

AWESOME FORCES OF NATURE



# HOWLING HURRICANES



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Revised and updated



Louise and Richard Spilsbury

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# What is a hurricane?

Hurricanes are the most powerful storms on Earth. They grow from **tropical** storms over the sea. Some stay over the open ocean, far from land, and some weaken and die out before they reach land. Others hurtle towards a shore at high speed.

Hurricane winds often travel at speeds of over 300 kilometres per hour – faster than many of the fastest trains! If hurricanes reach land, their violent, fast winds and heavy rain can cause terrible damage and destruction. Some only last for days, others can go on for weeks. Hurricanes usually cause most damage around coasts, but big hurricanes can sometimes reach far inland.

These waves are being whipped up by a Caribbean hurricane. The word 'hurricane' is said to come from the name of a god of evil, 'Hurican'. People in the Caribbean in the past gave it this name because of its destructive power.





This is some of the massive damage to Gilchrist, Texas, USA. It was caused by Hurricane Ike in September 2008.



Hurricanes cause great destruction when they move onto land. They can blow down buildings, pull up trees, and throw cars and boats around like toys. They can whip up the sea to form giant waves that crash onto shores. The strong winds also push massive quantities of water on shore. This is called a **storm surge**. Heavy rains and storm surges can cause floods, when land that is normally dry is covered in water. In the past, hurricanes killed many people. Today **scientists** usually spot dangerous hurricanes early and warn people to move to a safe place.

### Top hurricane speeds

No one really knows exactly how fast the fastest hurricanes go because measuring equipment is often destroyed by the hurricane. Some scientists believe that the fastest hurricane winds are around 300 kilometres an hour, while others say they might reach almost 600 kilometres per hour!

# How do hurricanes happen?

Hurricanes always begin over warm water. Warm water heats the air just above it and supplies water vapour to it. Water vapour is water in the form of a gas. The warm, moist air is lighter and it rises. As it rises, the water vapour turns back into liquid water to form clouds. When the layer of warm air moves up, cooler air fills the space it has left. This movement causes winds.

Over **tropical** waters that reach very high temperatures, the heat makes the air rise very quickly. As the winds and clouds rise, they move faster and faster. They also start to **rotate** in a spiral. When the winds in this spinning storm reach about 120 kilometres per hour, it is called a hurricane. The whirling pattern of the winds makes the air inside the hurricane move even faster.

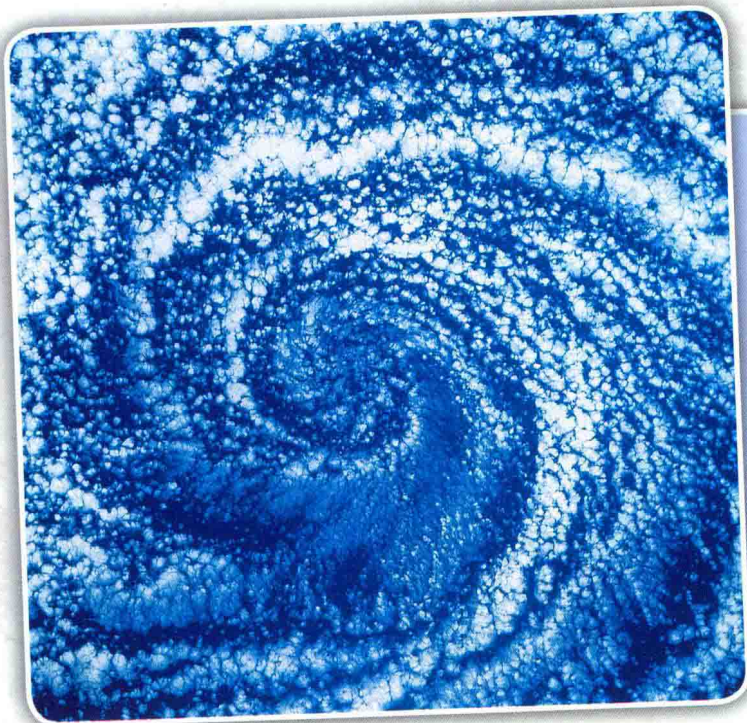


Hurricanes may begin like this – as winds that merely whip up waves on the sea. A hurricane usually takes days to develop. The fastest a hurricane might form is two days.



## How do hurricanes die?

Hurricanes are created and powered by the heat and water vapour that comes off very warm water. As hurricanes move over land or over cooler parts of the ocean, the supply of water vapour is reduced or cut off and they weaken and start to die out. A hurricane without warm water is like a toy car with a run-down battery – it gradually loses power and then stops altogether.




If fast enough, winds above a warm sea can start spinning within 12 hours. You can see the winds spiralling fast in this picture from above a hurricane, taken from the Space Shuttle.

## Naming hurricanes

**Scientists** give hurricanes boys' and girls' names. They do this so that everyone who talks about a particular hurricane, whether they are scientists or ordinary people, know which one it is. The names go in alphabetical order. For Atlantic hurricanes, scientists don't use Q, U, X, Y or Z as there are few names starting with these letters.

## What is a hurricane's eye?

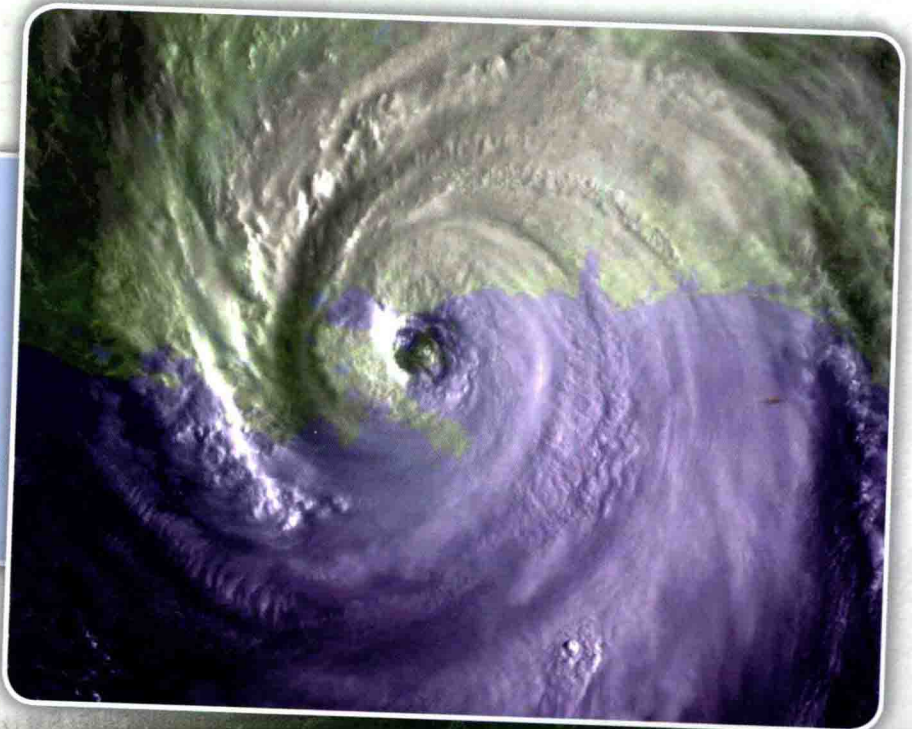
The **eye** of a hurricane is at its centre, inside the swirling mass of wind and cloud. If you could fly high above a hurricane and look down inside it, it would look like water spinning around a plughole. The centre is calm and the strongest winds spin around it in the **eyewall**. When the eye passes over land, people below feel just a gentle breeze and the rain stops. As the hurricane moves on, the winds at the edge of the eye – the eyewall – begin again.



### Making a mini-hurricane eye

You can create your own mini-hurricane eye after a bath. When the water spirals around the plug hole, right in the middle there is a dry centre. This is just like the eye of a hurricane, except that in a hurricane you get huge spiralling winds and clouds instead of swirling water.

This is a **satellite** image of Hurricane Katrina. Can you see the eye of the hurricane? Most hurricanes have an eye between 30 and 60 kilometres across.





## How do hurricane rains form?

Hurricanes almost always bring very heavy rains. This is because they pick up water vapour as they travel across warm waters. They do this by a process called **evaporation**. The process of evaporation turns liquid water into a gas called water vapour. Evaporation increases rapidly as the liquid water becomes warmer. This is how wet clothes dry outside after washing. The water inside them is warmed by the air and evaporates, leaving the clothes dry.

Water vapour turns back into liquid water when it cools. This is the reverse of evaporation, called **condensation**. In a hurricane, the air cools as it rises. The water vapour then condenses into liquid water and falls out as rain.



Large hurricanes can carry vast amounts of water vapour. This means that they can cause incredibly heavy rainstorms, like this one during Hurricane Keith, which hit Belize in October 2000.



# Where do hurricanes happen?

Hurricanes only start over really warm water, so they only form in certain parts of the world. Hurricanes never start over cold oceans, such as the South Atlantic. They form over **tropical** oceans. These areas of water are near the **Equator**, an imaginary line around the centre of the Earth, where it is always very warm.

## When is a hurricane not a hurricane?

Hurricanes are called different names in different parts of the world. These storms are called hurricanes when they happen over the North Atlantic and Northeast Pacific oceans. When they occur in the Pacific and Indian Oceans they are called typhoons or cyclones. Even though they have different names, they are the same kind of storm.



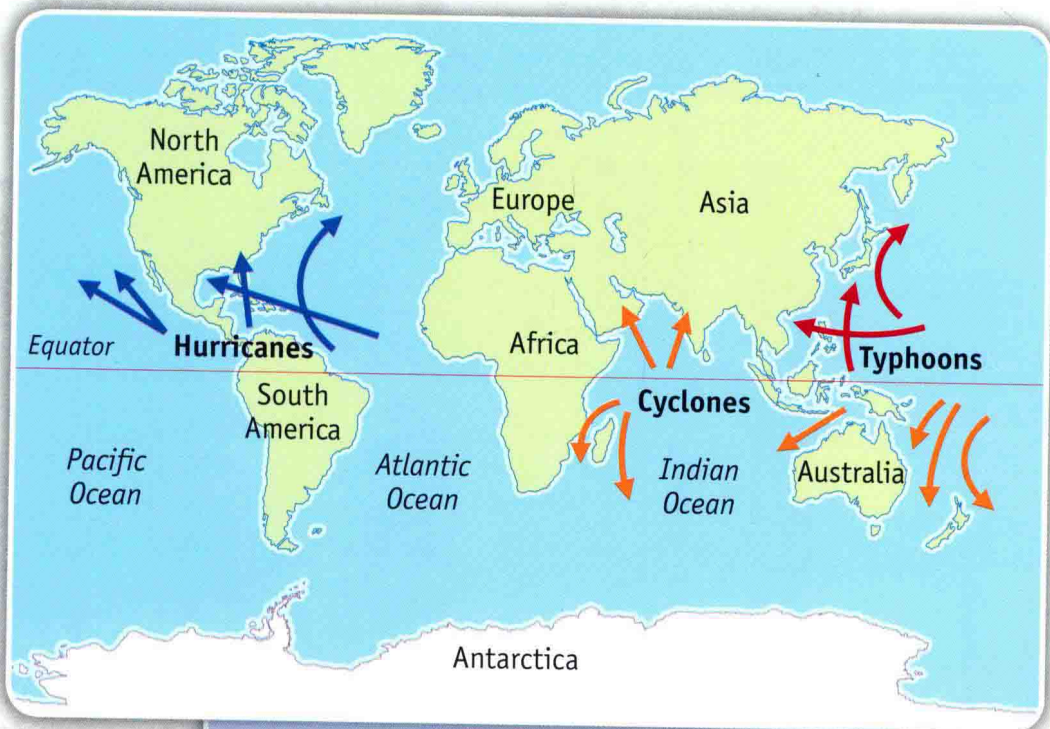
This woman stands among the debris caused by Cyclone Nargis. It hit Burma (Myanmar) in May 2008, causing over 145,000 deaths and massive destruction.



## Hurricanes on the move

Once a storm has started, it does not stay in one place. Hurricanes can travel thousands of kilometres over the oceans. They move like a spinning top – spiralling around their **eye** at high speeds. At the same time, the whole storm moves slowly forwards or backwards in another direction. Most hurricanes travel generally west or northwards. The average speed for a hurricane to travel is 10 kilometres an hour.

Hurricanes occur in the **northern hemisphere** and cyclones happen mostly in the **southern hemisphere**. Hurricanes and cyclones usually spin in opposite directions. This is because the Earth is turning slowly all the time. As it turns, the winds blowing above Earth's surface are pulled in different directions. The Earth's rotation causes the spin to be clockwise in the northern hemisphere and counter-clockwise in the southern hemisphere.



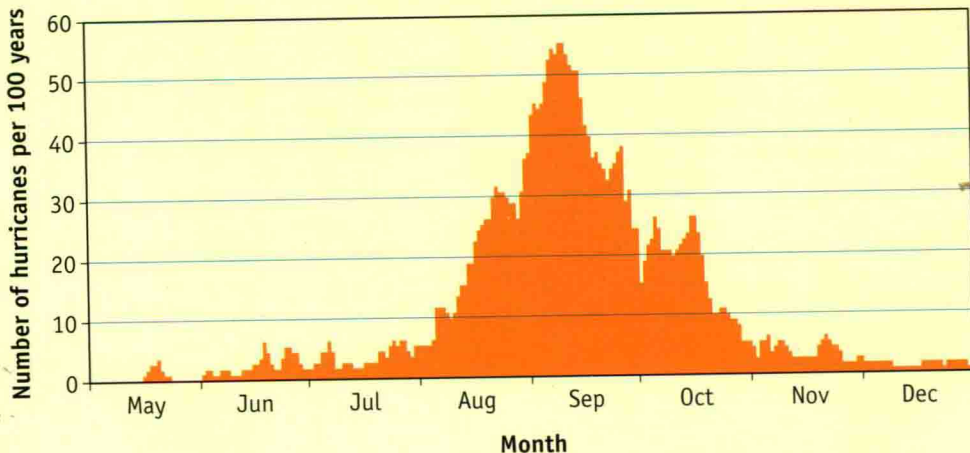
The arrows on this world map show where hurricanes, cyclones, and typhoons usually form and the routes that they usually take.

## When do hurricanes happen?

Hurricanes happen every year. There has been a hurricane, cyclone, or typhoon recorded every year for the past 500 years. It is likely that they happened just as regularly before that, too. Every year there is also at least one major hurricane which reaches land somewhere and causes damage or destruction.

Hurricanes always happen at certain times of the year, known as the **hurricane seasons**. In **tropical** oceans and seas, like the Gulf of Mexico and the Caribbean Sea, the hurricane season begins in May or June. In the Atlantic Ocean the season runs from 1 June to 30 November. Hurricane seasons may last up to six months, but the worst storms usually happen over a two-month period – for example, August and September in the northeastern Pacific.

This graph shows the number of hurricanes that have happened at certain times of year over the past century in the Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico. As you can see, the peak of the hurricane season is from mid-August to late October.





# CASE STUDY

## Hurricane Katrina, USA, 2005

Hurricane Katrina hit the gulf coast of the United States on 28 August 2005. It was one of the deadliest and costliest hurricanes in US history. Although many areas were affected, most damage occurred to the city of New Orleans, Louisiana. The city was built on low-lying land and protected by **levees**. The hurricane's **storm surge** pushed water over and through the levees, flooding the city. Officials had asked people to **evacuate**, but many stayed. Afterwards, government response and rescue efforts were disorganized. It was difficult to help the people in need.

“ *‘It’s like being in a Third World country. We’re trying to work without power. Everyone knows we’re all in this together. We’re just trying to stay alive.’*

Mitch Handrich, a registered nurse manager at Charity Hospital in New Orleans

”



Water covers homes just east of downtown New Orleans. Many residents of the area were displaced after the disaster and forced to move elsewhere in the US.