

Paper 1 Hazards: Climatic

Global pattern of air circulation

The Atmospheric Circulation Model explains how air moves around Earth to create different weather patterns and climates. Imagine the Earth as a big ball with warm areas near the equator and cooler areas near the poles. Warm air near the equator rises because it's lighter, and as it rises, it spreads out towards the poles. When it cools down, it sinks back towards the ground and flows back to the equator, creating a loop.

Be aware, there are 6 of these circular motions each covering about 30 degrees latitude

The distribution of tropical storms

They are known by many names, including hurricanes (North America), cyclones (India) and typhoons (Japan and East Asia). They all occur in a band that lies roughly 5-15° either side of the Equator.

High and low pressure

Low Pressure

Caused by hot air rising. Causes stormy, cloudy weather.

High Pressure

Caused by cold air sinking. Causes clear and calm weather.

Hurricanes are very low pressure systems; but they do have an area of high pressure calm in the eye. The eye wall, however is where the strongest winds are found.

Formation of Tropical Storms

1. The sun's rays heats large areas of ocean in the summer and autumn. This causes **warm, moist air** to rise over the particular spots
2. Once the **temperature is 27°**, the rising warm moist air leads to a **low pressure**. This eventually turns into a thunderstorm. This causes air to be sucked in from the **trade winds**.
3. With trade winds blowing in the opposite direction and the rotation of earth involved (Coriolis effect), the thunderstorm will eventually start to **spin**.
4. When the storm begins to **spin faster than 74mph**, a tropical storm (such as a hurricane) is officially born.
5. With the tropical storm growing in power, **more cool air sinks** in the centre of the storm, creating calm, clear condition called the **eye of the storm**.
6. When the tropical storm hits land, it **loses its energy source** (the warm ocean) and it begins to lose strength. Eventually it will 'blow itself out'.

Responding to tropical storms The 3 P's

Prediction	Planning	Protection
With increased technology and understanding, tropical storms have become easier to predict. Eg/ Hurricane Watch and Hurricane Warning.	Public awareness programmes to know what to expect and how to react.	<ul style="list-style-type: none"> • Constructed of strong concrete • Shutters over windows • Built on silts in case of floods • Built on raised ground • Stairs to get people to first floor • Can be used as medical or community centre for most of the time

Storm case Studies: UK and Philippines

Storm Desmond. 3rd to 8th December 2015

The UK's weather is becoming more extreme as temperatures continually and slowly rise. We are on a weather roundabout which means we are at the meeting point of several different types of weather from different directions

Primary impacts	Secondary impacts
<ul style="list-style-type: none"> -3 people dead. -About 5,200 homes were flooded. 	<ul style="list-style-type: none"> - 61,000 homes in Lancaster were left without power -There was major disruption to rail services in the north of England while a landslide closed a section of the West Coast mainline between Preston and Carlisle. -Many roads were closed due to the flood water. -£400–500 million damage.
Immediate responses	Long term responses
<ul style="list-style-type: none"> -The government helped by providing local authorities with over £500 for each household affected. -The army were deployed to help flood-hit communities in the north of England. 	<ul style="list-style-type: none"> -Support was given for people as they tried to protect their homes against future floods by providing grants of up to £5000. -£45 million spent on flood defences to try and prevent this from happening in the future. -Severe flood warnings were put in place by the government which urged people to evacuate areas
Prediction	
The Met Office's supercomputer worked with a good level of accuracy.	

Typhoon Haiyan Philippines LIC (GDP only \$4700 per person per year).

Lasted from 2nd to 11th November, hit Philippines 8th November.
Worst affected place Tacloban.

Primary Impacts	Secondary Impacts
<ul style="list-style-type: none"> - Over 14 million people were affected - Killed approximately 8000 people - Estimated losses at \$3 billion with much of this in agriculture. - The major rice and sugar producing areas for the Philippines were destroyed. - Over 1 million homes damaged or destroyed - Airport was mostly destroyed - Storm surge 25 feet high in some areas, including in the city of Tacloban - Loss of forests, trees and widespread flooding 	<ul style="list-style-type: none"> - Flooding triggered landslides and delayed the arrival of aid - 6 Months later, many people still had limited access to shelter and water leading to outbreaks of typhoid - 6 million workers lost income sources. - The damage of the airport led to loss of foreign income - 5 million homes destroyed led to homelessness. - Salt water on farmland limits production leading to loss of income and food - Resulting poor mental health led to loss of income
Immediate Responses	Long term responses
<ul style="list-style-type: none"> - The typhoon was predicted and 800 000 people were evacuated to storm shelters two days before it made landfall - Fisherman were told not to go to sea - Philippines formally declared "A State of National Calamity" and asked for international help one day after Haiyan hit. - The Red cross were providing fresh water, food and shelter. - Plan International constructed pit latrines to prevent the spread of disease like typhoid 	<ul style="list-style-type: none"> - The UN appealed for 300 million to help rebuilding projects - The Red Cross helped build storm resistant new homes - The Philippine government encouraged tourism to the country to bring in foreign income. They highlighted that most of the country was not affected.

Paper 1: Hazards: Climate Change

What is Climate Change		
Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.		
Recent Evidence for climate change.		
Global temperature	Ice sheets & glaciers	Sea Level Change
Average global temperatures have increased by more than 0.6°C since 1950.	Many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by 10% in 30 years.	Average global sea level has risen by 10-20cms in the past 100 years. This is due to the additional water from ice and thermal expansion.
Enhanced Greenhouse Effect		
Recently there has been an increase in humans burning fossil fuels for energy. These fuels (gas, coal and oil) emit greenhouse gases. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation and causing less to be reflected. As a result, the Earth is becoming warmer.		
Evidence of natural change		
Orbital Changes		Volcanic Eruptions
Some argue that climate change is linked to how the Earth orbits the Sun, and the way it wobbles and tilts as it does it.	Volcanoes release large amounts of dust containing gases. These can block sunlight and results in cooler temperatures.	
Managing Climate Change		
Carbon Capture	This involves new technology designed to reduce climate change.	
Planting Trees	Planting trees increase the amount of carbon is absorbed from atmosphere.	
International Agreements	Countries aim to cut emissions by signing international deals and by setting targets.	
Renewable Energy	Replacing fossil fuels based energy with clean/natural sources of energy	
Changing pattern of Tropical Storms		
Scientist believe that global warming is having an impact on the frequency and strength of tropical storms. This may be due to an increase in ocean temperatures.		