

## **Hurricanes: Interesting Facts and F.A.Q.**

- The word hurricane comes from the Taino Native American word, hurucane, meaning evil spirit of the wind.
- The first time anyone flew into a hurricane happened in 1943 in the middle of World War II.
- A tropical storm is classified as a hurricane once winds go up to 74 miles per hour or higher.
- Hurricanes are the only weather disasters that have been given their own names.
- All hurricanes begin life in a warm moist atmosphere over tropical ocean waters.
- A typical hurricane can dump 6 inches to a foot of rain across a region.
- The most violent winds and heaviest rains take place in the eye wall, the ring of clouds and thunderstorms closely surrounding the eye.
- Every second, a large hurricane releases the energy of 10 atomic bombs.
- Hurricanes can also produce tornadoes. They are not as strong as regular tornadoes and last only a few minutes.
- Slow moving hurricanes produce more rainfall and can cause more damage from flooding than faster-moving, more powerful hurricanes.
- Hurricane Floyd was barely a category I hurricane, but it still managed to mow down 19 million trees and caused over a billion dollars in damage.
- Most people who die in hurricanes are killed by the towering walls of sea water that comes inland.
- In the Pacific Ocean, Hurricanes are generally known as typhoons. In the Indian Ocean they are called tropical cyclones.
- The man who first gave names to hurricanes was an Australian weather forecaster named C. Wragge in the early 1900s.
- The first hurricane of the year is given a name beginning with the letter "A".
- Hurricane season is from June to November when the seas are at their warmest and most humid, which are ripe conditions for a hurricane to develop.
- The planet Jupiter has a hurricane which has been going on for over 300 years. It can be seen as a red spot on the planet. This hurricane on Jupiter is bigger than the Earth itself.

**Q. What are "Cape Verde" type hurricanes?**

Cape Verde-type hurricanes are those Atlantic basin tropical cyclones that develop into tropical storms fairly close (<1000km or so) to the Cape Verde Islands and then become hurricanes before reaching the Caribbean. (there may be other definitions). Typically, this occurs in August and September, but in rare years (like 1995), there may be some in late July and/or early October. The numbers range from none up to around five per year, with an average of around 2.

**Q. What is the “eye?” How is it formed and maintained?**

The “eye” • is a roughly circular area of comparatively light winds and fair weather found at the center of a severe tropical cyclone. Although the winds are calm at the axis of rotation, strong winds may extend well into the eye. There is little or no precipitation in the eye, and sometimes blue sky or stars can be seen. The eye is the region of lowest surface pressure and warmest temperatures aloft: the eye temperature may be more than 10°C (18°F) warmer at an altitude of 12 km (8 mi) than the surrounding environment, but only 0-2°C (0-3°F) warmer at the surface in the tropical cyclone. Eyes range in size from 8 km (5 mi) to over 200 km (120 mi) across, but most are approximately 30–60 km (20–40 mi) in diameter. The eye is surrounded by the eyewall—“the roughly circular area of deep convection which is the area of highest surface winds in the tropical cyclone. The eye is composed of air that is slowly sinking and the eyewall has a net upward flow as a result of many moderate and occasionally strong updrafts and downdrafts. The eye’s warm temperatures are due to compressional warming of the subsiding air. Most soundings taken within the eye show a low-level layer which is relatively moist, with an inversion above. This suggests that the sinking in the eye typically does not reach the ocean surface, but instead only gets to around 1–3 km of the surface.

The general mechanisms by which the eye and eyewall are formed are not fully understood, although observations have shed some light on the subject. The calm eye of the tropical cyclone shares many qualitative characteristics with other vortical systems such as tornadoes, waterspouts, dust devils and whirlpools. Given that many of these lack a change of phase of water (i.e. no clouds and diabatic heating involved), it may be that the eye feature is a fundamental component to all rotating fluids. It has been hypothesized that supergradient wind flow (i.e. swirling winds that are stronger than what the local pressure gradient can typically support) near the radius of maximum winds (RMW) causes air to be centrifuged out of the eye into the eyewall, thus accounting for the subsidence in the eye. However, Willoughby found that the swirling winds within several tropical storms and hurricanes were within 1–4% of gradient balance. It may be that the amount of supergradient flow needed to cause such centrifuging of air is only on the order of a couple percent and thus difficult to measure.

Another feature of tropical cyclones that probably plays a role in forming and maintaining the eye is the eyewall convection. Convection in tropical cyclones is organized into long, narrow rainbands which are oriented in the same direction as the horizontal wind. Because these bands seem to spiral into the center of a tropical cyclone, they are sometimes called spiral bands. Along these bands, low-level convergence is at a maximum, and therefore, upper-level divergence is most pronounced above. A direct circulation develops in which warm, moist air converges at the surface, ascends through these bands, diverges aloft, and descends on both sides of the bands. Subsidence is distributed over a wide area on the outside of the rainband but is concentrated in the small inside area. As the air subsides, adiabatic warming takes place, and the air dries. Because subsidence is concentrated on the inside of the band, the adiabatic

warming is stronger inward from the band causing a sharp fall in pressure across the band since warm air is lighter than cold air. Because of the pressure drops on the inside, the tangential winds around the tropical cyclone increase due to the increases in the pressure gradient. Eventually, the band moves toward the center and encircles it and the eye and eyewall form.

Thus, the cloud-free eye may be due to a combination of dynamically forced centrifuging of mass out of the eye into the eyewall and to a forced descent caused by the moist convection of the eyewall. This topic is certainly one that can use more research to ascertain which mechanism is primary.

Some of the most intense tropical cyclones exhibit concentric eyewalls—two or more eyewall structures centered at the circulation center of the storm. Just as the inner eyewall forms, convection surrounding the eyewall can become organized into distinct rings. Eventually, the inner eye begins to feel the effects of the subsidence resulting from the outer eyewall, and the inner eyewall weakens to be replaced by the outer eyewall. The increasing pressure due to the destruction of the inner eyewall is usually more rapid than the decreasing pressure caused by the intensification of the outer eyewall, causing the cyclone to weaken for a short period of time.

**Q. What does an average hurricane season mean?**

An average hurricane season brings 10.6 tropical storms. Six of those become hurricanes and two become major hurricanes, meaning category 3 or greater.

The average is based on data from 1968 to 2003. Officially, the Atlantic hurricane season is from June 1 to November 30, although storms can form outside this time period.

**Q. What year was the most active? What year was the least active?**

Until recently, 1933 had the most named storms on record with 21. In 2005, that record was broken when the National Hurricane Center identified 28 storms. Since all of the traditional names had been used for 2005, the last six named storms were called "Alpha," "Beta," "Gamma," "Delta," "Epsilon," and "Zeta," the first six letters of the Greek alphabet.

1933 is now second, and 1995 is third with 19 tropical storms. 2005 also had the most hurricanes in one season with 15. The least number of tropical storms happened in 1983 when just four storms formed. In 1982, just two hurricanes formed, making it the year with the least amount of hurricanes since 1968.

**Q. Do I need to open my windows when a hurricane approaches?**

That's a question we get every hurricane season. The answer is a resounding no. It is a myth that opening windows will help equalize pressure in your house when a hurricane approaches.

Your windows should be boarded up with plywood or shutters. Leaving your windows open will just bring a lot of rain into your house and flying debris could fly into your home, too. Don't waste time taping your windows either. It won't help prevent hurricane damage. It's just another myth.

**Q. Why are hurricanes named?**

A tropical cyclone is given a name when it becomes a tropical storm. It's much easier to remember the name of a storm than try to track it by using latitude and longitude. It also helps prevent confusion when there is more than one tropical storm or hurricane occurring at the same time.

In 1953, the U.S. Weather Bureau began assigning women's names to tropical storms. In 1979, men's names were included on the list. The names are in alphabetical order, excluding the letters Q, U, X, Y and Z.

Today, the list includes names of English, Spanish and French origin because these languages are most commonly used by the countries in the Atlantic Basin. There are six lists of names. Each list is used in rotation every six years.

**Q. How and why are names retired?**

A name is retired when the storm caused so many deaths or so much destruction that it would be confusing or insensitive to use the name again. The World Meteorological Organization is in charge of retiring hurricane names and choosing new names.

The headline-making hurricanes of 2004 -- Charley, Frances, Ivan and Jeanne -- have all been retired. They will be replaced by Colin, Fiona, Igor, and Julia when the list is used again this year.

**Q. Does El Niño affect hurricanes?**

It can. In years with an El Niño, there are typically fewer tropical storms and hurricanes because vertical shear increases during El Niño years. The vertical shear can prevent tropical cyclones from forming and can prevent storms from intensifying.

El Niño is a warming of the equatorial Pacific Ocean waters, which usually occurs every three to seven years and affects weather patterns around the world.

La Niña is the opposite of El Niño and is characterized by cooler than normal ocean waters in the tropical Pacific. In years with La Niña, researchers have found that there is an increased number of hurricanes and an increased chance that the United States and Caribbean will experience hurricanes.