

## What Causes Hurricanes?

Hurricanes are enormous storms that form over warm ocean water. The ocean's surface must be at least 80°F (27°C) for a hurricane to start. When warm water evaporates, it creates clouds and makes the storm grow. Wind patterns in the atmosphere help the storm get organized, and once it becomes strong enough, it can turn into a hurricane.



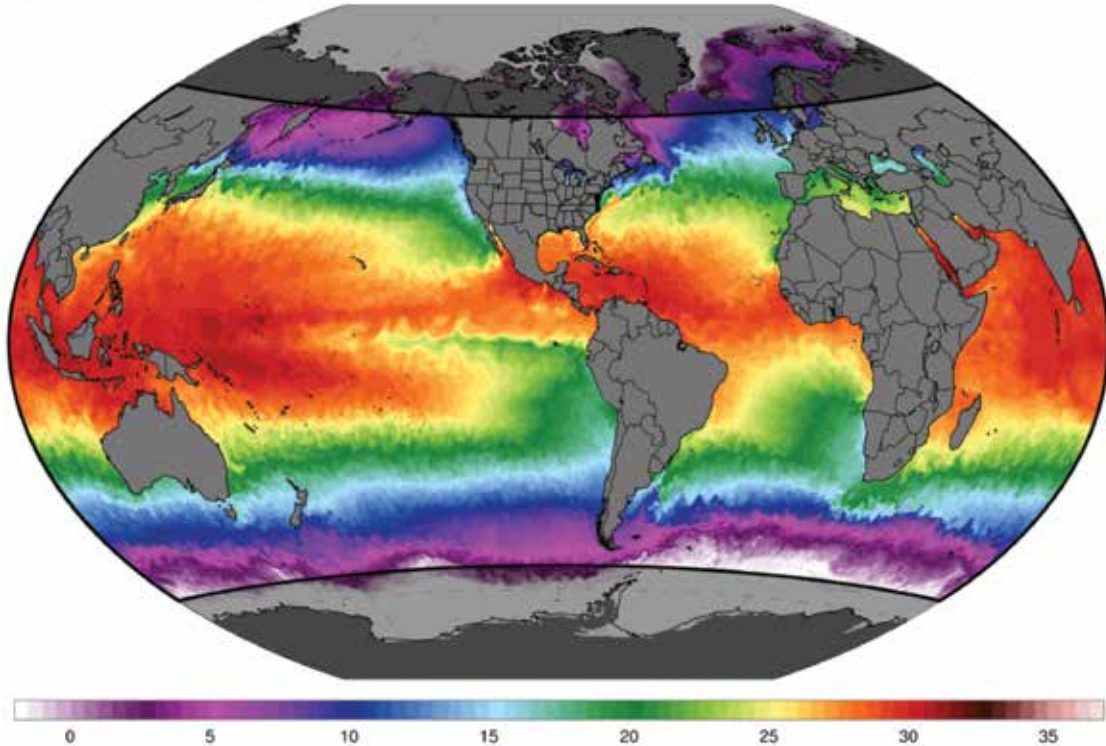
Photo by NASA

*Hurricane Milton, a Category 5 storm at the time of this photograph, seen from the International Space Station on October 8, 2024.*

As the world warms due to climate change, hurricanes become more intense. Warmer oceans give hurricanes more energy, making them stronger and causing more rain and flooding. Rising sea levels also worsen storm surges, which means more flooding in coastal areas. These massive, rotating storm systems require a sea surface temperature of at least 80°F (27°C) to gain energy. Moist air above the ocean allows clouds to form and grow as warm water evaporates, while consistent wind patterns at all levels of the atmosphere help organize the storm.

NOAA OISST V2.1 Sea Surface Temperature (°C)  
Sun, Nov 03, 2024 | preliminary

ClimateReanalyzer.org  
Climate Change Institute | University of Maine



Climate Reanalyzer (n.d.). Daily Sea Surface Temperature Climate. Change Institute, University of Maine. Retrieved [11/04/2024], from <https://climatoreanalyzer.org/>

When a hurricane forms, it starts as thunderstorms over the ocean. If these storms grow, they turn into a tropical depression. If they get stronger, they become a tropical storm; if they get even more robust, they become a hurricane.

## How Are Hurricanes Rated?

Hurricanes are ranked based on wind speeds using the **Saffir-Simpson Hurricane Wind Scale**. There are five categories:

- **Category 1 (74-95 mph):** Some damage and a few power outages.
- **Category 2 (96-110 mph):** Moderate damage to buildings and trees.
- **Category 3 (111-129 mph):** Serious damage to buildings, flooding.
- **Category 4 (130-156 mph):** Severe damage, some areas become unlivable.
- **Category 5 (157+ mph):** Extreme damage, entire neighborhoods destroyed.

This scale measures wind speed, not other dangers like rainfall or flooding.

## What Are Some Recent Hurricanes?

- **Hurricane Ian (2022):** A Category 4 hurricane that hit Florida, causing heavy flooding and wind damage.
- **Hurricane Fiona (2022):** Also a Category 4 storm, it caused severe flooding in Puerto Rico.
- **Hurricane Helene (2024):** A Category 4 hurricane that caused flooding and damage in the southeastern U.S.
- **Hurricane Milton (2024):** A powerful Category 5 hurricane that weakened to a Category 3 before hitting Florida.

## Why Do Tornadoes Form in Hurricanes?

Tornadoes can happen on the outer edges of hurricanes. This occurs because the wind in hurricanes moves at different speeds and directions at various heights, creating instability that can cause a tornado. These tornadoes are usually smaller than regular ones but can still cause damage.

## What Does FEMA Do?

**FEMA** is the Federal Emergency Management Agency. They help people before, during, and after disasters like hurricanes. Their job includes:

- Setting up shelters for people who lose their homes.
- Providing food, water, and supplies.
- Helping communities rebuild after the storm.

After a hurricane, FEMA is often the first agency on the ground, helping people get back on their feet.



## How Do We Prepare for Hurricanes?

Communities can reduce hurricane damage by:

- Strengthening buildings to withstand strong winds.
- Building barriers like seawalls and improving drainage to reduce flooding.
- Restoring natural areas like wetlands which can help absorb stormwater.
- Setting up early warning systems to alert people to evacuate in time.

Once a hurricane passes, local governments and volunteers work together to clean up, restore power, and rebuild homes and infrastructure.

## How Does Climate Change Affect Hurricanes?

Climate change is making hurricanes stronger. Warmer ocean waters give hurricanes more energy, and a warmer atmosphere holds more moisture, leading to heavier rain. Rising sea levels also make storm surges more dangerous, causing more flooding along the coasts.

1. What temperature does the ocean need to be for a hurricane to form?
2. What is the Saffir-Simpson Hurricane Wind Scale used for?
3. How does climate change affect hurricanes?
4. What is FEMA's role during and after a hurricane?
5. Why do tornadoes sometimes form during hurricanes?