

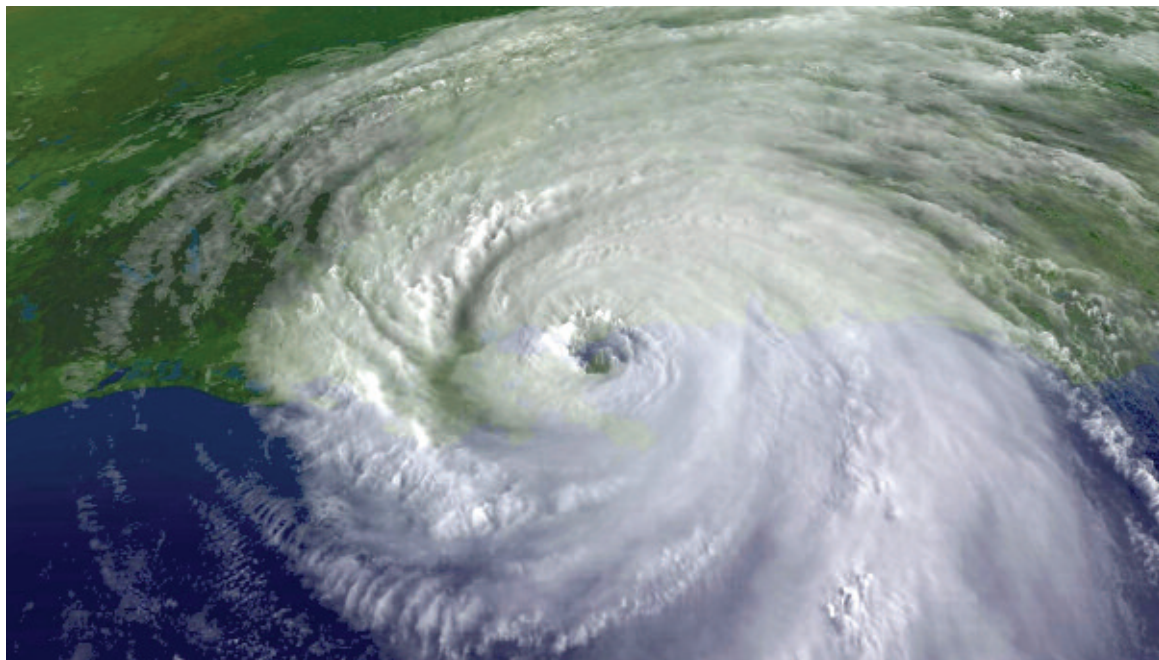
Hurricanes

GCSE key words

Water cycle
Convection
Condensation

The first hurricane of the season is given a name starting with A; they then work through the alphabet. Once a hurricane (like Katrina) has become famous, this name will not be used again.

Right: Hurricane Katrina from space



NOAA/SPL

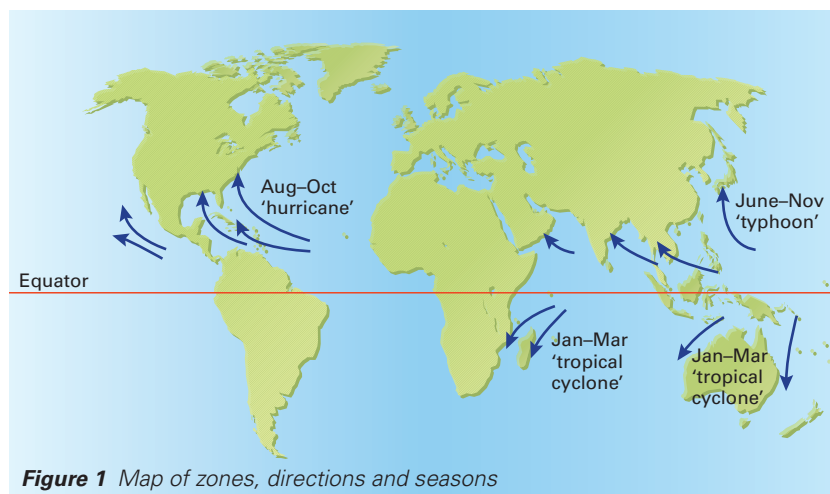


Figure 1 Map of zones, directions and seasons

In August 2005, Hurricane Katrina caused many deaths – and vast damage – along the coastline of the Gulf of Mexico in the USA. Hurricanes are an unfamiliar phenomenon here in the UK. Why is this? And can we expect to see more hurricanes in future as a result of climate change?

Hurricane, typhoon, cyclone – these are all names for the same thing, a violent tropical storm. Winds spiral round a central ‘eye’ at speeds of over 300 km/h while torrential rains pour down.

How do hurricanes form?

Hurricanes form in two bands around the Earth, usually between 10° and 20° to the north or south of the equator (Figure 1). In these areas, sea water is warmed by the sun so that it reaches the critical temperature of 26°C. A convection current of warm, moist air rises above this water. As it rises, it cools and water vapour condenses as rain, releasing energy. Just as it takes energy – known as latent heat – to evaporate water, so this energy must be released when the vapour recondenses.

As a hurricane tracks across the ocean, more moist air is sucked upwards at the low pressure eye, providing a constant source of energy (Figure 2). Hurricanes gradually lose energy when they move over land because there is no warm, wet air to keep them going.

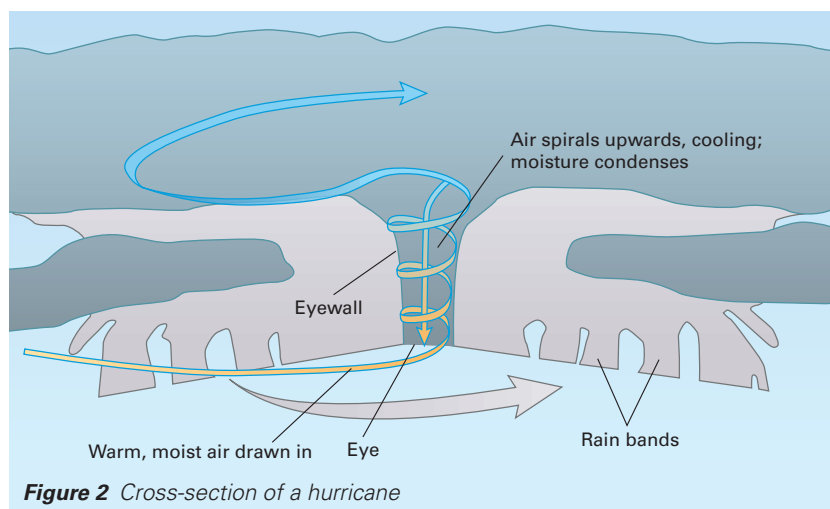


Figure 2 Cross-section of a hurricane



TopFoto

Devastation caused by Hurricane Katrina — 12 months later, half the population of New Orleans were still unable to return home to their devastated city

Why do hurricanes form a spiral?

The spiral arises as a result of the rotation of the Earth. A hurricane tends to move towards the west, in the opposite direction to the Earth's rotation. The rotation causes the hurricane to be flung off to one side, northwards in the northern hemisphere and southwards in the southern hemisphere. This makes the winds spiral round, and pushes the track of the hurricane away from the equator. This is known as the **Coriolis effect**, and explains why hurricanes do not form over the equator — there is insufficient sideways push.

The winds spiral in towards the low pressure at the eye of the storm. As they do so, they speed up. This is similar to the way in which spinning ice-skaters can speed up by pulling their arms in to their sides. It is an example of the conservation of angular momentum.

How are hurricanes classified?

Hurricanes are classified according to wind speed (see Table 1). Table 1 also shows the height of the storm surge that results as the circling winds cause the sea to pile up — this rise in sea level may do as much damage as the winds themselves when it makes landfall. Although the UK is far off the regular hurricane zone, many people still recall the storm of September 1987 when hurricane force winds crossed much of southern England.

Table 1 The Saffir-Simpson scale

Category	Wind speed (km/h)	Storm surge (m)	Effect
5	≥250	>5.5	Buildings collapse; severe flooding
4	210–249	4.0–5.5	Extensive damage to buildings; beaches eroded
3	178–209	2.7–3.7	Structural damage; flooding near coast
2	154–177	1.8–2.4	Some damage to buildings; trees down
1	119–153	1.2–1.5	Minor damage to shrubs and trees; some flooding on coast
Tropical storm	63–117	0–0.9	Limited damage

Can we expect more hurricanes in the future?

This is a question which divides scientists. First, it is impossible to attribute a single hurricane (e.g. Katrina) to global warming. There have always been individual, devastating hurricanes. Similarly, an increase in the number of hurricanes from one season to the next may be part of a natural cycle, rather than a growing trend.

However, some scientists claim to have found an increase in the frequency of the *most violent* storms — these have doubled in the last 30 years. This may be a significant change.

Another analysis suggests that there is a strong correlation between the surface temperature of the oceans and the number of hurricanes. As the oceans warm up, the hurricane zones may extend further from the equator and be active for more months of the year.

Before 1979, hurricanes were given only girls' names. This was deemed unfair so boys' names were added.

● In Britain tornadoes are more likely to affect us than hurricanes. Find out more about tornadoes in Britain at www.torro.org.uk

● Look out for hurricane warnings at www.hurrwarn.com

Answers to wordmaze, page 17

S	U	N	F	L	O	W	E	R	H	U	B
M	A	R	Y	A	R	R	O	W	A	T	A
E	A	L	Y	P	T	U	S	A	N	E	R
S	C	I	G	I	T	A	L	I	T	R	B
O	U	D	N	G	O	L	I	S	O	C	A
R	E	E	Y	M	P	I	V	P	L	R	S
E	N	E	R	A	N	O	E	U	I	E	I
W	A	S	E	R	E	D	L	R	N	S	L
O	P	I	V	I	D	N	E	G	A	S	A
L	M	N	A	C	I	L	E	G	N	A	V
F	A	C	E	L	E	R	I	H	P	M	E
F	A	S	N	O	S	M	A	R	E	D	N

Herb used in sweet-making: Licorice