

HODDER
EDUCATION

MY REVISION NOTES
OCR GCSE (9–1)
GEOGRAPHY B

OCR

GCSE (9–1)

GEOGRAPHY B
SECOND EDITION

- + Plan and organise your revision
- + Reinforce skills and understanding
- + Practise exam-style questions

Simon Ross
Rebecca Blackshaw
Jo Payne



 **HODDER**
EDUCATION
[LEARN MORE](#)

Topic 1 Global hazards

- 8 The global circulation system
- 11 Extremes in weather conditions around the world
- 13 Tropical storms
- 14 Droughts
- 15 El Niño and La Niña
- 17 Case studies: Natural weather hazard events

- 23 Plate tectonics
- 25 Plate boundaries
- 27 Earthquakes and volcanoes
- 29 Case study: A tectonic hazard event
- 30 Impact of technology in hazard zones

- 31 The pattern of climate change
- 32 Evidence for climate change
- 33 Causes of natural climate change
- 34 The natural greenhouse effect
- 35 Impacts of climate change worldwide
- 37 Impacts of climate change within the UK

38 The concept of a landscape
39 The distribution of landscapes in the UK
40 The characteristics of landscapes in the UK

- 42 Geomorphic processes
- 45 Coastal landforms
- 47 River landforms
- 51 Case study: A coastal landscape
- 54 Case study: A river landscape

REVISED	TESTED	EXAM READY
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6 Why are natural ecosystems important?

- 56 The concept of an ecosystem
- 57 The global distribution and characteristics of biomes

7 Why should tropical rainforests matter to us?

- 62 The distinctive characteristics of tropical rainforests
- 64 The value of tropical rainforests
- 65 Human activities in tropical rainforests
- 67 Case study: Sustainable management of an area of tropical rainforest

8 Is there more to polar environments than ice?

- 68 The distinctive characteristics of the Antarctic and the Arctic
- 71 The impacts of human activity on ecosystems in the Antarctic and the Arctic
- 75 Case study: Small-scale sustainable management in the Antarctic and the Arctic
- 76 Case study: Global sustainable management in the Antarctic and the Arctic

Part 2: People and society

Topic 5 Urban futures

9 Why do more than half the world's population live in urban areas?

- 77 The global pattern of urbanisation
- 78 World cities and megacities
- 80 Rapid urbanisation in cities
- 82 Urban trends in advanced countries

10 What are the challenges and opportunities for cities today?

- 84 Case study: A city in an advanced country
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- 88 The definition of development and how countries are classified
- 89 How development is measured
- 92 Factors influencing uneven development
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12 Are LIDCs likely to stay poor?

- 95 Economic development in Ethiopia
- 96 A model of economic development
- 97 Sustainable Development Goals

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TESTED

EXAM
READY

My revision planner

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13 How is the UK changing in the twenty-first century?

- 106 The characteristics of the UK
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- 112 The UK's ageing population
- 113 Population change in a named place: Boston, Lincolnshire
- 115 Economic changes in the UK
- 117 UK economic hubs
- 118 The changes in one economic hub

14 Is the UK losing its global significance?

- 120 The UK's role in political conflict
- 120 Case study: The UK's political role in one global conflict
- 122 The UK's media exports
- 124 Contribution of ethnic groups to the cultural life of the UK

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127 How environments and ecosystems are
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16 Can we feed 9 billion people by 2050?

- 131 Food security and the factors which influence it
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Now test yourself and exam practice answers at
www.hoddereducation.co.uk/myrevisionnotesdownloads

[illegible]

Countdown to my exams

6–8 weeks to go

- Start by looking at the specification – make sure you know exactly what material you need to revise and the style of the examination. Use the revision planner on pages 4–6 to familiarise yourself with the topics.
- Organise your notes, making sure you have covered everything on the specification. The revision planner will help you to group your notes into topics.
- Work out a realistic revision plan that will allow you time for relaxation. Set aside days and times for all the subjects that you need to study, and stick to your timetable.
- Set yourself sensible targets. Break your revision down into focused sessions of around 40 minutes, divided by breaks. These Revision Notes organise the basic facts into short, memorable sections to make revising easier.

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2–6 weeks to go

- Read through the relevant sections of this book and refer to the exam tips, and key terms. Tick off the topics as you feel confident about them. Highlight those topics you find difficult and look at them again in detail.
- Test your understanding of each topic by working through the 'Now test yourself' questions in the book. Look up the answers online.
- Make a note of any problem areas as you revise, and ask your teacher to go over these in class.
- Look at past papers. They are one of the best ways to revise and practise your exam skills. Write or prepare planned answers to the exam practice questions provided in this book. Check your answers online at www.hoddereducation.co.uk/myrevisionnotesdownloads
- Use the revision activities to try out different revision methods. For example, you can make notes using mind maps, spider diagrams or flash cards.
- Track your progress using the revision planner and give yourself a reward when you have achieved your target.

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One week to go

- Try to fit in at least one more timed practice of an entire past paper and seek feedback from your teacher, comparing your work closely with the mark scheme.
- Check the revision planner to make sure you haven't missed out any topics. Brush up on any areas of difficulty by talking them over with a friend or getting help from your teacher.
- Attend any revision classes put on by your teacher. Remember, they are an expert at preparing people for examinations.

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The day before the examination

- Flick through these Revision Notes for useful reminders, for example the exam tips and key terms.
- Check the time and place of your examination.
- Make sure you have everything you need – extra pens and pencils, tissues, a watch, bottled water, sweets.
- Allow some time to relax and have an early night to ensure you are fresh and alert for the examinations.

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My exams

Paper 1: Our natural world

Date:

Time:

Location:

Paper 2: People and society

Date:

Time:

Location:

Paper 3: Geographical exploration

Date:

Time:

Location:

1 How can weather be hazardous?

The global circulation system

How does it work?

REVISED

There are three large-scale circulations of air in each of the Earth's **hemispheres**. These circular movements, or 'cells', take air from the Equator and move it towards the poles. The cells have a role to play in creating the **climate zones** on Earth.

Hemisphere: one half of the Earth, usually divided into northern and southern halves by the Equator.

Climate zones: divisions of the Earth's climates into belts, or zones, according to average temperatures and average rainfall. The three major zones are polar, temperate and tropical.

Revision activity

Study Figure 1 for one minute, memorising as many details as possible. Close your revision guide and draw as much of the model as you can remember on a piece of paper. Look back at Figure 1 to check which details you have missed.

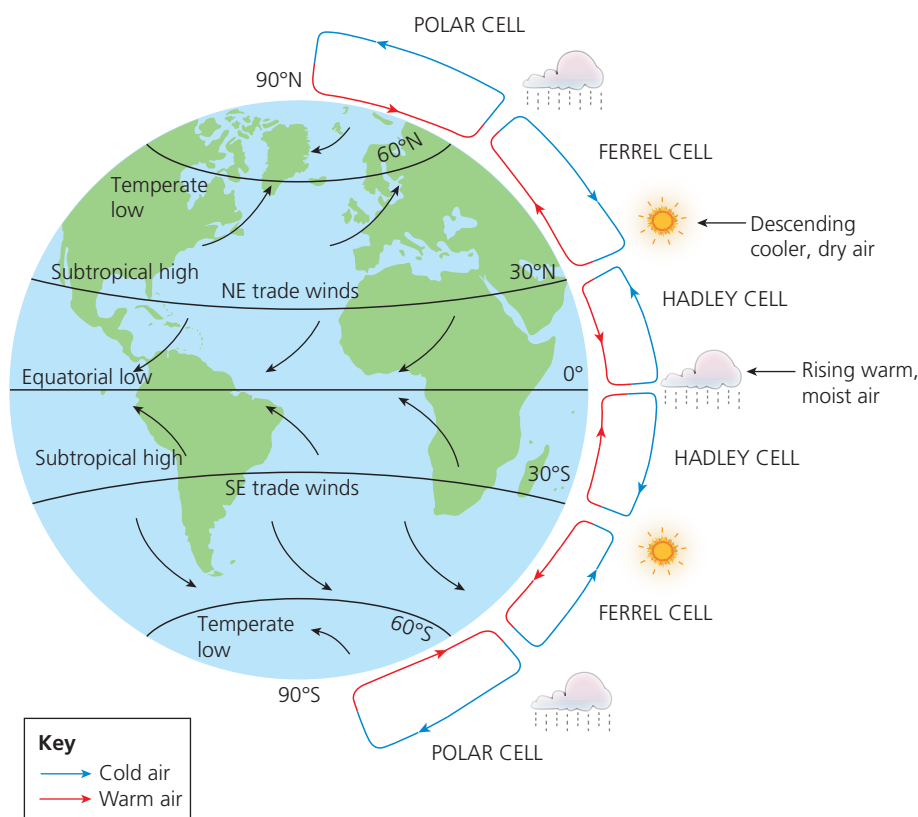


Figure 1 The global circulation system

Circulatory cells

REVISED

Figure 2 Characteristics of the circulatory cells

	Where is it?	What happens?
Hadley cell	The largest cell, which extends from the Equator to 30° in the north and south.	Winds meet near the Equator and the warm air rises, causing thunderstorms. The drier air then flows out towards 30° before sinking over subtropical areas.
Ferrel cell	The middle cell, which generally occurs from the edge of the Hadley cell at 30° to 60° in the north and south.	Air in this cell joins the sinking air at the edge of the Hadley cell; it travels across these mid-latitude regions until the air rises along the border of cold air with the Polar cell.
Polar cell	The smallest and weakest cell, which occurs from the edge of the Ferrel cell to the poles at 90°.	The air sinks over the higher latitudes at the poles and flows towards the mid-latitudes where it meets the Ferrel cell and rises.

High and low pressure

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Atmospheric air pressure ranges from low pressure of approximately 980 millibars to high pressure of approximately 1050 millibars. **Low pressure** is created where the two Hadley cells meet and air rises. Where the Hadley and Ferrel cells meet, air descends, creating **high pressure**.

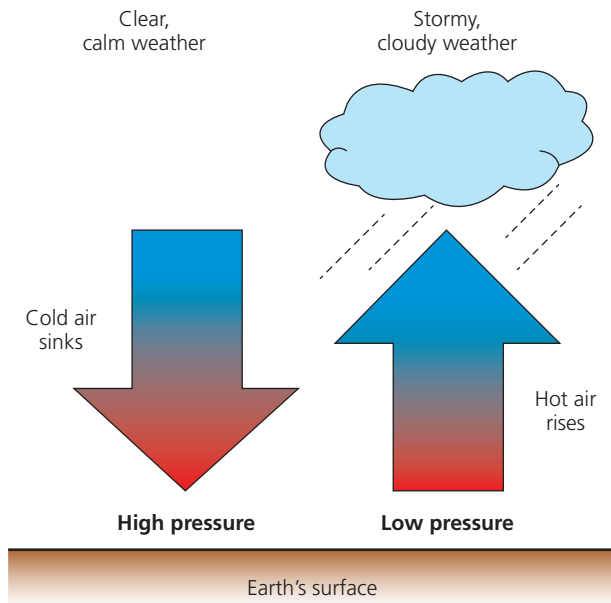


Figure 3 High and low pressure

High pressure

- When air cools it becomes denser and falls towards the ground, leading to high pressure.
- Cool air warms as it reaches the Earth's surface, causing any clouds to evaporate.
- Heavy rain at the Equator means that most of the moisture has gone by the time the air reaches the subtropics.
- High-pressure systems are usually associated with clear skies and dry, hot weather.

Low pressure

- Low pressure causes warm air to rise, after which it cools and condenses to form clouds.
- Moisture falls from the atmosphere as rain, sleet, snow or hail (collectively known as **precipitation**).
- Differences in temperature between day and night are unlikely to be large as the cloud cover reflects solar radiation during the day and traps it at night.

Now test yourself

TESTED

- 1 At which line of latitude do the Polar and Ferrel cells meet?
- 2 Describe the difference between high and low pressure.
- 3 Which circulatory air cell is the smallest?
- 4 Which circulatory cells meet at the Equator?
- 5 Why might the climatic conditions be unsettled around 60° latitude in the northern and southern hemispheres?
- 6 Summarise what happens at 30° north and south of the Equator.

Atmospheric air pressure:

the force exerted on the Earth's surface by the weight of the air, measured in millibars.

Low pressure: caused by ascending air. As warm air rises, it leads to low pressure at the surface. As air rises and cools, water vapour condenses to form clouds and precipitation.

High pressure: caused by descending air. As air cools it sinks, leading to high pressure at the surface. As air descends, it reduces the formation of clouds and leads to light winds and settled conditions.

Precipitation: the collective term for moisture that falls from the atmosphere; it could be in the form of rain, sleet, snow or hail.

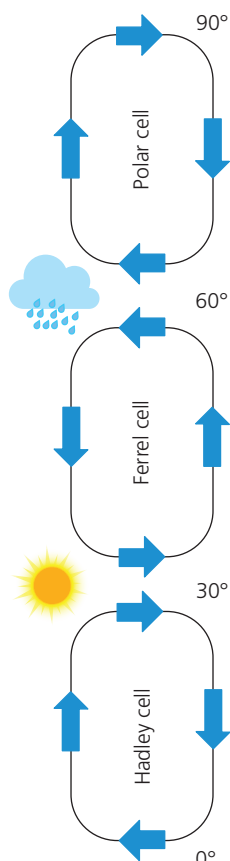
1 How can weather be hazardous?

Climate zones

REVISED

Exam tip

The specification requires you to be able to describe the relationship between the global circulation system and the climate zones. Make sure you refer to precise details such as the cells, continents/regions, air pressure and latitude.



Climate zone	Latitude	Characteristics of the climate
Polar	At the poles 90° north and south of the Equator	Cold air from the Polar cell sinks, producing high pressure. The spin of the Earth creates dry, icy winds. In some parts of Antarctica, the average wind speed is 80 kph.
Temperate	Mid-latitudes 50° to 60° north and south of the Equator	Two air cells meet, one warm from the Ferrel cell and one cold from the Polar cell. Low pressure is created as the warm air from the Equator meets the cold air from the poles along a weather front. This brings frequent rainfall and is typical of the UK.
Subtropical	30° north and south of the Equator	High pressure as a result of sinking air where Hadley and Ferrel cells meet. This creates a belt of deserts, including the Sahara in northern Africa and the Namib in southern Africa. Daytime temperatures can exceed 40°C.
Tropical	At the Equator, 0° line of latitude	A belt of low pressure where the Hadley cells meet and air rises rapidly. This results in regular heavy rainfall and thunderstorms in places such as Malaysia in South East Asia and northern Brazil in South America.

Figure 4 Climate zones

Now test yourself

TESTED

- 1 Which climate zone is found where the two Hadley cells meet?
- 2 Which climate zone is found where the Hadley and Ferrel cells meet?
- 3 Which cell creates high pressure in Antarctica and the Arctic?
- 4 Describe what happens to air as it moves from the Equator to the poles.

Exam practice

- 1 Outline what the global circulation system is. [2]
- 2 Describe the climatic conditions in a high-pressure belt. [2]
- 3 Explain the climatic characteristics created by low-pressure belts. [4]
- 4 State a link between the Hadley cells and tropical climates. [2]

Extremes in weather conditions around the world

Temperature

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Coldest place

- **Vostok, Antarctica:** on 21 July 1983, the coldest air temperature ever was recorded at the Russian research station, Vostok: -89.2°C . It has an altitude of around 3500 m, which helps to make it the coldest place on Earth. For every 1 km in altitude the temperature decreased by 6.5°C .

Hottest place

- **Al-Aziziyah, Libya:** on 13 September 1922, the world experienced its hottest air temperature ever recorded at 57.8°C in Libya, which is located 32° north of the Equator. This means Libya is in the subtropical high region.

Precipitation

REVISED

Driest places

- **Death Valley, USA:** one of the driest places in North America with an average rainfall of 60 mm per year. Storms from the Pacific Ocean travel over a series of mountain ranges before they reach Death Valley, meaning that the moisture has already fallen as rain (Figure 5).
- **Aswan, Egypt:** it has an average rainfall of only 0.861 mm per year; it is close to the Tropic of Cancer.
- **Atacama Desert, South America:** the average annual rainfall is 15 mm. This is due to its location in the rain shadow of the Andes. On its western side, the onshore winds do not have enough warmth to pick up moisture from the ocean surface.

Wettest places

- **Mawsynram, India:** this village of 10,000 people copes with an annual average rainfall of 11,871 mm, 80 per cent of which arrives during the seasonal **monsoon** (Figure 6).
- **Ureca, Equatorial Guinea:** located on the southern tip of Bioko Island, Ureca is the wettest place in Africa, with 10,450 mm per year.

Monsoon: heavy rain that arrives as a result of seasonal wind, most notably in southern Asia and India between May and September.



Figure 5 Death Valley, USA



Figure 6 A sign declaring Mawsynram as the wettest place on Earth

Windiest places

REVISED

- **Commonwealth Bay, Antarctica:** winds regularly exceed 240 kilometres per hour, with an average annual wind speed of 80 kilometres per hour. Winds carry air from high ground down the slopes by gravity.
- **Wellington, New Zealand:** the strongest gust of wind recorded in Wellington was 248 kilometres per hour. Gusts of wind exceed gale force on 175 days of the year. The mountains either side of Wellington funnel the winds.

Exam tip

You will be required to use your knowledge of specific places and facts to support your argument. Make sure you are familiar with the map of the world.

Now test yourself

TESTED

- 1 Where is the hottest place on Earth and what temperature was measured there?
- 2 Why is rainfall low in the Atacama Desert?
- 3 How are the winds in Wellington, New Zealand, intensified?
- 4 Suggest two reasons why Antarctica is home to the coldest place on Earth.
- 5 Use your knowledge of global atmospheric circulation to explain the location of the hottest place on Earth.
- 6 What is a monsoon?

Exam practice

The table below lists a selection of the wettest places in the world and their annual rainfall totals.

Location	Rainfall (mm)
Big Bog in Maui, Hawaii	10,272
Debundscha, Cameroon	10,229
Mawsynram, India	11,777
Mount Emei, China	8,169
River Cropp waterfall, New Zealand	11,516
Tutendo, Colombia	11,770

- 1 Use the table to calculate the:
 - (a) median
 - (b) mean
 - (c) range of the data.
- 2 Suggest an appropriate graphical technique to present this data.
- 3 Study the caption below, which shows a record-breaking temperature. Suggest why this part of the world experiences extreme weather conditions.

[3]

The coldest air temperature ever recorded was -89.2°C at Vostok, Antarctica. It has an altitude of around 3500 m.

Revision activity

Use a blank map of the world to locate the extremes of weather and annotate it with the important information. Do you notice a pattern? Can you link it to your knowledge of the global circulation model and high/low pressure? Are there any anomalies?

Tropical storms

Tropical storms begin as low-pressure systems in the tropics. They develop into tropical cyclones (also known as hurricanes or typhoons depending on their geographical location) when wind speeds reach 119 kilometres per hour.

Tropical storm: an area of low pressure with winds moving in a spiral around a calm central point called the 'eye' of the storm. The winds are powerful and rainfall is heavy.

Where do tropical storms occur?

REVISED

Tropical storms only happen in certain areas:

- typically between 5° and 15° north and south of the Equator
- temperature of the surface of the ocean more than 26.5°C
- ocean depth of at least 50–60 m
- At least 500 kilometres away from the Equator so that the **Coriolis effect** can make the weather system rotate.

Coriolis effect: the effect of the Earth's rotation on weather patterns and ocean currents, making storms swirl clockwise in the southern hemisphere and anticlockwise in the northern hemisphere.

Exam tip

It is easy to lose marks by giving oversimplified statements, for example stating that 'the ocean water has to be warm' instead of that 'the sea surface temperature has to be at least 26.5°C'. Be as precise as you can in your descriptions.

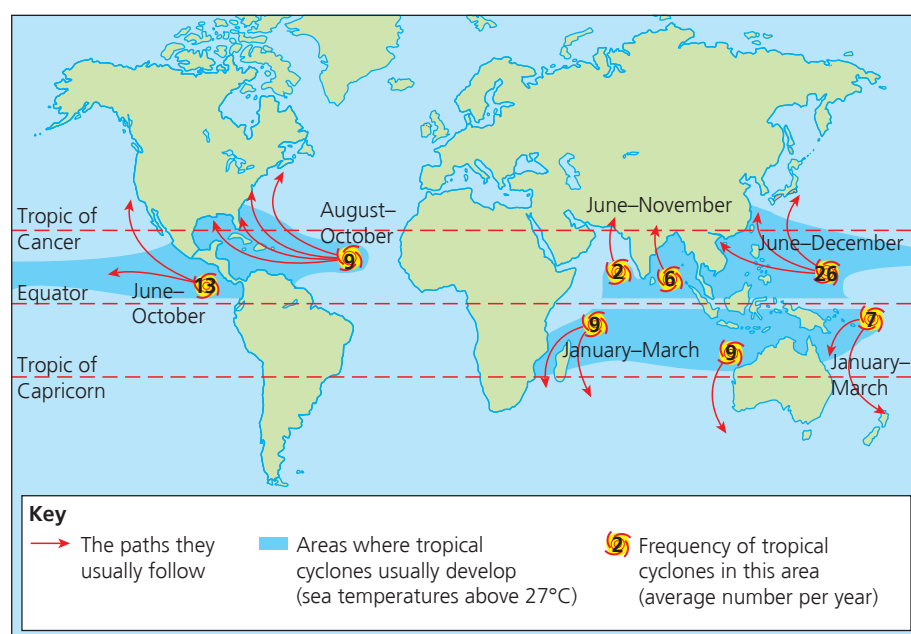


Figure 7 Global distribution and frequency of tropical storms

Causes of tropical storms

REVISED

A number of factors contribute to the development of a tropical storm:

- Temperatures need to cool quickly enough for tall clouds to form through condensation
- The wind speeds need to change slowly with height – this is known as wind shear; if the winds in the upper and lower atmosphere are different speeds, the storm will be torn apart
- Fuelled by warm ocean water, water vapour is rapidly drawn upwards into the low-pressure system; deep clouds rise from the Earth's surface to 15 km
- The most destruction occurs at the eyewall where the wind speeds are greatest and rainfall heaviest; this is typically 15–30 km from the centre of the storm
- When vertical winds reach the top of the troposphere at 16 km, they are deflected outwards by the Coriolis effect; this is what makes the storm rotate.

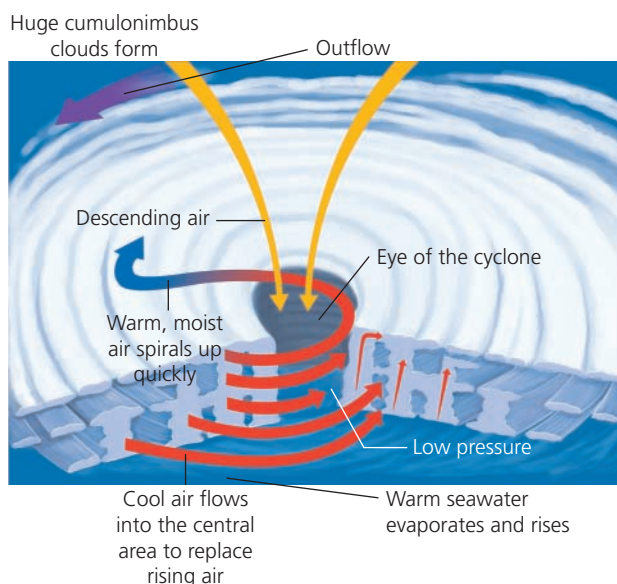


Figure 8 Cross section of a tropical storm

Frequency of tropical storms over time

REVISED

- There are approximately 80 major tropical storms per year; the most powerful occur in the western Pacific.
- They occur from June to November in the northern hemisphere and November to April in the southern hemisphere.
- The energy released by hurricanes over the last 30 years has increased by 70 per cent.
- During **El Niño**, there tend to be fewer hurricanes in the Atlantic and more tropical cyclones in the eastern part of the South Pacific.
- Scientists disagree about whether climate change has made tropical storms more frequent.

Now test yourself

TESTED

- 1 List five key features of tropical storms.
- 2 To what extent are tropical storms increasing in frequency?
- 3 Draw a diagram to show the formation of a tropical storm.

El Niño: climatic changes affecting the Pacific region every few years. It is characterised by the appearance of unusually warm water around northern Peru and Ecuador, typically in late December. The effects of El Niño include the reversal of wind patterns across the Pacific, causing drought in Australasia and unseasonal heavy rain in South America.

Droughts

A **drought** is a prolonged period of time with unusually low rainfall. Droughts occur when there is not enough rainfall to support people or crops.

Where do droughts occur?

REVISED

- Recent severe droughts have occurred in the Sahel region of Africa, as well as in Middle Eastern countries that have already been affected by war and conflict.
- Regions that already have an arid (dry) climate are particularly vulnerable if they receive less than their usually very low rainfall. These include Australia, parts of the USA (such as California) and regions of China.
- There are some unexpected examples of drought in the world, such as the Amazon Basin in Brazil, where a drought affected 19 million square kilometres of rainforest between 2002 and 2005.

Drought: a prolonged period of time with unusually low rainfall; there is not enough rainfall to support people or crops.

Exam practice

Using data and Figure 9, describe the global distribution of the frequency of drought disasters from 1974 to 2004. [3]

Exam tip

Remember to comment on TEA (Trend, Examples and any Anomalies).

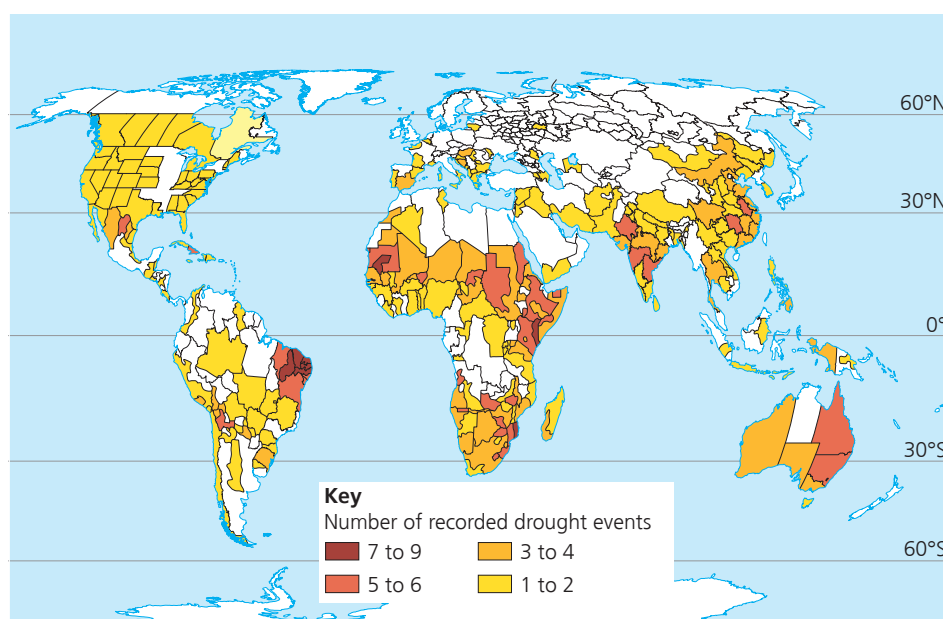


Figure 9 The global distribution and frequency of drought disasters, 1974–2004

Causes of drought

REVISED

Figure 10 Physical and human factors that can lead to drought

Physical factors	Human factors
A presence of dry, high-pressure weather systems	Excessive irrigation
El Niño brings descending air and high pressure over Australasia, leading to drought	Deforestation , which reduces transpiration and, therefore, rain
As global temperatures increase, more water is lost from surfaces through evaporation	Overgrazing, exposing soils to wind erosion
The inter-tropical convergence zone (ITCZ) may not move as far north or south as usual, depriving some regions, particularly across parts of Africa, of much-needed rainfall	Dam building, which deprives regions downstream of water
	Intensive farming practices

Inter-tropical convergence zone (ITCZ):

a low-pressure belt that encircles the globe around the Equator. It is where the trade winds from the north-east and south-east meet. As the Earth is tilted on its orbit around the Sun, it causes the ITCZ to migrate between the Tropics of Cancer and Capricorn with the seasons.

Deforestation: the cutting down of trees, transforming a forest into cleared land for other uses such as building, or for growing crops.

Frequency of droughts over time

REVISED

- A 2013 report from NASA predicted that warmer worldwide temperatures will lead to decreased rainfall and more droughts in some parts of the world.
- The Met Office predicts that extreme drought could happen once every decade in the UK in the future.

Now test yourself

TESTED

- 1 Name two physical causes of drought.
- 2 Explain how human factors can make the effects of a drought worse.
- 3 What is the ITCZ and how can it cause a drought?
- 4 What did NASA predict about the changing frequency of drought in the future?
- 5 Explain how deforestation can make a drought worse.

El Niño and La Niña

What causes El Niño?

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It was first noticed by fishermen in Peru who relied on the usually colder waters swelling up from beneath the sea surface to bring up nutrient-rich waters from the deep ocean, improving their catch of anchovies. Their haul of fish was declining. El Niño means 'Little Boy' or 'Christ Child' as this occurred every 2–3 years around Christmas. It is associated with unusually warm sea temperatures. While theories have been proposed, such as sea floor heating following a volcanic eruption, or tropical storms triggering the movement of water, scientists do not fully understand the causes of El Niño. It is, however, associated with small changes in sea surface temperature and the strong interaction between air and sea.

1 How can weather be hazardous?

Extreme weather conditions

REVISED

Figure 11 compares normal conditions with the conditions in years when El Niño and La Niña occur.

Figure 11 Comparison of normal weather conditions with El Niño and La Niña years

Event and diagram	What happens?
<p>Normal</p> <p>Rising warm, moist air associated with heavy rainfall</p> <p>Descending air associated with warm, dry conditions</p> <p>Trade winds blow westwards</p> <p>WARM SURFACE WATER</p> <p>STRONG SURFACE CURRENT</p> <p>UPWELLING COLD, DEEP WATER</p> <p>AUSTRALIA</p> <p>SOUTH AMERICA</p>	<p>Trade winds over the Pacific usually push warm waters towards the western Pacific, near Australia.</p> <p>Warm air rises over the warm waters in the West. It cools and condenses, bringing rainfall.</p> <p>In the eastern Pacific, air descends, creating high pressure. The colder waters are nearer the surface due to warmer water moving westwards.</p> <p>Sea levels in Australia are about half a metre higher than in Peru, and sea temperatures are 8°C warmer.</p>
<p>El Niño</p> <p>Descending air brings warm, dry weather and the possibility of droughts</p> <p>Rising warm, moist air brings rainfall and the possibility of floods</p> <p>Trade winds blow eastwards or weaken</p> <p>WARM SURFACE CURRENTS REVERSE, ACCUMULATING OFF SOUTH AMERICA</p> <p>COLD UPWELLING CEASES (BLOCKED BY WARM WATER)</p> <p>AUSTRALIA</p> <p>SOUTH AMERICA</p>	<p>The trade winds weaken, stop or reverse in the western Pacific.</p> <p>Water around Australia moves back towards the eastern Pacific, leading to a 30 cm sea level around Peru. This prevents the cold water rising and reduces fish stocks.</p> <p>An increase in water temperature over Peru (6–8°C warmer than usual) leads to low pressure, increasing the risk of flooding.</p> <p>Descending air over Australia, high pressure, can lead to droughts.</p>
<p>La Niña</p> <p>Extreme version of normal conditions that could result in flooding</p> <p>Extreme version of the normal conditions that could result in droughts</p> <p>Trade winds strengthen</p> <p>MORE WARM WATER PUSHED WESTWARDS</p> <p>STRONG OCEAN CURRENT NEAR PERU</p> <p>UPWELLING</p> <p>AUSTRALIA</p> <p>SOUTH AMERICA</p>	<p>After an El Niño event, La Niña might happen. La Niña can be described as a more exaggerated version of a normal year.</p> <p>While Australia might experience droughts during El Niño, it could experience flooding with La Niña.</p> <p>Sea temperatures are unusually cold around Peru (3–5°C colder).</p>

Exam practice

- 1 Describe the global distribution of tropical storms. [3]
- 2 Outline the conditions needed for a tropical storm to form. [3]
- 3 Explain two physical causes of drought. [4]
- 4 State how tropical storms have changed in frequency over time. [1]

Trade winds: the prevailing pattern of easterly surface winds found in the tropics, within the lower section of the Earth's atmosphere.

Case studies: Natural weather hazard events

Revision activity

For flashcards to be an effective form of revision, they have to be used **actively** to **test** your knowledge. Create a series of flashcards for your case studies. Create three cards for each, focusing on the keywords from the specification (causes, consequences, responses). Write notes about the case study on one side of the card and key questions on the other side of the card. Practise answering the questions, using the other side of your card to check that you are correct.

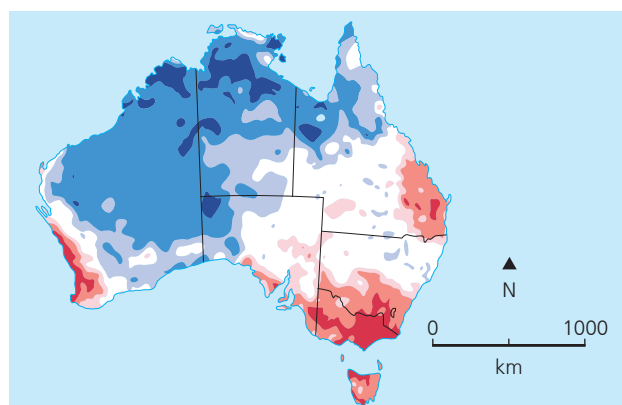
Exam tip

You need to know two case studies of natural weather hazard events. You have the choice of flash flooding or tropical storms for one, and a heatwave or a drought for the other. You must make sure that one is **UK based** and the other **non-UK based**.

Case study: Drought in Australia

Background

From 2002 to 2009, Australia experienced its worst drought for 125 years, which became known as the Big Dry.



Key

Rainfall

■ Highest on record	■ Below average
■ Very much above average	■ Very much below average
■ Above average	■ Lowest on record
□ Average	

Figure 12 The distribution of rainfall in Australia, 1997–2009

Causes

The fact that Australia is often affected by droughts is influenced by a number of factors:

- Australia's geographical location makes it vulnerable to droughts. It is in a subtropical area of the world that experiences dry, sinking air leading to clear skies and little rain.
- In 2006, the rainfall was 40–60 per cent below normal over most of Australia south of the Tropic of Capricorn.

- When El Niño is in action, the chances of rainfall in Australia decrease and it becomes even drier than normal, particularly in eastern Australia.
- The Murray–Darling river basin is home to 2 million people and is under a lot of pressure to supply water to residents and for agricultural production.

Consequences

Figure 13 shows the devastating consequences of the Big Dry.

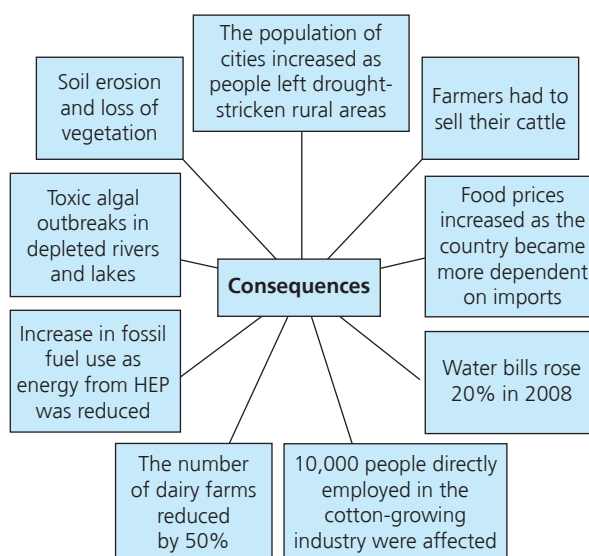


Figure 13 Consequences of the Big Dry

Responses

The different stakeholders found responses to the Big Dry.

Figure 14 Responses to the Big Dry

Individuals	Recycling waste water from showers, baths and wash basins (grey water) Farmers claiming financial assistance of \$400–600 per fortnight
Local government	Subsidising rainwater storage tanks for homes Legislation to ban car washing and limit showers to four minutes
National government	A new multimillion-dollar desalination plant built in Sydney Paying out \$1.7 million a day in drought relief to farmers
Scientists and environmentalists	Using efficient irrigation systems Calculating the amount of water that can sustainably be used by a state to create a limit that could be traded across states

Now test yourself

TESTED ☐

- 1 Describe one social, one economic and one environmental consequence of drought in Australia.
- 2 Choose two responses at different scales from Figure 14. Explain how they would help to reduce the effects of the drought.

Revision activity

Copy the spider diagram in Figure 13. Use three different colours to indicate the social, economic and environmental consequences. Add a key. Add an extra box off each of the consequences to explain the impact it would have. Start with 'This means that...'

Case study: Storm Desmond, NW England, UK

Background

Storm Desmond arrived on 5–6 December 2015 in Cumbria and surrounding areas, bringing gusts of wind up to 130 kilometres per hour and the worst flooding for 600 years. Storm Desmond became a record-breaking extreme weather event after 342.4 mm of rainfall in a 24-hour period was measured at Honister Pass. This broke the previous record set in Cumbria in 2009.

Causes

- Warm air from the Caribbean travelling across the Atlantic Ocean met colder air over northern England.
- It was a deep low pressure system (see page 9 for a definition) also known as an extratropical cyclone.
- This resulted in **relief rainfall** as the warm air was forced to rise over the Cumbrian mountains. This air cooled and condensed to form a prolonged period of heavy rainfall.
- Other factors made the **flash flood** worse. Many parts of north-west England had already experienced twice the monthly average rainfall before the floods. This meant that Storm Desmond was falling on already saturated ground; the water ran overland and straight into the rivers.

Relief rainfall: where air is forced to rise over a mountain, causing it to cool, condense and form clouds, which leads to rain.

Flash flood: a sudden flood which typically happens after heavy rainfall but can also be attributed to other factors such as already saturated ground, impermeable rock or a lack of vegetation. All of these factors increase the speed with which water reaches the river, leading to flash flooding.

Areas worst affected by flooding



Figure 15 Location map for Cumbria

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