

# Thunderstorm Types

Thunderstorms are common in this part of the world, and most of us are quite familiar with them and the dangerous weather they can bring. Most individual thunderstorms only last several minutes, however some individual thunderstorms become very well-organized and can last several hours. These long-lived thunderstorms are called supercell thunderstorms. Supercell thunderstorms are responsible for the majority of significant severe weather, including very large hail and tornadoes. However, storms that form in organized lines (called squall lines) can also produce widespread strong and damaging winds.

## What is a Severe Thunderstorm?

A severe thunderstorm is defined by the National Weather Service as one that produces one or more of the following:

- Hail  $\frac{3}{4}$  of an inch in diameter (roughly the size of a dime)
- Wind gusts of 58 mph (50 knots) or higher
- Wind or hail damage
- A tornado

The National Weather Service issues severe thunderstorm warnings and tornado warnings, based in part on observations from storm spotters in the field.

## Tornado

A violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. A visible funnel does not need to reach to the ground for a tornado to be present; a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado. Tornadoes can assume a wide variety of shapes, sizes and colors depending on your viewing angle and many other factors.

## Funnel Cloud

A funnel extending from the base of a cloud, associated with a rotating column of air that is not in contact with the ground (and hence different from a tornado). A funnel cloud in itself is not dangerous, but provides a clue that a tornado could form very quickly.

## Wall Cloud

A localized, persistent, often abrupt lowering from the base of a thunderstorm. Not all wall clouds produce tornadoes!! Wall clouds can range from a fraction of a mile up to nearly five miles in diameter, and normally are found on the south or southwest side of a supercell thunderstorm. When seen from within several miles, dangerous wall clouds show rapid upward motion and cyclonic rotation. However, not all wall clouds rotate. Rotating wall clouds usually precede significant tornadoes, by anywhere from a few minutes up to nearly an hour. Wall clouds should be watched closely for signs of persistent, sustained rotation and/or rapid vertical motion.

## Rain-free base

A dark, horizontal cloud base with no visible precipitation beneath it. The rain-free base typically marks the location of the thunderstorm updraft. Tornadoes may develop from wall clouds attached to the rain-free base, or from the rain-free base itself - especially when the rain-free base is on the south or southwest side of the main precipitation area. Note that the rain-free base may not actually be rain free; hail or large rain drops may be falling. For this reason, updraft base is more accurate.

## Supercell

A significant severe thunderstorm with a persistent rotating updraft. Supercells are relatively rare, but are responsible for a remarkably high percentage of severe weather events, including tornadoes, extremely large hail and damaging straight-line winds. On radar, a supercell may have a hook echo and may show strong rotation.

## **Downburst**

A strong downdraft resulting in an outward burst of damaging winds at or near the ground. Downburst winds can produce damage equal to that of a strong tornado. Downbursts are usually associated with thunderstorms, but can also occur with showers too weak to produce thunder.

## **Storm Forecast Information**

During threatening storm conditions, the National Weather Service's forecast office, working with the Storm Prediction Center, utilizes an entire suite of forecasting products to keep the public informed about severe weather from days to minutes before the storms. The following explains a few of these forecasting products.

### **CONVECTIVE OUTLOOK**

Issued by the Storm Prediction Center, these convective outlooks cover the current day, tomorrow and the next day (day three). They are issued for the 48 contiguous states of the U.S. and offer guidance to NWS offices and others on where severe weather may occur.

### **HAZARDOUS WEATHER OUTLOOK**

Based in part on the Storm Prediction Center (SPC) convective outlooks, these outlooks provide a heads-up description of any hazardous weather that's expected in the next week. The main focus is on today and tomorrow, with more general information provided further into the future.

The HWO is written specifically for storm spotters, emergency managers and others who need specific severe weather forecast information for planning purposes. However, the HWO is available to everyone via the [Internet](#) and [Weather Radio](#).

The HWO provides details on what is expected (including what types of storms and hazards), when it is likely to happen and the meteorological reasoning behind it. It is written by NWS forecasters who are the experts in your local area and is updated as often as needed.

### **SHORT TERM FORECAST**

The local NWS office issues short term forecasts to describe what's expected in the next few hours over small groups of counties. These forecasts may include information on where storms are anticipated, or details on what existing severe storms are expected to do in the next few hours.

### **TORNADO/SEVERE THUNDERSTORM WATCH**

Tornado and severe thunderstorm watches are issued by the National Weather Service's Storm Prediction Center. Watches typically cover a large geographic area and are in effect for several hours. Watches may prompt the beginning of formal spotter activities in a community.

A watch means conditions are favorable for severe thunderstorms and perhaps tornadoes to develop in and close to the watch area. Remember that people in and close to a watch area should be alert to severe storm development. Also remember that watches are not issued for every single severe storm.

### **TORNADO WARNING**

A tornado warning is an urgent message from your local National Weather Service office. The warning means a tornado is imminent or occurring and indicates that immediate action is needed to avoid injury.

A tornado warning is usually based on a combination of radar information and storm spotter observations. Tornado warnings are issued for parts of counties and are in effect for about half an hour. A tornado warning may prompt local officials to sound outdoor warning sirens.

## **SEVERE THUNDERSTORM WARNING**

A severe thunderstorm warning is an urgent message that means a severe thunderstorm (containing hail at least dime size and/or winds in excess of 58 mph) is imminent or occurring.

**DO NOT IGNORE** severe thunderstorm warnings! These warnings give specific details as to what is expected and may cover a wide range of storms from dime size hail and 50 mph winds to destructive deadly storms producing softball size hail and 100 mph winds. And, severe thunderstorm warnings often precede tornado warnings, giving you even more advance notice that a dangerous storm is nearby.

## **SEVERE WEATHER STATEMENT**

The NWS issues severe weather statements to update warnings. Statements provide critical new information on a warning, including spotter reports, updated radar analysis, the latest storm motion and expected hazards.

## **LOCAL STORM REPORT**

These reports include the latest severe weather reports received by the National Weather Service, and include the time, location and a description of what happened. Spotter reports are the primary source for local storm report information.

All of the services mentioned above, along with more information, are available on the NWS Norman website - [www.srh.noaa.gov/oun/home.php](http://www.srh.noaa.gov/oun/home.php) and on [NWS Weather Radio](#).