

## The Saffir-Simpson Hurricane Scale

The Saffir-Simpson Hurricane Scale (SSHS) was developed in order to categorize tropical cyclones and hurricanes based on their strongest wind speed, central pressure, and storm surge. Today, the SSHS' only criterion is wind speed. After the listing of each category on the scale is a recent storm that of that category, in the Northern Atlantic at landfall. Category 3, 4, and 5 Hurricanes are considered to be "Major Hurricanes".

Category	Wind Speed	Recent Atlantic U.S Landfall
Tropical Depression	≤38 mph (≤33 knots)	Ten (2007)
Tropical Storm	38-74 mph (34-63 knots)	Ana (2015)
Category 1 Hurricane	74-95 mph (64-82 knots)	Isaac (2012)
Category 2 Hurricane	96-110 mph (83-95 knots)	Dolly (2008)
Category 3 Hurricane	111-129 mph (96-112 knots)	Rita (2005)
Category 4 Hurricane	130-156 mph (113-136 knots)	Charley (2004)
Category 5 Hurricane	≥157 mph (≥137 knots)	Andrew (1992)

The SSHS does not take into account other factors such as storm surge, central pressure, or rainfall, nor does the scale function for extratropical cyclones (non-tropical systems). Therefore, many catastrophic storms were not highly categorized (if at all) at landfall despite their overall strength. Most notably, Hurricane Katrina in 2005 (made landfall as a Category 3), Tropical Storm Allison in 2001, and Hurricane Sandy in 2012 (turned extratropical as it made landfall).

Hurricane Isaac approaching the Louisiana coast in 2012.  
Photo Credit: NWS Jackson, MS



## Hurricane Safety

Many weather phenomena are caused by hurricanes, such as flash flooding, storm surge, intense winds, and occasionally weak tornadoes, even far inland. Hurricane Katrina (2005) still had hurricane status over north-east Mississippi, for example.

Therefore, hurricanes cause a significant threat to coastal and inland residents alike. The best way to remain safe during a hurricane is evacuation, particularly for residents who live on the water or in low-lying places. If an evacuation order is given for your area, evacuate, remembering to take important documents, medication, pets, and food and water. If you are unable to evacuate, shelters may be available for you to stay.

If an evacuation order is not given and you stay home, be sure to have enough food, water, batteries, and medication to last at least three-four days. Roads maybe flooded and it may be unsafe you leave your house. Remember, you may lose electricity, phone service, and internet access during the storm.

The most dangerous part of hurricane frequently is the storm swells. If at the beach while a hurricane is over the ocean, be sure you listen for warnings from the lifeguards about the waves and rip currents.

For more information about hurricanes and hurricane safety, go to:

<http://www.nhc.gov/climo>  
<http://www.nhc.noaa.gov/prepare/>  
<http://www.ready.gov/hurricanes>

Cover Photo Credit: NWS Jackson, MS

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## Tropical Storms And Hurricanes



Hurricane Rita (2005) near peak strength in the Gulf of Mexico

What is a hurricane?  
 When do tropical storms and hurricanes occur?  
 How do we measure hurricane strength?  
 How do I stay safe in a hurricane?

StormReady in a Box  
 Supplemental Information Pamphlet  
 NWS Twin Cities  
 Chanhassen, MN

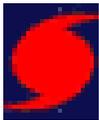
## Tropical Cyclones, Tropical Storms, and Hurricanes

A **tropical cyclone** is a rotating, organized, warm-core system, composed of clouds, showers, and thunderstorms, that develops over the ocean in the tropical latitudes, typically between 5° and 25° North or South.

A **tropical storm** (symbol right) is a tropical cyclone whose sustained wind speeds are at least 38 mph (34 knots).



A **hurricane** (symbol left) is a tropical cyclone whose sustained wind speeds are greater than 74 mph (64 knots).



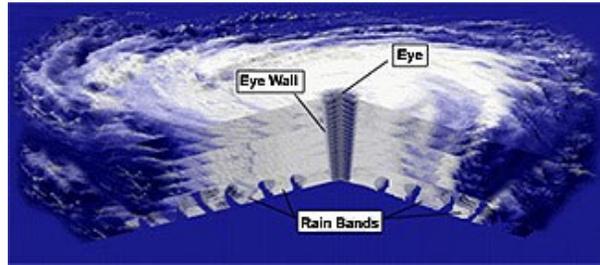
When tropical cyclones form or weaken so their sustained wind speeds of less than 38 mph (34 knots), they are classified as a **tropical depression**. On weather maps, tropical depressions are symbolized with a capital “L” like other low pressure systems.

When a tropical cyclone forms at tropical depression status, it is given a number (e.g. Tropical Depression Two) and advisories are initiated by the National Hurricane Center in Miami, FL. Once the depression reaches tropical storm strength (or if the system forms at tropical storm strength), the cyclone is given a name based on annual lists provided by the World Meteorological Organization (WMO). It retains this name for the remainder of its lifespan.

Tropical Cyclones vary in how long they last. Some weak systems may only last a couple days, while other systems may last for nearly a month. Recently, Hurricane Nadine in 2012 spent over three weeks in the Northeast Atlantic Ocean, near the Azores. While, also in 2012, Tropical Storms Joyce and Oscar only survived less than three days.

## Parts of a Hurricane

There are three main parts of a hurricane: the eye, the eye wall, and out rain bands. All of the parts are fairly easy to see via satellite and radar imagery.



The **eye** of a hurricane is a central region of the storm, where conditions are calm and relatively clear. Usually the eye is located at or near the center of a hurricane’s rotation, and (in the Northern Hemisphere) the hurricane spins counterclockwise around it. Typically, when we speak of a where a hurricane is making landfall, we talk about where the eye passes over. Frequently, the stronger the storm the more well-defined the eye is.



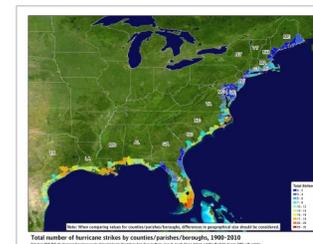
Well-Defined Eye in Hurricane Katrina

The **eye wall** is the region immediately outside the eye. In the eye wall, the heaviest precipitation and strongest winds occur. There is an incredible amount of energy within the eye wall, and with stronger storms and lower pressures, the eye strengthens. The eye goes through “replacement cycles” which temporarily (or sometimes permanently) weaken the hurricane and restore energy to the eyewall region.

A hurricane’s **outer/rain bands** produce heavy rains and significant winds. Occasionally, this region of the storm may spawn a weak tornado and other severe weather. Rainfall from the outer bands (and eye wall) can often cause flooding, especially when combined with storm surge.

## Tropical Cyclone and Hurricane Climatology

In the Atlantic Basin, Hurricane season stretches from June 1st through November 30th. In the Eastern Pacific, Hurricane season starts on May 15th and ends concurrently with the Atlantic’s on November 30th. However, tropical storms and hurricanes can occur at any time of the year, even outside hurricane season. However, the most tropical storms and hurricanes form between late August and early October. Tropical cyclones can occur in other regions of the world, too, including the Western Pacific, the Indian Ocean, and the South Pacific. In these basins, tropical cyclones are called just cyclones or typhoons. Tropical Cyclones do not regularly occur in the Southeast Pacific or the South Atlantic.



The primary locations in the United States that are threatened by the tropical cyclones are the Gulf and Atlantic

coasts in the southeastern United States, although systems can move inland and cause significant weather and damage inland. Tropical systems also threaten Mexico, Central America, the islands of the Caribbean, and Bermuda. Eastern Pacific tropical cyclones do not typically make landfall in the United States, outside rare landfalls in Hawaii, such as Hurricane Isele in 2014.

Atlantic basin tropical cyclones can make landfall in non-Tropical locations. Notable examples include Hurricane Carol (1950) made landfall in New York and Connecticut and Hurricane Vince (2005) made landfall in Spain as a Tropical Depression.