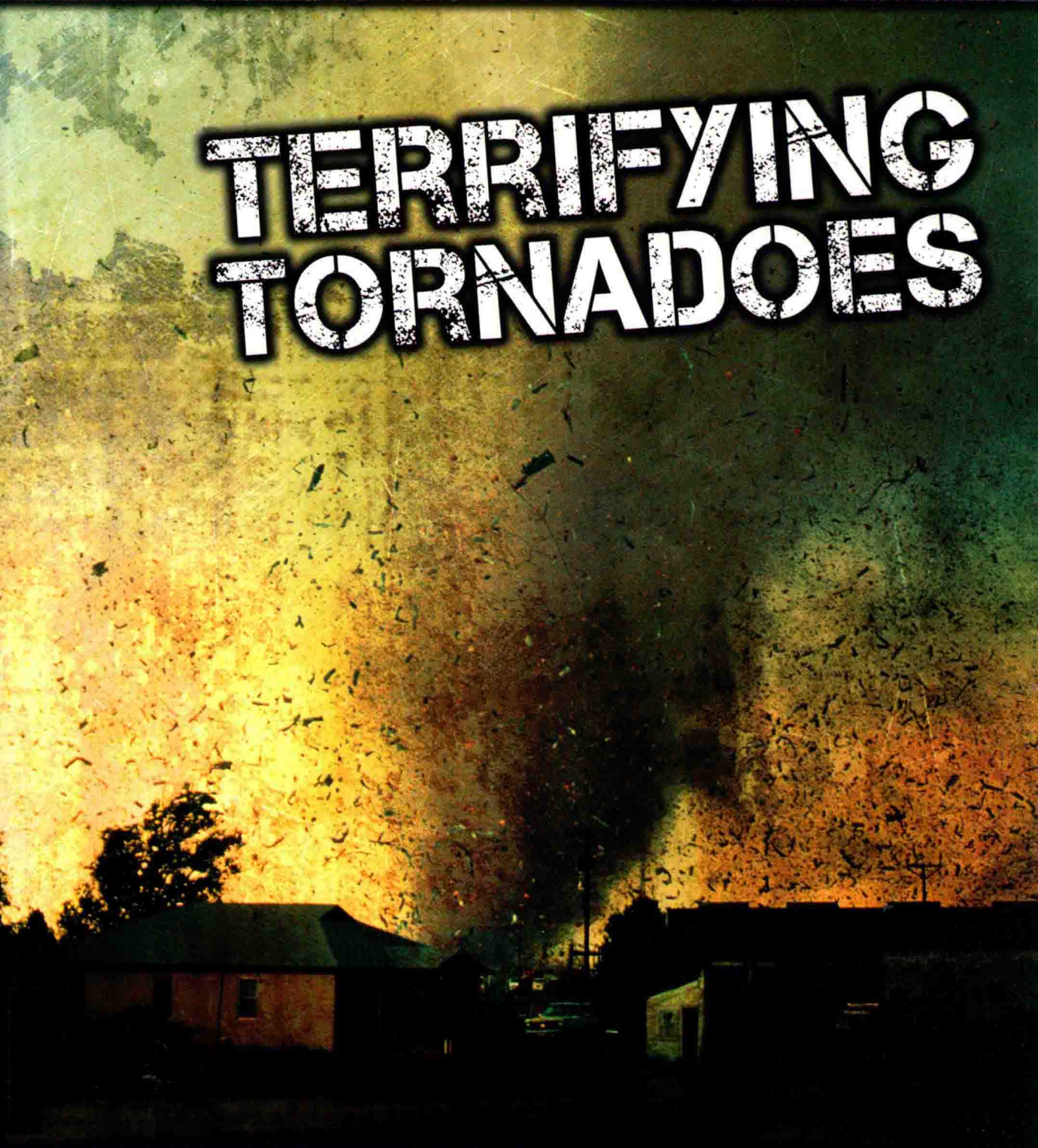


AWESOME FORCES OF NATURE



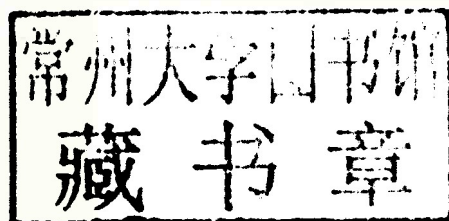
# TERRIFYING TORNADOES



AWESOME FORCES OF NATURE

# TERRIFYING TORNADOES

Revised and updated



Louise and Richard Spilsbury







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# What is a tornado?

Tornadoes are among the most terrifying forces of nature. A tornado is a fast-moving, spinning column of air that twists down from a thunderstorm cloud. The twisting column of air reaches all the way down to the ground from the cloud in a **funnel**. Many tornadoes look like high, narrow black spinning tops. Other tornadoes look like incredibly long twisted ropes, or even bubbling masses of clouds.

Most of the tornadoes that happen are small. They may last for only a few seconds and do no damage at all. Large tornadoes can be hundreds of metres wide and kilometres high. These tornadoes are the most violent winds on Earth.



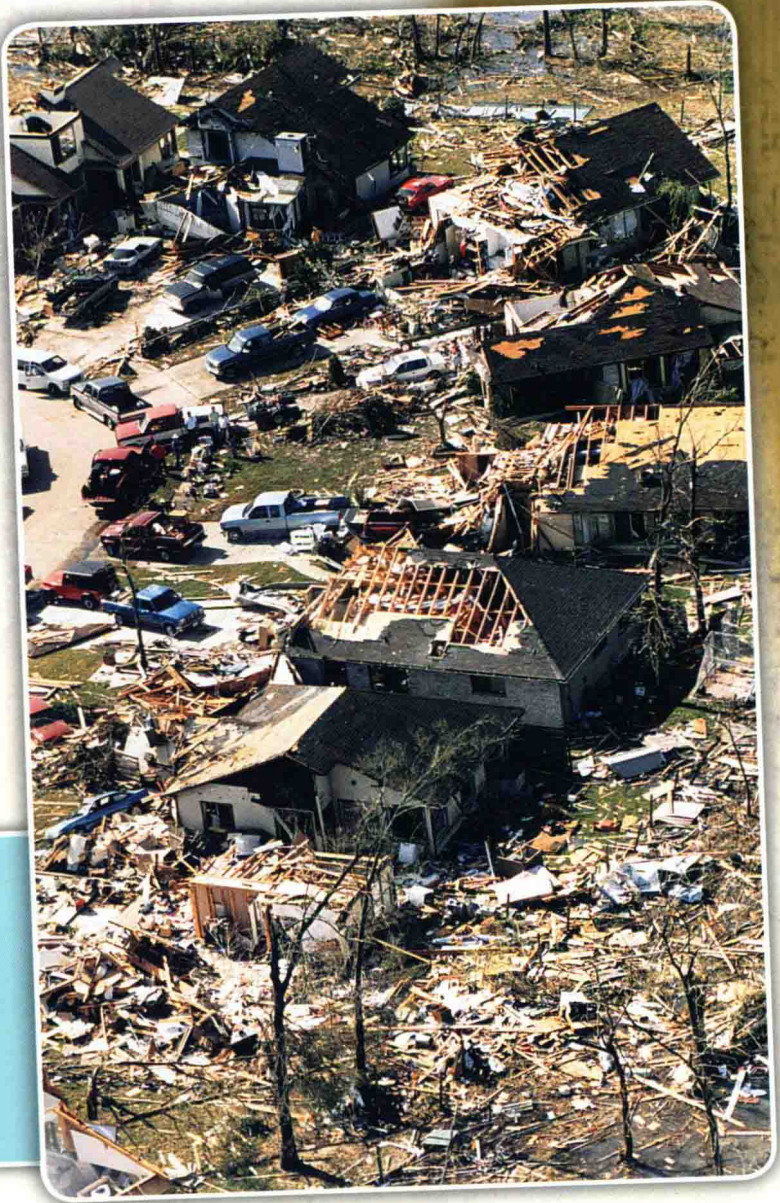
This tornado touched down in Canada in 2007. Tornadoes are often called twisters because the winds within them twist and spin.



## Spinning winds

Tornadoes can travel at great speeds and they can cause terrible destruction. The spinning winds in the funnel of a tornado act like an enormous vacuum cleaner. They can suck up cars, trains, trees and even houses, and drop them down again from a great height. The winds in tornadoes spin so fast that they can tear buildings apart and flatten whole forests when they pass over.

When a series of six tornadoes hit Houston, Texas, USA, in November 1992, many homes and buildings were severely damaged.



## Where did tornadoes get their name?

The word 'tornado' comes from the Latin word *tonare* or the Spanish word *tornar*, which mean 'to twist or turn'. It may also come from the Spanish word *tronada*, which means thunderstorm. These words give a good description of tornadoes – twisting thunderstorms.

# What causes tornadoes?

Tornadoes happen when warm, wet winds from one direction meet colder, dryer winds moving in the opposite direction. When these two kinds of winds meet, the warm air rises over the cold air and starts to spin. This is how a tornado starts.

The rising, spinning air sucks in warm air from just above the ground. This warm air becomes part of the tornado. Warm air rises and this makes the tornado rise higher in the air. As it rises, it spins faster and faster. This spiralling part is called the **funnel** or **spout**.

## TORNADO FACTS

- 1 The winds spinning in the funnel of a big tornado may blow faster than any other winds on Earth.
- 2 Two out of every hundred tornadoes have spinning winds of over 330 kilometres per hour.

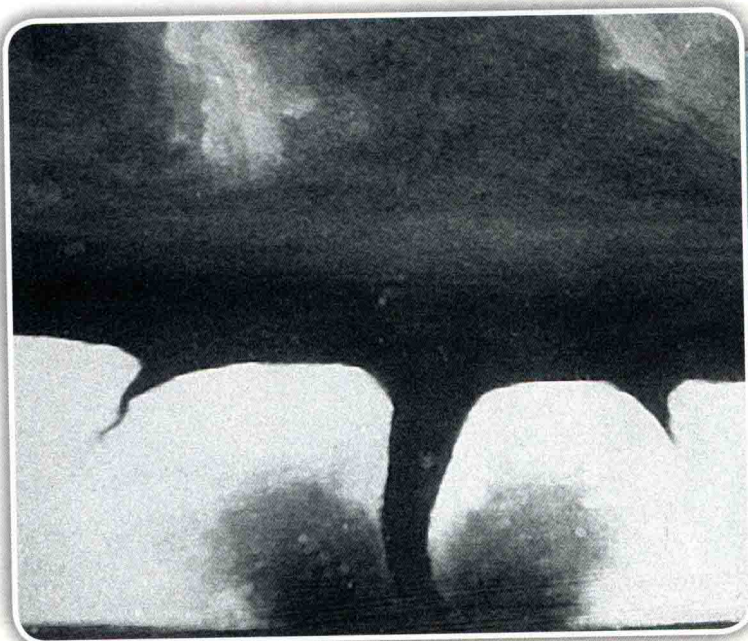
The white column of twisting air in this picture is the part of a tornado called the funnel.





## What is a tornado like?

A tornado may spin for just a few seconds, or it may go on for several hours. It may spin over one spot for a while and then suddenly dart off in one direction. It is very difficult to tell where a tornado is going next. Sometimes they zigzag about, moving quickly from side to side. Sometimes there are several tornadoes that move in a group or follow each other.



Some tornadoes grow so big that they create other smaller tornadoes. These extra tornadoes can head off on their own. This picture shows the oldest known photo of a group of tornadoes. It was taken in 1884!

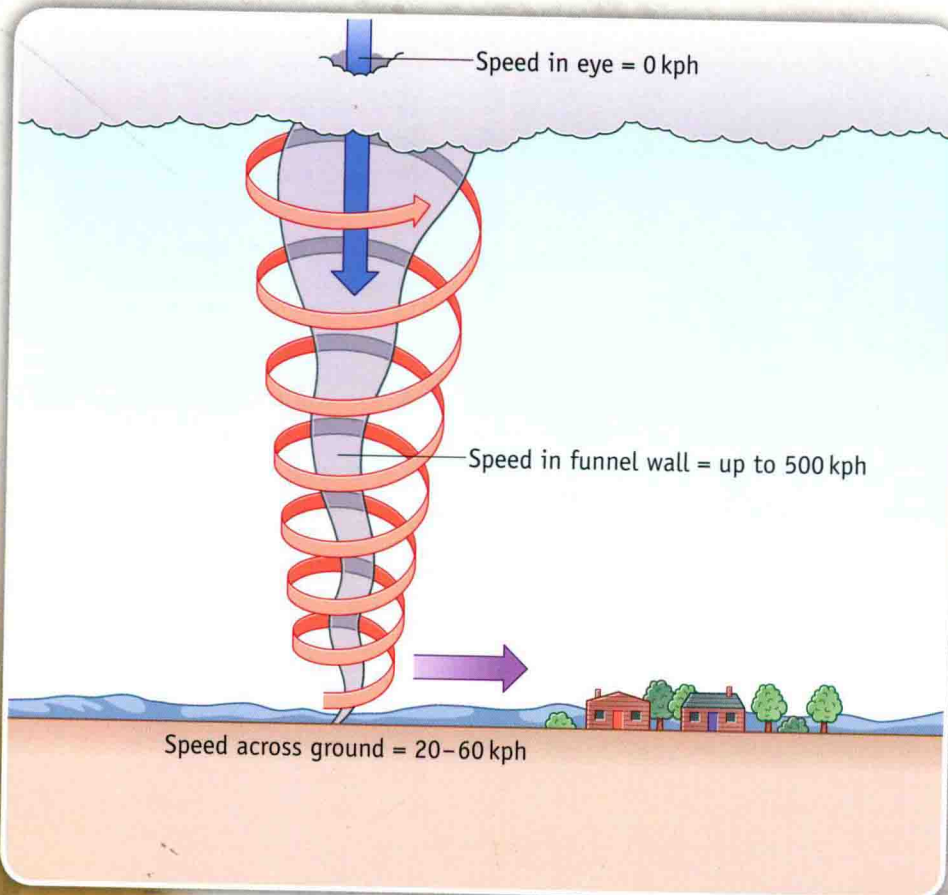
## What is the difference between a tornado and a hurricane?

Tornadoes and **hurricanes** both have spinning winds, but they are very different forces of nature. A hurricane is a huge storm, but a tornado comes from a storm. Tornadoes can happen in hurricanes. Although they are violent, tornadoes are only very small compared to hurricanes. Tornadoes almost always start far inland, away from the coast. Hurricanes start over warm oceans. Most tornadoes last for less than half an hour, while hurricanes can rage for weeks.

## What is a tornado's eye?

The **eye** is the very centre of a tornado. The eye is the point around which the strong tornado winds spiral and twist. It is calm inside the eye. There may be a few clouds and just a gentle breeze. People who have lived through a tornado describe its sound as being like the roaring of many trains or the buzzing of millions of bees. In the eye it may suddenly become quieter.

Some people have seen inside a tornado's eye. They say that when you look up it is like standing at the bottom of a huge pipe. The sides look like a stack of huge, ring-shaped clouds. These clouds are so thick that you cannot see through them.



This diagram shows the speeds in different parts of a tornado as it travels across the ground.



## What is a waterspout?

Most tornadoes happen far inland, away from water. A **waterspout** is an unusual tornado that forms over an area of water, such as a river, lake, or ocean. This kind of tornado sucks up water as well as warm air.

Waterspouts can be one metre to tens of metres wide. They can be as little as 10 metres high, but the largest waterspout ever seen was over 1500 metres high! Waterspouts usually only last for about 15 minutes. They don't cause as much destruction as tornadoes, but they can seriously damage ships that meet them at sea.

### It's raining fish and toads!

Like tornadoes on land, waterspouts pick up objects and drop them down again. Waterspouts have caused showers of toads in France, dropped tadpoles in New York, and once dropped fish from the skies over Rhode Island in the USA!

This is a waterspout off Florida Keys, USA. Most waterspouts look something like this – their thin column-shaped **funnels** sucking water up in the air.



# Where and when do tornadoes happen?

Tornadoes can happen anywhere in the world, if the right combination of warm, damp winds meet colder, dryer winds. More tornadoes happen in the USA than anywhere else in the world. Tornadoes also happen in Australia, parts of Europe, such as Italy and the UK, and in Bangladesh and India.

## Tornadoes in England!

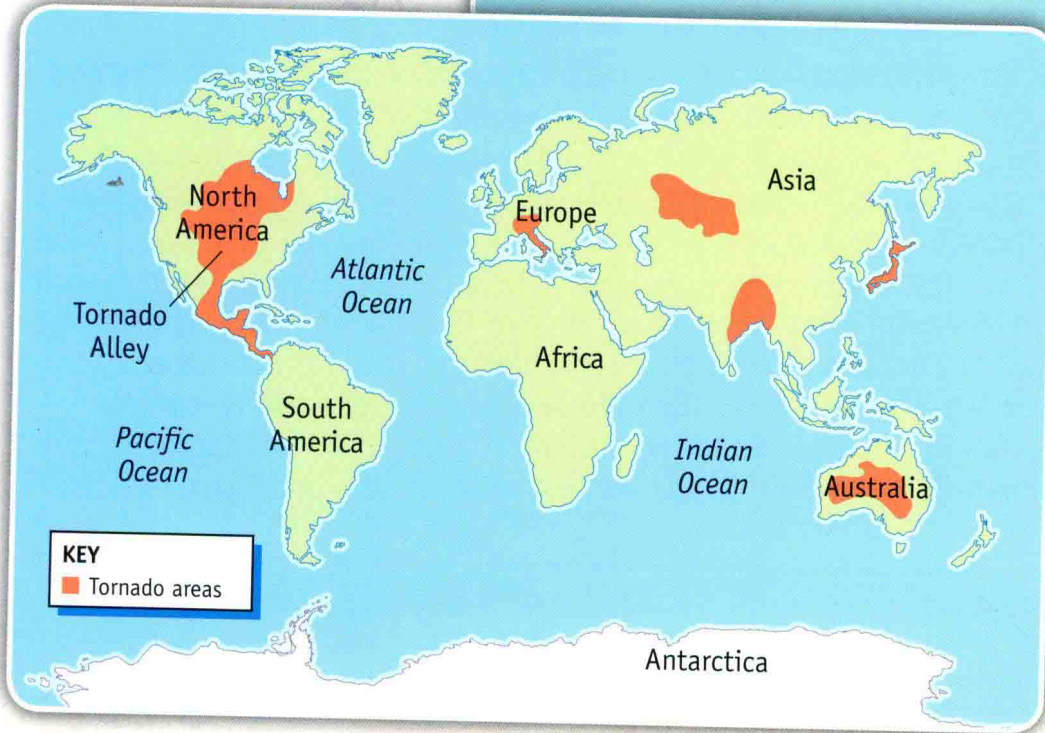
On average, about 30 tornadoes are reported in the UK each year. Most happen around East Anglia, southern England and the Midlands. On 21 November 1981, a total of 105 tornadoes were reported. This is the highest number of tornadoes to hit any country in Europe in a single day. They happened in the area between Gwynedd, Essex, and Humberside and thirteen were reported in Norfolk alone. Fortunately, none of the tornadoes were big or fast enough to do too much damage.

This photograph shows an aerial view of the damage caused by a tornado in Birmingham, England in 2005.





This map of the world shows where the world's worst tornadoes happen.



The reason that most tornadoes happen in parts of the USA is the Rocky Mountains! Cool, dry air heading down from Canada is sent eastwards when it hits the huge wall formed by the Rocky Mountains. This cool air then blows over the flat open stretch of land known as the **Great Plains**. Here it crashes into patches of warm, damp air travelling up from the Gulf of Mexico. Tornadoes are so common in this area that it has become known as **Tornado Alley**.

## TORNADO FACTS

- 1 The USA has about 100,000 thunderstorms a year, which cause between 800 and 1000 tornadoes a year.
- 2 In the USA more than 80 people are killed by tornadoes every year.
- 3 The Great Plains area in the USA has seven out of ten of all the tornadoes that happen on Earth!

## When do tornadoes happen?

In the right wind and weather conditions, tornadoes can appear at any time of the day or night. Most tornadoes, however, start in the afternoon or early evening. This is the time of day when the Sun has warmed up the ground and the air above it. This produces the hot air that is needed to create a tornado.

Tornadoes can also happen at any time of the year, although in many areas they are more common at some times of the year than others. These times are known as **tornado seasons**. In **Tornado Alley** and much of the southern USA, the tornado season happens in spring and summer. Further north, tornadoes tend to come later in the year.

This tornado rips through Conlen, Texas, USA, part of Tornado Alley. It was one of 28 record-breaking tornadoes in the area on 15 May 2003.





# CASE STUDY

## Tri-state Twisters, USA, 1925

The Tri-state Twisters were a terrible series of tornadoes that hit the USA on 18 March 1925. The tornadoes came in so close to the ground that people could not see them coming. They looked like big rolling clouds. The twisters raged through three states – Missouri, Indiana, and Illinois – at over 100 kilometres per hour, following a ridge where many mining towns were built.

The Tri-state Twisters were very wide and brought terrible winds and heavy downpours of rain. They wrecked trees, farmland, and buildings. They killed 695 people and injured over 2000. One town, Gorham, in Illinois, was totally destroyed and more than half of the population were killed or injured.

This map shows you the path of destruction followed by the Tri-state Twisters. This set of tornadoes was one of the worst in America's history. They lasted for three-and-a-half hours and finally broke up north-east of Princeton in Indiana.

