

## Hurricane Milton - A Big Deal

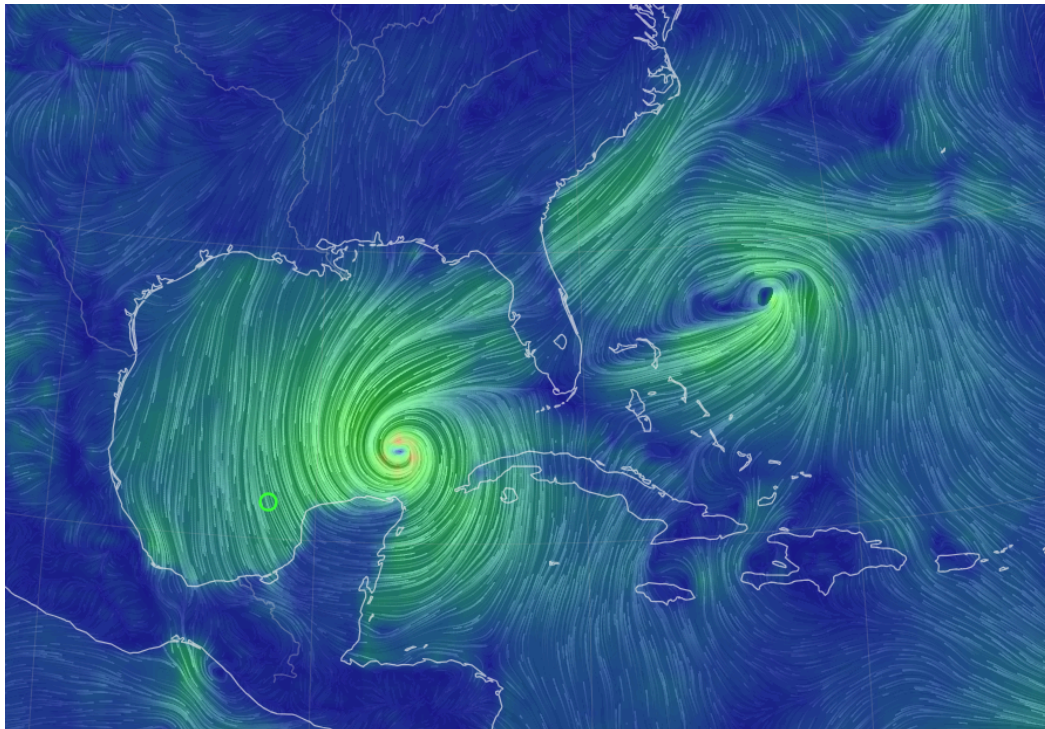
### Hurricanes and Climate Change

For a more complete introduction to how hurricanes form and how they are guided across the Atlantic, be sure to go back and look over [CSSG-2.22 Hurricanes and Climate Change](#)

## Hurricane Milton

Since this hurricane is actually bearing down on us, right now, from the Yucatan and across the gulf, and is expected to make landfall this evening (Wednesday, October 9, 2024, let's use it to learn more about the realities we face and may face in the future.

For a real-time look at the hurricane, we'll go first to Earth.nullschool.net: [Earth Nullschool](https://earth.nullschool.net/). Here's how the sea level winds looked at 6 pm Tuesday (the link above should give you the most recent update.)



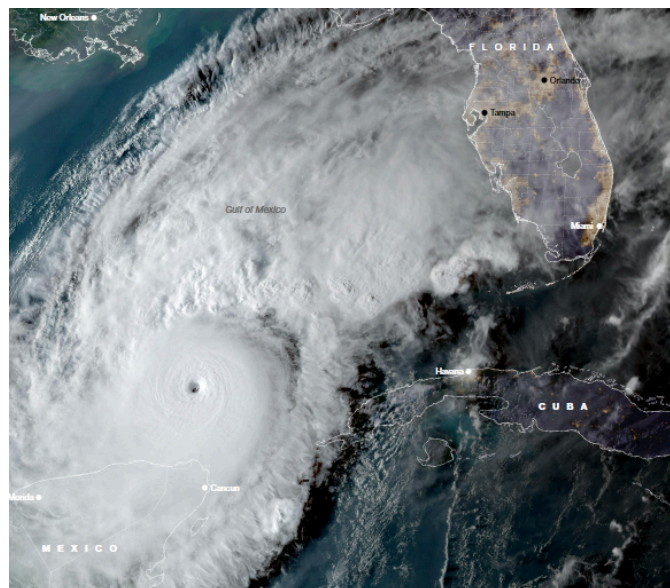
From this first glimpse, it looks like maybe a direction of travel might be to the other circulation across Miami? Especially notice that these surface winds are coming FROM Tampa towards the hurricane!

A critical question, of course, is where is it heading?

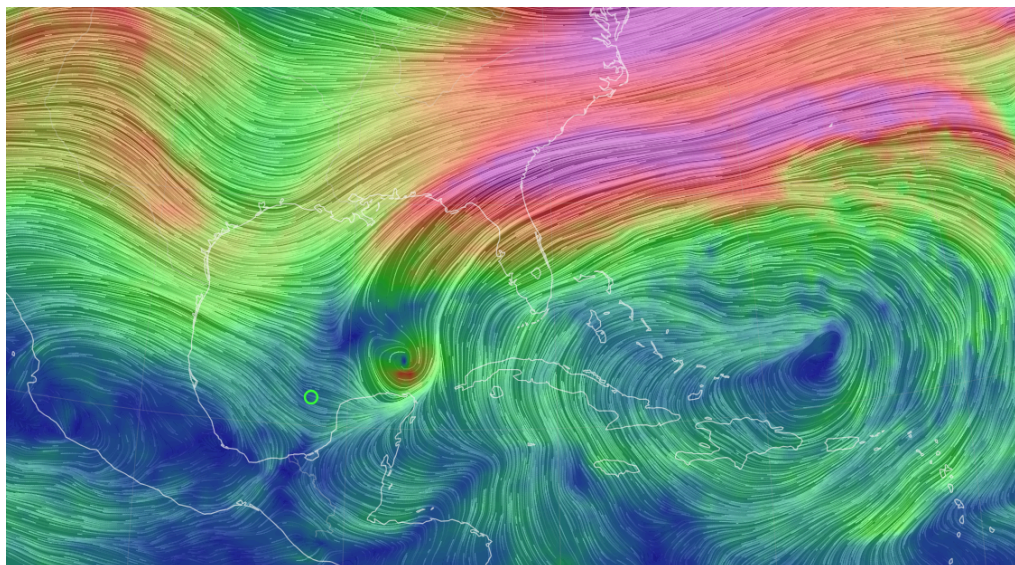
A recent projection looked something like this:



Notice that this is very different from the path through Miami. Something else is at play. This photo of the cloud path is definitely further North



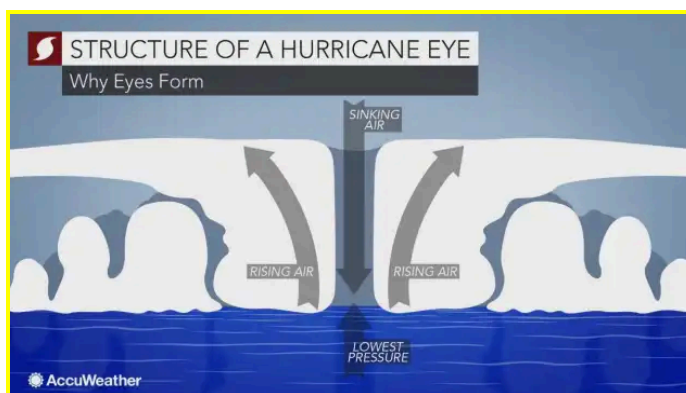
It turns out that the most important steering mechanism is the **Jet Streams**. See **CSSG-2.32 The Jet Streams at** [CSSG-2.32 The Jet Streams](#) , which are several miles up (perhaps 8 miles up, but this varies). Here's the link to the most recent data at that altitude: [Earth Nullschool](#)



Note that these winds are above the hurricane and guiding it further north towards Tampa and that area. The Jet Streams are the main guiding force.

What's the deal with Barometric Pressure Drop? First, remember:

- The air pressure at sea level is around 1000 millibars ( $1000 \times 1/1000 = 1$  bar). It's actually around 1013 millibars on the average.
- In a hurricane, air warmed by the sea temperature rises causing a low pressure area. As this rising air zone becomes more defined and the updraft intensifies, the pressure can drop a lot.



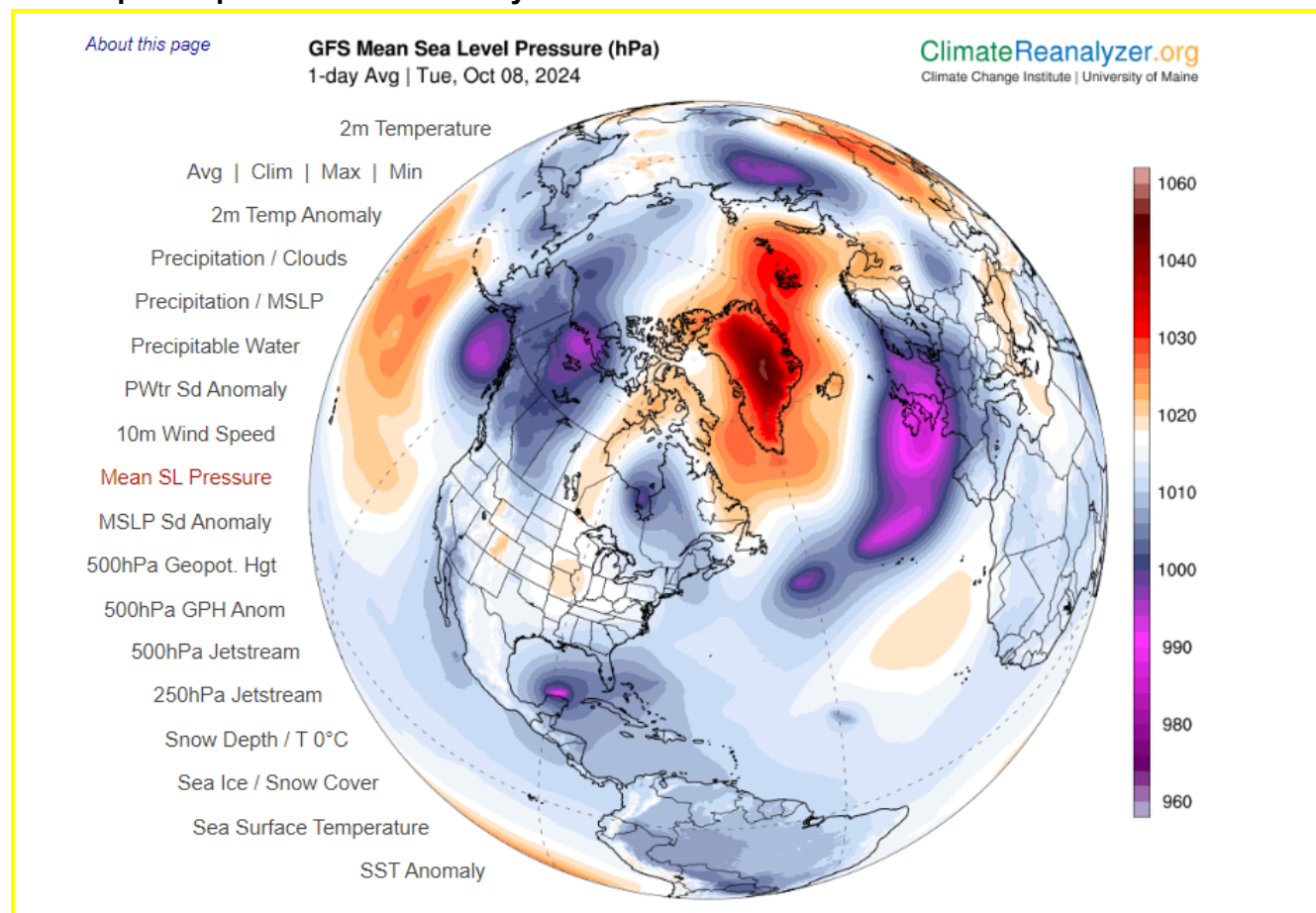
Here's a way to get a handle on how big a pressure drop matters. Remember 1013 mb is about the average sea level pressure. From the color scale on Milton Tuesday, its center pressure is on the

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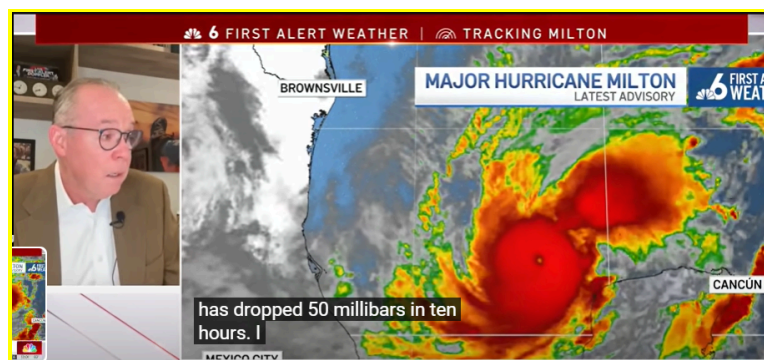


order of perhaps 980 mb. This is only a 30 mb drop at the moment of this data. We'll see that the real drop was quite a bit more shortly.



This is John Morales, our nationally-known meteorologist from Miami on Monday Morning as it brushed by the Yucatan. The ultimate drop was 80 mb, if I remember.

[https://youtu.be/lmrqhcMDL9A?si=U2BxM0WPRiB\\_Tqjg](https://youtu.be/lmrqhcMDL9A?si=U2BxM0WPRiB_Tqjg)



Given this little background, let's take a look at the first 8 minutes of a respected climate scientist's reaction to the storm, found at: [My Thoughts on Cat6 Superstorms, Hurricane Milton, Intensification, Jet Strea...](#)

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## Hurricane Winds

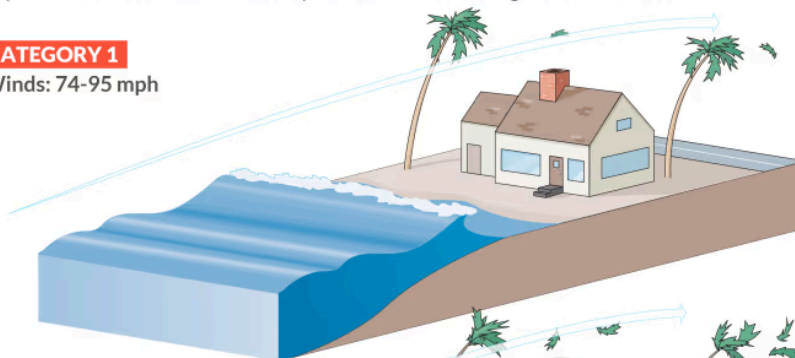
SAFFIR SIMPSON WIND SCALE		
CATEGORY	WIND (MPH)	DAMAGE
1	74-95	SOME
2	96-110	EXTENSIVE
3	111-129	DEVASTATING
4	130-156	CATASTROPHIC
5	157+	CATASTROPHIC

## Hurricane intensity

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's intensity. The scale gives an estimate of the potential property damage and flooding expected from a hurricane. Wind speed is the determining factor in the scale.

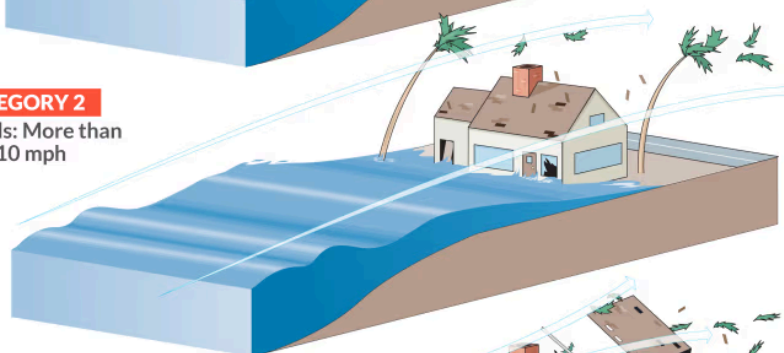
### CATEGORY 1

Winds: 74-95 mph



### CATEGORY 2

Winds: More than 96-110 mph



### CATEGORY 3

Winds: 111-130 mph



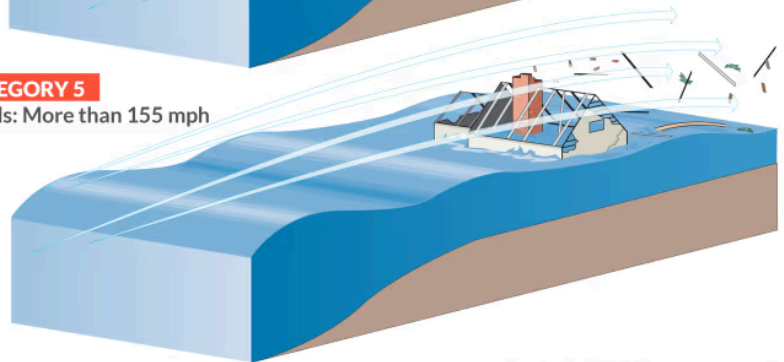
### CATEGORY 4

Winds: 131-155 mph



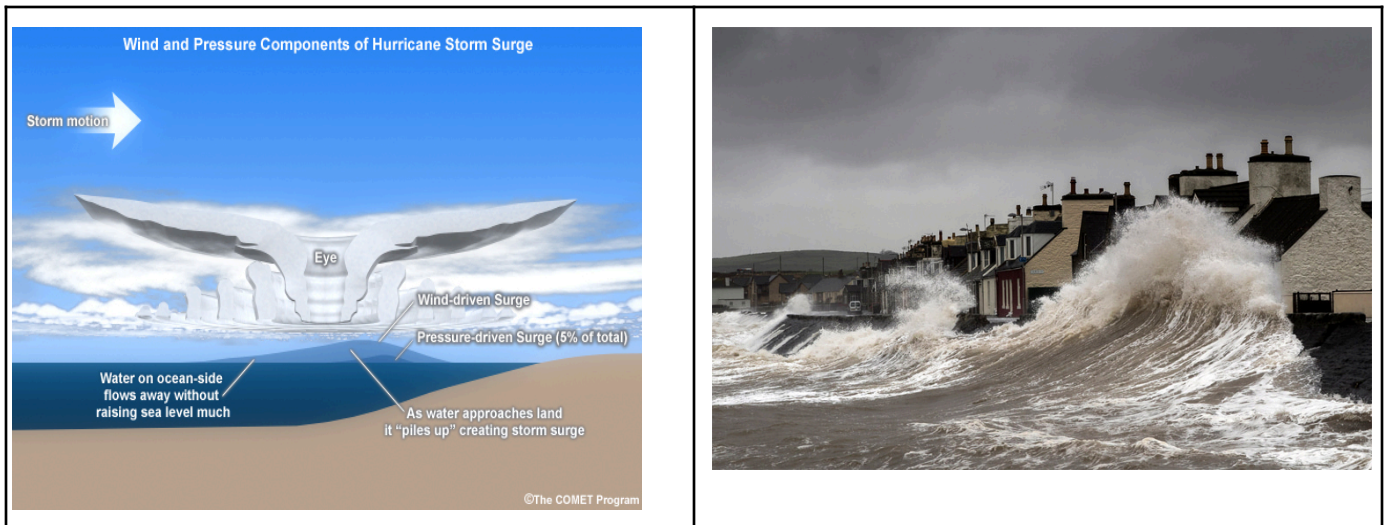
### CATEGORY 5

Winds: More than 155 mph



Sources: NOAA; National Weather Service, CEMA

## Storm Surge



The low pressure in the eye acts as a vacuum cleaner, sucking the surface of the ocean up - this is the storm surge. Add to that the tide level and the height of the waves kicked up by the storm.

## PUNCHLINES

### Hurricanes and Climate Change

While this is really just a quick look at the subject (again, look back at CSSG-2.22), there are some important things to note:

- The updraft which forms the storm's center is enhanced by the warmer water. The gulf is 2-4 °F hotter than normal
- Warmer air holds much more water - about 10% more for 3 °F. Expect more intense rains.
- The low pressure, rising air draws in the surface air, causing it to rotate counterclockwise in the northern hemisphere. (A high pressure zone will rotate in a clockwise direction, so it's easy to tell high and low pressure areas in earth.nullschool.net.)
- The updraft acts as a vacuum cleaner, causing a storm surge on top of tides and wind-driven wave heights.
- While we didn't look at this, a slow-moving hurricane may be able to spread out more, greatly impacting its affected area and amount of rain.



**Approximate "Cheat Sheet":**

1 meter → 3 feet      1 degree Celsius ( $^{\circ}\text{C}$ ) → 2 degree Fahrenheit ( $^{\circ}\text{F}$ )  
ppm = parts per million       $\text{CO}_2$  = Carbon Dioxide  
1 tonne = 1000 kilograms = 2205 pounds      1 gigatonne (1 Gt) = 1 billion tonnes  
1 trillion tonnes (1Tt) = 1000 gigatons

## GOOD NEWS CORNER

<https://www.washingtonpost.com/climate-solutions/interactive/2024/air-conditioning-humidity-hotter-summers-solutions/>



How to build an AC that will  
get the world through hotter  
summers

washingtonpost.com

## Our Natural World

<https://apple.news/AZHx2MqPWTFqHGhYI8nP0TQ>



Antarctica is 'greening' at dramatic rate as climate heats

The Guardian

Apple News