

Tornadoes: Interesting Facts and F.A.Q.

- Have you ever heard that a tornado can make your house explode? This particular myth sounds believable at first. The idea is that tornadoes bring such a drop in atmospheric pressure that the higher pressure inside your home will make it explode unless you open all the windows. Luckily for homeowners, there's no truth to this. Unless you live in a downed spaceship, your house probably has enough venting to avoid explosion. All opening the windows will accomplish is making it a little easier for debris to hit you while the storm is rolling through.
- Each year, about a thousand tornadoes touch down in the United States, far more than any other country.
- Waterspouts are tornadoes that form over a body of water.
- Knives and forks have been found embedded in tree trunks flung from a tornado.
- Usually a tornado starts off as a white or gray cloud but if it stays around for a while, the dirt and debris it sucks up eventually turns it into black one.
- 3 out of every 4 tornadoes in the world happen in the United States.
- Thunderstorms most likely to give birth to Tornadoes are called supercells.
- Tornado winds are the fastest winds on Earth.
- In 1928, a tornado in Kansas plucked the feathers right off some chickens.
- In 1931 a tornado in Mississippi lifted an 83 ton train and tossed it 80 feet from the track.
- Some tornadoes make a considerable amount of noise while others make very little. It depends on the objects a tornado might hit or carry. A tornado moving along an open plain may make very little noise.
- In 1989 the deadliest tornado ever recorded in the world killed around 1300 people in Bangladesh.
- In the southern hemisphere tornadoes usually rotate in a clockwise direction.
- In the northern hemisphere tornadoes usually rotate in a counterclockwise direction.

Q. What is it like in the eye of a tornado?

As far as we can tell, there are only two people on record that claim to have been in the center of a tornado and lived. Not surprisingly, both of them were farmers. The first man was Will Keller, from Greensburg, Kan.

On June 22, 1928, Mr. Keller was with his family, checking out the damage to his wheat crop from a hailstorm that had just passed. He spotted an umbrella-shaped cloud in the near distance and had a feeling that a tornado might develop. Before he knew it, there were three funnel clouds heading his way in a hurry. Keller rushed his family to their storm cellar and, before climbing in himself, decided to take another look. He'd seen many tornadoes over the years, so he wasn't afraid, but remained cautious. Keller said he was transfixed by the twister, and he held his position until it was directly overhead.

Once inside the swirling cloud, Keller said that everything was "as still as death." He reported smelling a strong gassy smell and had trouble breathing. When he looked up, he saw the circular opening directly overhead, and estimated it to be roughly 50 to 100 feet in diameter and about a half a mile high. The rotating cloud walls were made clearly visible by constant bursts of lightning that "zigzagged from side to side." He also noticed a lot of smaller tornadoes forming and breaking free, making a loud hissing noise. The tornado then passed, skipping over his house and smashing the home of his neighbor.

The second account from Roy Hall does nothing to disprove Keller's story. Hall was a soybean farmer in McKinnet, Texas. One spring afternoon in 1951, Hall and his family were outside when a nasty storm approached. He sent his wife and kids inside to hide under a bed but stayed to watch the coming storm. He claims to have seen green sheets of rain just before the tornado formed. After baseball-sized hail started coming down, he went inside. He then heard a loud rumbling followed by complete silence. The walls began to shake, and to his surprise, his roof was ripped away and thrown into the woods nearby. At this point, he looked up to find the tornado directly overhead. He described the inside as a smooth wall of clouds, with smaller twisters swirling around the inside before breaking free. Once again, non-stop lightning created a bluish light, enabling him to see everything clearly. And then, just like that, the tornado passed and the sky turned sunny. The same storm killed 100 Texans, but Hall and his family survived.

Q. What is a supercell thunderstorm?

A supercell is an organized thunderstorm that contains a very strong, rotating updraft. This rotation helps to produce severe weather events such as large hail, strong downbursts, and tornadoes. Supercells usually form isolated from other thunderstorms because it allows the storm more energy and moisture from miles around. These storms are relatively rare, but always a threat to life and property.

Q. What is the difference between a funnel cloud and a tornado?

A tornado begins as a rotating, funnel-shaped cloud extending from a thunderstorm cloud base, which meteorologists call a funnel cloud. A funnel cloud is made visible by cloud droplets, however, in some cases it can appear to be invisible due to lack of moisture. A funnel cloud is not affecting the ground. If the funnel extends far enough down to begin affecting the ground, then it becomes a tornado.

Q. What is the path length of tornadoes? How long do they last? How fast do they move?

Tornado paths range from 100 yards to one mile wide and are rarely more than 15 miles long,

although some strong tornadoes on record have crossed through multiple states (e.g. the Tri-State Tornado of 1925. They can last from several seconds to more than an hour, however, most don't exceed 10 minutes. Most tornadoes travel from the southwest to northeast with an average speed of 30 mph, but the speed has been observed to range from almost no motion to 70 mph.

Q. When and where do tornadoes occur?

Most tornadoes occur in the deep south and in the broad, relatively flat basin between the Rockies and the Appalachians, but no state is immune. Peak months of tornado activity in the U.S. are April, May, and June. However, tornadoes have occurred in every month and at all times of the day or night. A typical time of occurrence is on an unseasonably warm and sultry Spring afternoon between 3 p.m. and 9 p.m.

Q. Does hail always come before the tornado? Rain? Lightning? Utter silence?

Not necessarily, for any of those. Rain, wind, lightning, and hail characteristics vary from storm to storm, from one hour to the next, and even with the direction the storm is moving with respect to the observer. While large hail *can* indicate the presence of an unusually dangerous thunderstorm, and *can* happen before a tornado, don't depend on it. Hail, or any particular pattern of rain, lightning or calmness, is not a reliable predictor of tornado threat.

Q. How do tornadoes dissipate?

The details are still debated by tornado scientists. We do know tornadoes need a source of instability (heat, moisture, etc.) and a larger-scale property of rotation (*vorticity*) to keep going. There are a lot of processes around a thunderstorm which can possibly rob the area around a tornado of either instability or vorticity. One is relatively cold *outflow*--the flow of wind out of the precipitation area of a shower or thunderstorm. Many tornadoes have been observed to go away soon after being hit by outflow. For decades, storm observers have documented the death of numerous tornadoes when their parent circulations (*mesocyclones*) weaken after they become wrapped in outflow air--either from the same thunderstorm or a different one. The irony is that some kinds of thunderstorm outflow may help to *cause* tornadoes, while other forms of outflow may *kill* tornadoes.

Q. Do tornadoes really skip?

Not in a literal sense, despite what you may have read in many older references, news stories, or even damage survey reports. By definition (above), a tornado must be in contact with the ground. There is disagreement in meteorology over whether or not multiple touchdowns of the same vortex or funnel cloud mean different tornadoes (a strict interpretation). In either event, stories of skipping tornadoes usually mean

1. There was continuous contact between vortex and ground in the path, but it was too weak to do damage;
2. Multiple tornadoes happened; but there was no survey done to precisely separate their paths (very common before the 1970s); or
3. There were multiple tornadoes with only short separation, but the survey erroneously classified them as one tornado.

Q. How long does a tornado last?

Tornadoes can last from several seconds to more than an hour. The longest-lived tornado in history is really unknown, because so many of the long-lived tornadoes reported from the early-mid 1900s and before are believed to be tornado series instead. Most tornadoes last less than 10 minutes.

Q. What is a waterspout?

A waterspout is a tornado over water--usually meaning non-supercell tornadoes over water. Waterspouts are common along the southeast U. S. coast--especially off southern Florida and the Keys--and can happen overseas, bays and lakes worldwide. Although waterspouts are always tornadoes by definition; they don't officially count in tornado records unless they hit land. They are smaller and weaker than the most intense Great Plains tornadoes, but still can be quite dangerous. Waterspouts can overturn boats, damage larger ships, do significant damage when hitting land, and kill people. The National Weather Service will often issue special marine warnings when waterspouts are likely or have been sighted over coastal waters, or tornado warnings when waterspouts can move onshore.

Q. Big fat tornadoes are the strongest ones, right?

Not necessarily. There is a statistical trend (as documented by NSSL's Harold Brooks) toward wide tornadoes having higher damage ratings. This could be related to greater tornado strength, more opportunity for targets to damage, or some blend of both. However, the size or shape of *any particular tornado* does not say anything conclusive about its strength. Some small "rope" tornadoes still can cause violent damage of EF4 or EF5; and some very large tornadoes over a quarter-mile wide have produced only weak damage equivalent to EF0 to EF1.

Q. Can't we weaken or destroy tornadoes somehow, like by bombing them or sucking out their heat with a bunch of dry ice?

The main problem with anything which could realistically stand a chance at affecting a tornado (e.g., hydrogen bomb) is that it would be even more deadly and destructive than the tornado itself. Lesser things (like huge piles of dry ice or smaller conventional weaponry) would be too hard to deploy in the right place fast enough, and would likely not have enough impact to affect the tornado much anyway. Imagine the legal problems one would face, too, by trying to bomb or ice a tornado, then inadvertently hurting someone or destroying private property in the process. In short--bad idea!

Q. How does cloud seeding affect tornadoes?

Nobody knows, for certain. There is no proof that seeding can or cannot change tornado potential in a thunderstorm. This is because there is no way to know that the things a thunderstorm does after seeding would not have happened *anyway*. This includes any presence or lack of rain, hail, wind gusts or tornadoes. Because the effects of seeding are impossible to prove or disprove, there is a great deal of controversy in meteorology about whether it works, and if so, under what conditions, and to what extent.

Q. I've heard about tornadoes picking up objects and carrying them for miles. Does this happen? Who does research on it?

Yes, numerous tornadoes have lofted (mainly light) debris many miles into the sky, which was then blown by middle- and upper-atmospheric winds for long distances. The vertical winds in

tornadoes can be strong enough to temporarily levitate even heavy objects if they have a large face to the wind or flat sides (like roofs, walls, trees and cars), and are strong enough to carry lightweight objects tens of thousands of feet high. Though the heaviest objects, such as railroad cars, can only be airborne for short distances, stories of checks and other papers found over 100 miles away are often true. The Worcester MA tornado of 9 June 1953 carried mattress pieces high into the thunderstorm, where they were coated in ice, before they fell into Boston Harbor. Pilots reported seeing debris fluttering through the air at high altitude near the thunderstorm which spawned the Ruskin Heights MO tornado of 20 May 1957. There is a research group at the University of Oklahoma which studies tornado debris flight. If you personally know of a case of tornado debris carried long-distance, they have a hotline you can call to report it.

Q. What were the deadliest U. S. tornadoes?

The "Tri-state" tornado of 18 March 1925 killed 695 people as it raced along at 60-73 mph in a 219 mile long track across parts of Missouri, Illinois and Indiana, producing F5 damage. The death toll is an estimate based on the work of Grazulis (1993); older references have different counts. This event also holds the known record for most tornado fatalities in a single city or town: at least 234 at Murphysboro IL. The deadliest of the modern era (since 1950) was on 22 May 2011, when a large EF5 tornado crossed Joplin, MO, causing 158 direct fatalities. The 25 deadliest tornadoes on record are listed here. We also have web links related to this and other major tornado events.

Q. What was the biggest known tornado to hit the United States?

The Hallam, Nebraska F4 tornado of 22 May 2004 is the newest record-holder for peak width, at nearly two and a half miles, as surveyed by Brian Smith of NWS Omaha. This is probably close to the maximum size for tornadoes; but it is possible that larger, unrecorded ones have occurred.

Q. How many tornadoes hit the US yearly?

Recent trends indicate around 1300, give or take a few hundred per year. The actual average is unknown, because tornado spotting and reporting methods have changed so much in the last several decades that the officially recorded tornado climatologies are believed to be incomplete. Also, in the course of recording thousands of tornadoes, errors are bound to occur. Events can be missed or misclassified; and some non-damaging tornadoes in remote areas could still be unreported.

Q. How many people are killed every year by tornadoes? How do most deaths happen in tornadoes?

On average, tornadoes kill about 60 people per year--most from flying or falling (crushing) debris. The actual number of tornado deaths in a year can vary wildly -- from single digits to hundreds, depending on many factors from both weather and society.

Q. What is tornado season?

Tornado season usually means the peak period for historical tornado reports in an area, when averaged over the history of reports. There is a general northward shift in "tornado season" in the U. S. from late winter through mid summer. The peak period for tornadoes in the southern plains, for example, is during May into early June. On the Gulf coast, it is earlier during the spring; in the northern plains and upper Midwest, it is June or July. Remember: *tornadoes can happen any time of year if the conditions are right!* If you want to know the tornado peak periods for your area, Harold Brooks of NSSL has prepared numerous tornado probability graphics, which include distribution during the year.