1. Natural hazards

Definition: Natural hazards are natural events like a volcano or tropical storm which become a natural hazard when they pose a risk to people and property.

Factors which make a natural hazard worse:
Poverty – squatter settlements in LICs or NEEs are often built on unstable steep hillsides which are at risk of landslides
Urbanisation – big cities are at greater risk due to population size
Climate change – as the atmosphere warms up we are likely to experience more flooding and tropical storms

Types of natural hazards

- Earthquakes (tectonic hazard)
- Volcanoes (tectonic hazard)
- Tsunamis (tectonic hazard)
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- Tropical storms (atmospheric hazard)
- Drought (atmospheric hazard)
- Tornadoes (atmospheric hazard)
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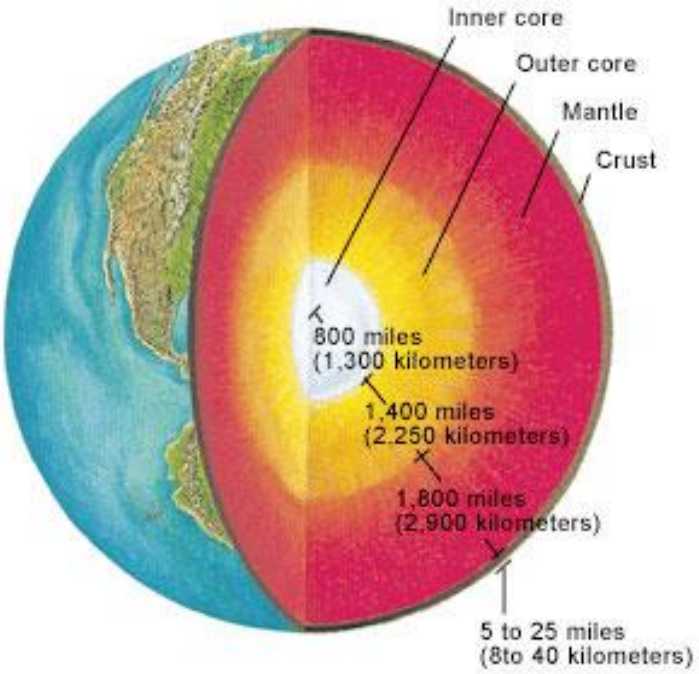
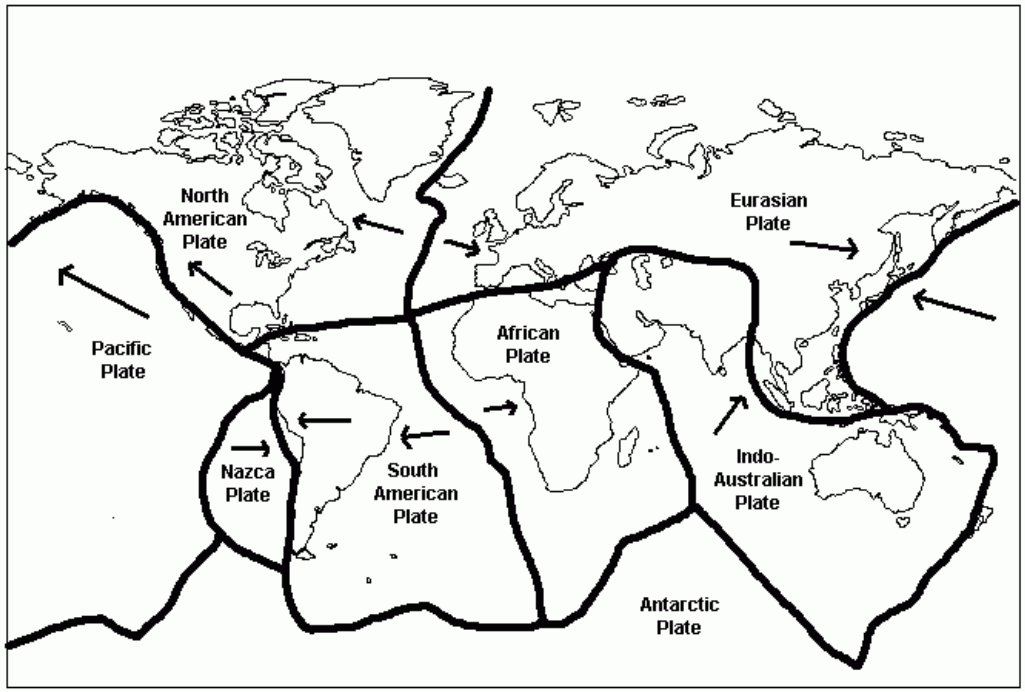
- Landslides (geological hazard)

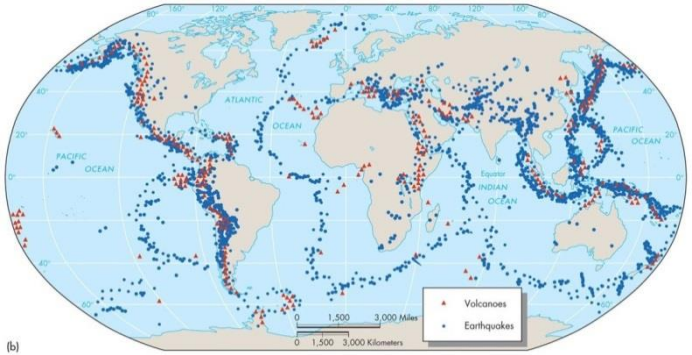
2. Inside the earth & plate margins





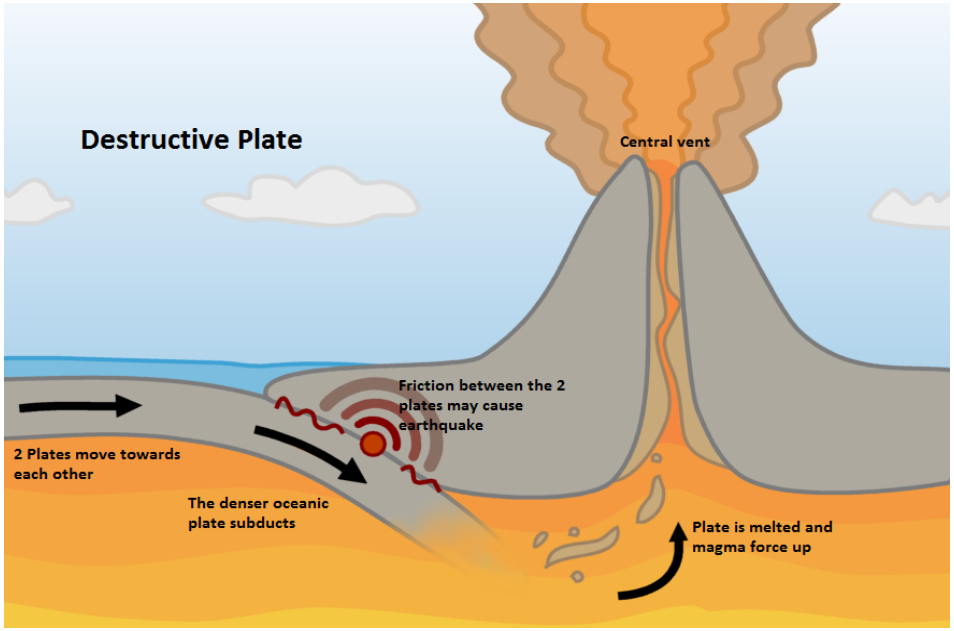
3. Plate Tectonics https://www.bbc.com/education/guides/z2vjxsg/revision/1

There is a relationship between the location of earthquakes and volcanoes and plate margins



The Earth's core is thought to be extremely hot, with temperatures reaching 5500°C. The heat from the core generates **convection currents** which move within the semi molten rock of the **mantle**. These currents cause the **plates** which make up the Earth's **crust** to move in different directions. This movement generates **tectonic hazards** such as **earthquakes** and **volcanoes**

4. Destructive plate margin



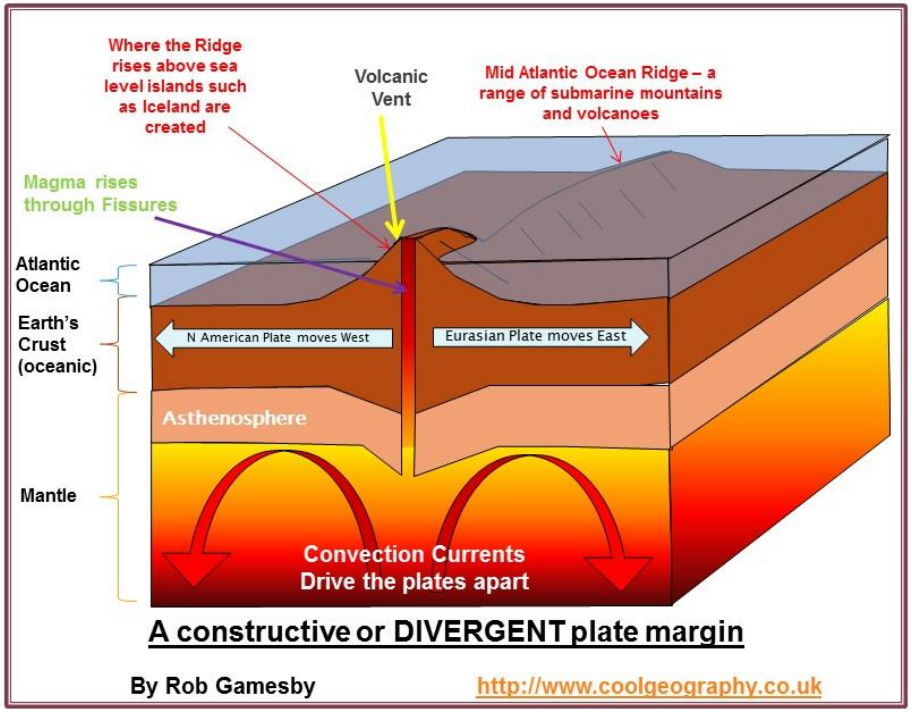
Be able to draw a sketch of a **destructive plate margin**.

Be able to **annotate it to explain** why **volcanoes** and **earthquakes** occur at this margin

Key words to use in your annotation:

mantle	oceanic crust	semi- molten
eruption	friction	pressure
earthquakes	continental crust	magma chamber
vent	Crater	melting
heat	denser	currents

5. Constructive plate margin



Be able to draw a sketch of a **constructive plate margin.**
Be able to annotate it to explain why volcanoes and earthquakes occur at this margin

Be able to **annotate it to explain** why **volcanoes** and **earthquakes** occur at this margin

Key words to use in your annotation:

mantle	Convection currents	semi- molten
crust	Mid ocean ridge	rising magma
earthquakes	core	shield volcano

6. Volcanoes (https://www.bbc.com/education/guides/zvnbkqt/revision/1)

Types of volcanoes

There are two types of volcano, composite and shield.
Composite volcanoes are steep-sided and cone-shaped, made up of layers of ash and lava and containing sticky lava which doesn't flow very far.
Mount Etna in Italy is a composite volcano.
Shield volcanoes have gently sloping sides and runny lava that covers a wide area. Gases escape very easily from shield volcanoes.
Mauna Loa in Hawaii is a shield volcano.

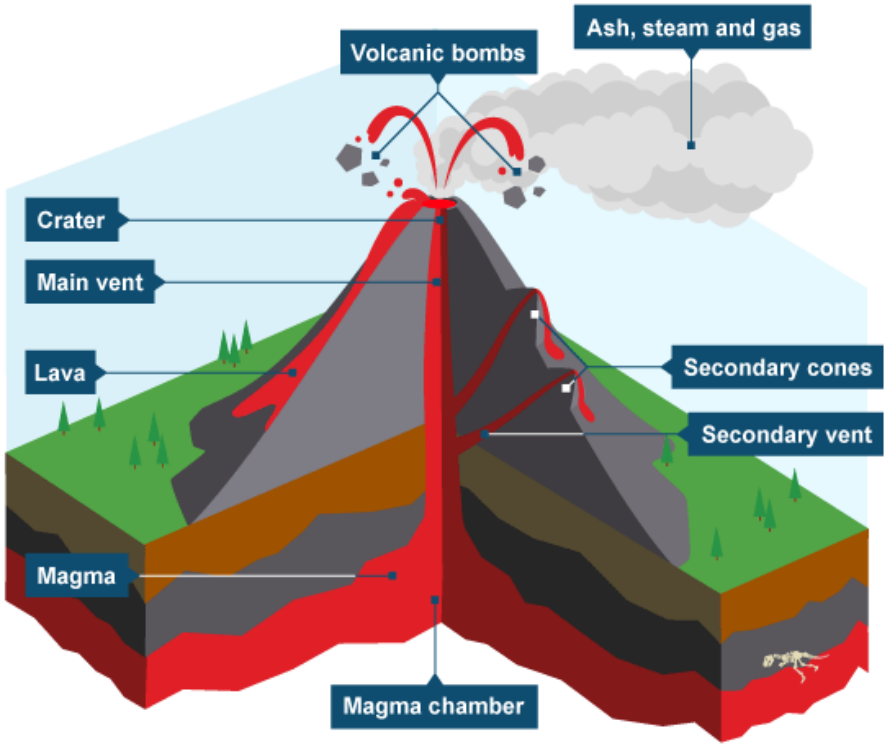
7. Volcanoes (https://www.bbc.com/education/guides/zvnbkqt/revision/1)

The structure of a volcano

Be able to sketch a volcano and identify the different features of a volcano

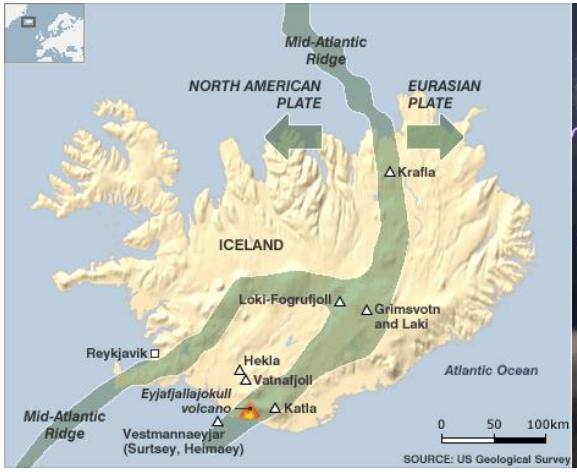
Magma chamber - large underground pool of magma
Lava - magma, once it reaches the surface

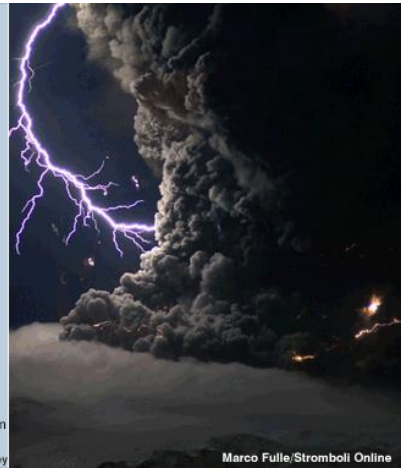
- **Crater** - bowl-shaped basin in the top of the volcano
- **Vent** - central tube which magma travels through
- **Secondary cones** - eruptions from other vents may build up secondary cones on the flanks
- **Ash, steam and gas** - material thrown out by the volcano
- **Volcanic bombs** - larger material thrown out by the force of eruption



8. The effects of a volcanic eruption (Case study: Iceland's Eyjafjallajokull volcano)

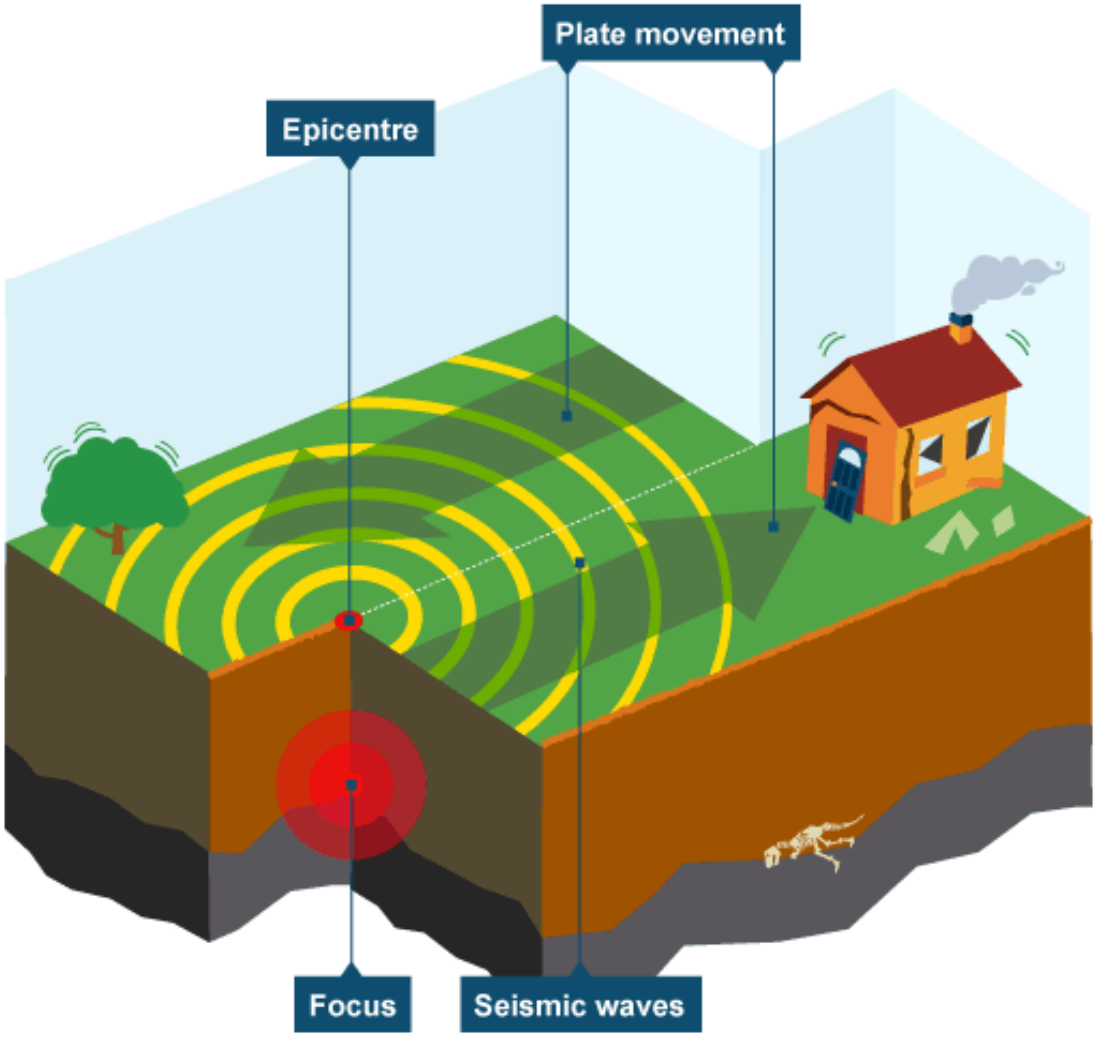
Facts about the eruption	Effects of the eruption within Iceland	Effects of the eruption within Europe
• The eruption started on 20 March 2010 • A 500 metre fissure opened up. • The eruption happened underneath an ice sheet. • Dissolved gases in the molten rock along with steam generated from the melting ice caused a large column of volcanic ash.	• Areas were flooded because of the glacier melt water which lay above the volcano. • Agricultural land was damaged, and farms were hit by heavy ash fall. • The ash fall poisoned animals in nearby farms. • Some roads were destroyed. • People were asked to stay indoors because of the ash in the air.	• Travel was severely disrupted as many flights were cancelled between 14 and 21 April 2010. • Businesses lost trade. • Air operators lost millions of pounds each day. • Perishable foods were wasted as they could not be transported. • People were not able to get to work because they were stranded. • The timing of the disruption was during the Easter holidays when levels of tourism are high.





9. Earthquakes (https://www.bbc.com/education/guides/z3sg87h/revision/1

Large earthquakes are usually connected with plate boundaries. Earthquakes happen often but most are too small for us to notice. **Seismometers** record earth movements. An earthquake is a sudden shockwave caused by rocks being under stress from the movements of plates at plate boundaries. Eventually the stress in the rock builds up enough to reach breaking point. At that point, the stored up energy is released in the form of **shockwaves**.



Measuring an earthquake
Earthquakes are measured using the **Magnitude Scale**. This measures the size of the **seismic waves** during the earthquake. Each step in the scale is ten times greater than the previous number. This is a logarithmic scale. Therefore a 6 is 10 times stronger than a 5 but a 7 is 100 times stronger than a 5 on the magnitude scale.

The amount of damage caused by an earthquake is measured by the **Mercalli Scale**. This is a measure of intensity, and changes according to which area you are measuring - damage nearer the epicentre would usually be greater than further away.

10. Earthquakes (https://www.bbc.com/education/guides/z3sg87h/revision/1)

Case Study: Haiti Earthquake

Haiti is part of a large Caribbean island called Hispaniola. The Dominican Republic is located to the east of Haiti and covers over half of the island.

Cause of the earthquake

Haiti lies right on the boundary of the Caribbean and North American plates. There was slippage along a conservative plate boundary that runs through Haiti. On 12 January 2010, a magnitude 7 earthquake hit Haiti at 16:53 local time. The earthquake's epicentre was 25 km west of Port-au-Prince, the capital. Most people, businesses and services were located in the capital.

Social impacts of the earthquake (effects on people)

- Over 220,000 deaths.
- 300,000 injured.
- 1.3 million made homeless.
- Several hospitals collapsed.

Economic impacts of the earthquake (effects on money and jobs)

- 30,000 commercial buildings collapsed.
- Businesses destroyed.
- Damage to the main clothing industry.
- Airport and port damaged.

Many of the effects were **immediate** or **primary**, e.g. injuries from falling buildings. Some **secondary** effects didn't happen until many months later, e.g. cholera outbreaks. The effects of this earthquake were particularly bad because of the following reasons:

Buildings and other structures were poorly built and there were very few earthquake-resistant buildings – many buildings simply collapsed.

The epicentre was near to the capital

There were few resources to rescue or treat injured people

United Nations troops and police were sent to help distribute aid and keep order.

Response to the earthquake

Haiti is a **poor country** without the money and resources to redevelop. It is one of the least developed countries in the world with most Haitians living on $2 or less per day, about £1.30.

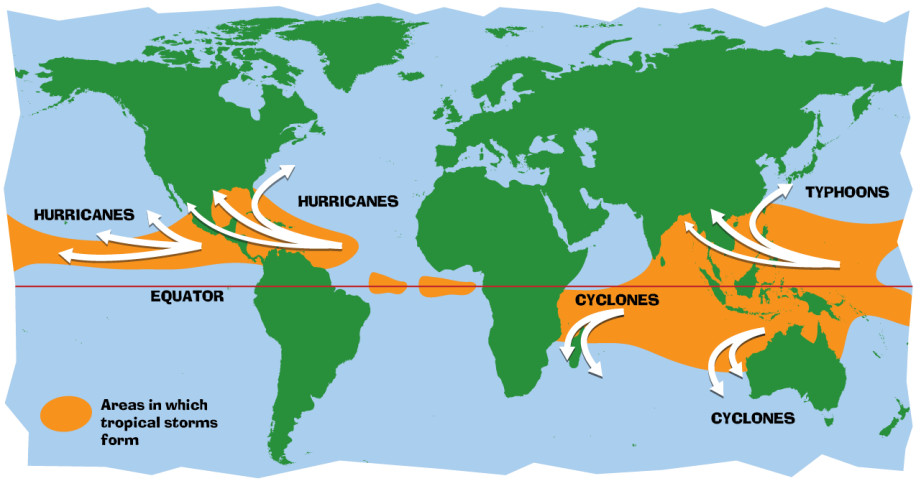
Immediate responses

- Neighbouring Dominican Republic provided **emergency water** and **medical supplies** as well as heavy machinery to help with search and rescue underneath the rubble, but most people were left to dig through the rubble by hand.
- Emergency **rescue teams** arrived from a number of countries, e.g. Iceland.
- Medical teams began treating the injured - **temporary field hospitals** were set up by organisations like the International Committee of the Red Cross.
- GIS was used to provide satellite images and maps of the area, to assist aid organisations.
- People from around the world watched the news from Haiti on TV and through
- social networks. Many **pledged money** over their mobile phones.

Long term responses

Money was pledged by organisations and governments to assist in rebuilding, but only slow progress had been made after one year.
After one year, there were still 1,300 camps.
'Cash for work' programs are paying Haitians to clear rubble.
Small farmers are being supported - so crops can be grown.
Schools are being rebuilt.

11. Tropical storms (https://www.bbc.com/education/guides/zrv4jxs/revision/1)



A **tropical storm** is a hazard that brings **heavy rainfall**, **strong winds** and other related hazards such as **mudslides** and **floods**.

Tropical storms usually form between approximately **5° and 30°** latitude and move westward due to easterly winds. The **Coriolis force** sends them spinning towards the poles.

In most areas, **tropical storms are given names**. The names are alphabetical and alternate between male and female.

It is **hard to predict the path of a tropical storm**, and therefore difficult to manage an adequate evacuation of an area if needed.

Have you got a tropical storm named after you?
https://www.nhc.noaa.gov/aboutnames.shtml?text

How do tropical storms form?

- ✓ They need heat from warm oceans **27°c+**
- ✓ The warm ocean heats the air above causing it to **rise rapidly**
- ✓ The rising air contains a **great amount** of **water vapour**
- ✓ The rising air starts to spin due to the **Coriolis force**
- ✓ As the air rises it cools, condenses and forms towering **cumulonimbus clouds**
- ✓ The rapidly rising air creates an area of **intense low pressure** which sucks in air causing **very strong winds**
- ✓ Once the storm makes **landfall** it will lose energy as its heat and water source is lost but the storm can still wreak havoc for days….