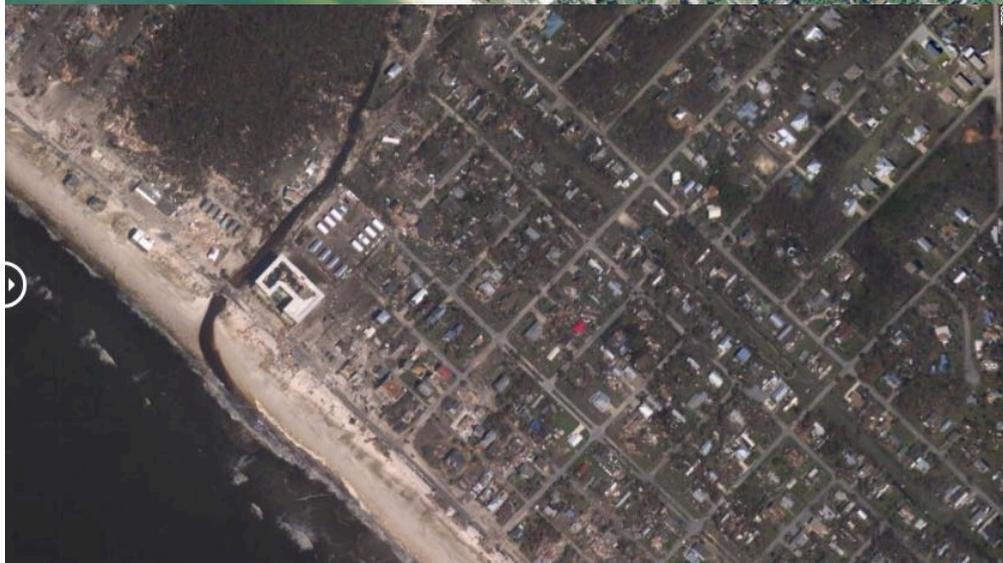
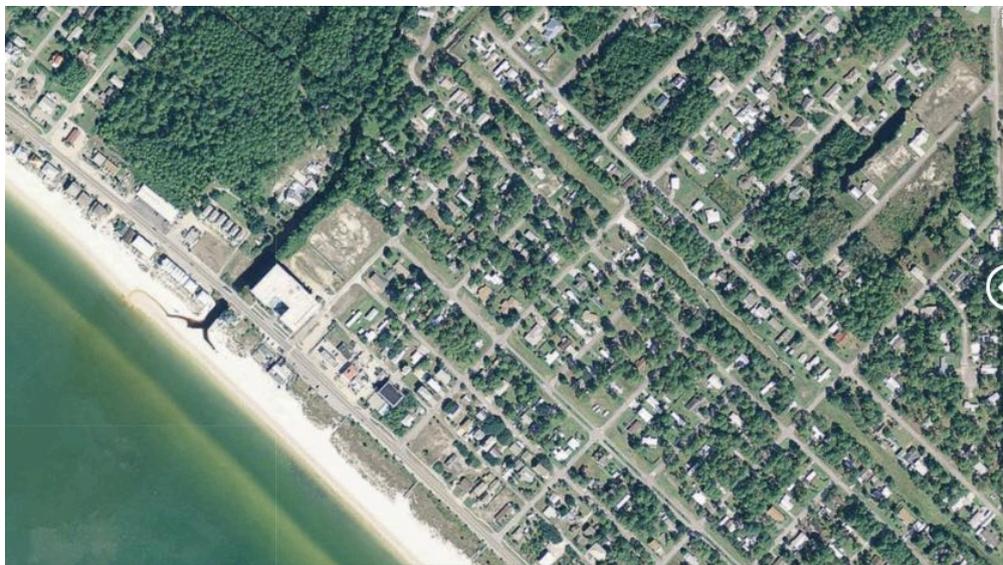
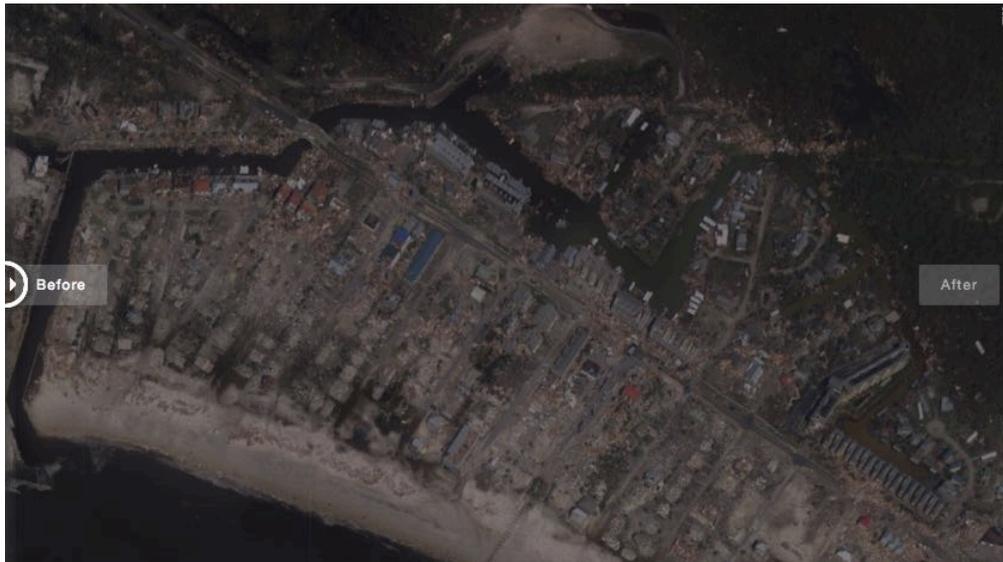
Aerial footage shows the destruction in Mexico Beach, Florida

Hurricane Michael left "unimaginable destruction" as it ploughed into coastal areas of Florida, the state's governor, Rick Scott says. "So many lives have been changed forever," he said. "So many families have lost everything." The worst hit areas of Florida's northwest coast saw houses ripped from their foundations, trees felled, and power lines strewn across streets. Hurricane Michael struck on Wednesday with winds of 155mph (250km/h). It weakened to a storm as it moved inland towards the north-east, but at least six people have died, most of them in Florida. More than 370,000 people in Florida were ordered to evacuate but officials believe many ignored the warning. Governor Scott said the US Coast Guard carried out 10 missions overnight, saving at least 27 people.

Before and after images show there's nothing left in some parts of Mexico Beach

<https://edition.cnn.com/2018/10/12/us/before-after-aerial-images-mexico-beach-devastation-trnd/index.html>





Which areas are worst affected?

Michael ploughed into Florida's Panhandle coast near the town of Mexico Beach at 14:00 (18:00 GMT) on Wednesday, one of the strongest storms to ever hit the US mainland. Ranked four on the five-step Saffir-Simpson scale and with a storm surge of 9ft (2.7m), it lifted homes from their foundations and heavily damaged others in districts closest to the sea in Mexico Beach, CNN helicopter footage showed.

Twenty survivors were found in the town overnight, AP reports, but 285 had refused to obey warnings to evacuate.



A boat tossed onshore in Mexico Beach

Head of the Federal Emergency Management Agency, Brock Long, called Mexico Beach "ground zero" due to the damage.

Trees were downed in Panama City, northwest of Mexico Beach, buildings flattened, boats and electrical cables scattered.

Apalachicola, with 2,300 residents, was also badly affected, the mayor reporting that downed cables were making it difficult to get through the town.

Debris and floodwater are also making some of the worst-hit areas difficult to reach.

Governor Scott urged residents not to return until the authorities "make sure things are safe", given the danger from power lines and other debris.

Silence and Sun

By Gary O'Donoghue, BBC News, Mexico Beach, Florida

One of the first things you notice as you walk into Mexico Beach is the stillness.

No wind, almost no-one on the street, just the beating hot Sun and the debris: debris everywhere, tossed and scattered - the calling card of a monstrous storm.

And then you hear faint beeping sounds coming from all directions - a dissonant symphony of high-pitched notes that turn out to be myriad small alarms, still transmitting their warnings from the batteries which power them.

On the left, as we walk, there's a mattress slumped at the roadside, on the right a Dean Koontz novel lies in the dirt.

Picking our way through a mass of rubble and detritus that was once a house, we spot an American flag on the ground; in amongst it all there is also a toy car and a cracked glass plate from a microwave.

A little further on, and a woman, accompanied by a friend, is sifting through the remains of her home, loading what she can salvage into the boot of a car. This was her dream retirement place she tells me - the last four years spent doing it up. "I'll never step back in there," she says through her tears.

The sheer force of Hurricane Michael has been well analysed, but it's only when you see the everyday stuff of people's lives crushed, broken, smashed to pieces, that you realise they will be living with this long after we have gone.

Who are the victims?

Six deaths have been confirmed - four in Florida, one in Georgia and one in North Carolina.

Florida officials say one man died when he was crushed in an incident involving a tree in Gadsden County.

In Seminole County, Georgia, a metal car-shelter lifted by a gust of wind hit a mobile home, killing a girl of 11.



Residents of Mexico Beach have returned to find homes heavily damaged

Travis Brooks, director of Seminole County's emergency management agency, told ABC News there was "complete and total devastation".

Michael earlier reportedly killed at least 13 people as it passed through Central America: six in Honduras, four in Nicaragua and three in El Salvador.

Winds have knocked out power to more than 900,000 homes and businesses across Florida, Alabama, the Carolinas and Georgia.

Around 6,000 are thought to have sought refuge in official shelters, mainly in Florida.

What is the storm doing now?

With reduced winds of 50mph, according to the National Hurricane Center (NHC), Michael has moved north-east crossing Georgia and is closing in on Greensboro, North Carolina.

The NHC warned that communities in north-west Florida and North Carolina faced the threat of life-threatening flooding as rising water moved inland from the coast.

The Carolinas are still recovering from **the floods of Hurricane Florence**.

States of emergency have been declared in all or parts of Florida, Alabama, Georgia and North Carolina.

Is climate change making hurricanes worse?

By Chris Fawkes
BBC Weather

30 December 2017



NASA/NOAA

The past year has been a busy one for hurricanes.

There were 17 named storms in 2017, 10 hurricanes and six major hurricanes (category 3 or higher) - an above average year in each respect. The 10 hurricanes formed consecutively, without weaker tropical storms interrupting the sequence. The only other time this has been recorded was in 1893. Are these storms getting worse? And does climate change have anything to do with it?

A year of records

This Atlantic hurricane season has been particularly bad. There was Harvey, which **pummelled the United States in August**. It brought the largest amount of rain on record from any tropical system - 1,539mm. It caused the sort of flooding you'd expect to see once every 500 years, causing \$200bn of damage to Houston, Texas. Ironically, this was the third such "one every 500 years" flood Houston had suffered in three years.



Usually hurricanes might last a day or two, but the torrential rain from Harvey lasted a week.

September brought Irma, which **devastated Caribbean communities**. It was the joint second strongest Atlantic hurricane ever, with sustained winds of 185mph. Those winds were sustained for 37 hours - longer than any tropical system on record, anywhere in the world.

Saffir - Simpson hurricane scale

	<p>Category 1</p> <ul style="list-style-type: none"> • Winds 74-95 mph (119-153 km/h) • Some damage and power cuts
	<p>Category 2</p> <ul style="list-style-type: none"> • Winds 96-110 mph (154-177 km/h) • Extensive damage
	<p>Category 3</p> <ul style="list-style-type: none"> • Winds 111-129 mph (178-208 km/h) • Well-built homes suffer major damage
	<p>Category 4</p> <ul style="list-style-type: none"> • Winds 130-156 mph (209-251 km/h) • Severe damage to well-built homes, trees blown over
	<p>Category 5</p> <ul style="list-style-type: none"> • Winds 157+ mph (252+ km/h) • Many buildings destroyed, major roads cut off

BBC

Next came Hurricane Maria - another category 5 hurricane, with sustained winds of 175mph - which **destroyed Puerto Rico's power grid**. Finally, **Hurricane Ophelia span past Portugal and Spain** - the farthest east any major Atlantic hurricane has ever gone.



Ophelia carried Saharan dust as far north as London, darkening the sky in the middle of the day

Despite this, 2017 wasn't the worst year in some key respects.

It didn't produce the strongest storm - that was Hurricane Allen in 1980, with sustained winds of 190mph.

Nor did it have the greatest number of storms - that was 2005, which saw an incredible 28 named storms, including seven major hurricanes. One of them was the infamous Hurricane Katrina.

But 2017 was probably the costliest. Estimates for the cost of the hurricane season vary and continue to be revised, ranging up to \$385bn.

By comparison, 2005 **racked up \$144bn in damage according to the National Hurricane Center** - about \$180bn today, adjusted for inflation.



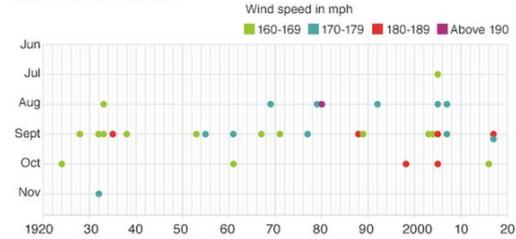
Harvey's persistent rain caused catastrophic flooding in parts of Texas

It has certainly been a bad year. But over time, are hurricanes getting worse?

There have been 33 of the strongest category 5 hurricanes since 1924. Eleven of these have occurred in the past 14 years.

Are the strongest hurricanes becoming more frequent?

Hurricanes from 1924-2017



Source: National Hurricane Center at NOAA

BBC

We know that hurricanes are powered by warm seas and over the past 100 years global average sea temperatures have risen by about 1C.

But when you look at the total strength of storms in each year since records began, some years are more fearsome than others.

Meteorologists use something called accumulated cyclone energy (ACE) to calculate the total wind power of all the storms in any given year.

As you can see from the following chart, there's no clear upward trend.

Why not?

Even though seas are getting warmer, other factors can prevent hurricanes forming in particular years.

Saharan dust can interfere with hurricane formation as can the close proximity of African storms to the equator.

But one of the great weather ironies is that hurricanes hate strong winds.

Strong winds in the Atlantic interfere with the circulation of air through a developing storm. This stops the storm growing into a hurricane.

During a phenomenon called El Niño, the Pacific Ocean near the equator gets warmer than usual. This affects global wind patterns, leading to stronger winds in the Atlantic.

That means El Niño years tend to be quiet years for hurricanes.

But when the Pacific is cooler (known as La Niña), the reverse is true - making it easier for hurricanes to form. And 2017 is a La Niña year.

In fact, the total storm strength in La Niña years has been rising decade by decade.

Land drainage

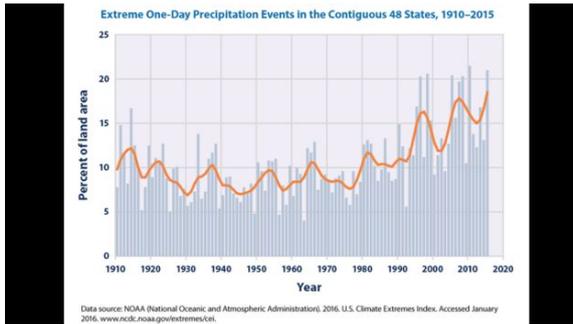
High winds are just part of the story. Climate change affects hurricane seasons in other ways, too.

Rainfall during hurricanes can be devastating. Hurricane Harvey would have brought severe flooding to Houston regardless of climate change.

But it is reasonable to assume that Harvey brought more rain than it would have done 100 years ago.

Global air temperatures have also increased by about 1C in the past 100 years, and warmer air holds more water.

That's likely to be behind the increasing frequency of extreme rainfall events seen in the US in recent decades.



Extreme rainfall events are becoming more common in the US, according to data from the EPA

But the location of housing compounded the damage.

Houston's population has more than doubled since 1960 to more than two million people. Housing developments are expanding into more marginal, poorly drained land.

This puts more people in harm's way.

Climate change is also causing seas to rise.

Melting glaciers and land-based ice sheets contribute to higher sea levels.



Melting glaciers are causing sea levels to rise

Also warmer water occupies a larger volume. So as seas warm up, sea levels rise.

In the US, the largest sea-level rise is around the coast of the Gulf of Mexico - about 9.6mm each year at Eugene Island, Louisiana.

All of this is increasing vulnerability to flooding when hurricanes and their associated storm surge reach land.

Scientists are still analysing what this data will mean, but a warmer world may bring us a greater number of more powerful category 4 and 5 hurricanes and could bring more extreme rainfall.

There's an increased risk of flood damage - whether related to climate change, rising sea levels or more people moving into flood-prone areas.

Correction 29 January 2018: This story has been updated to clarify that it is modelling rather than historical data that predicts stronger and wetter hurricanes.