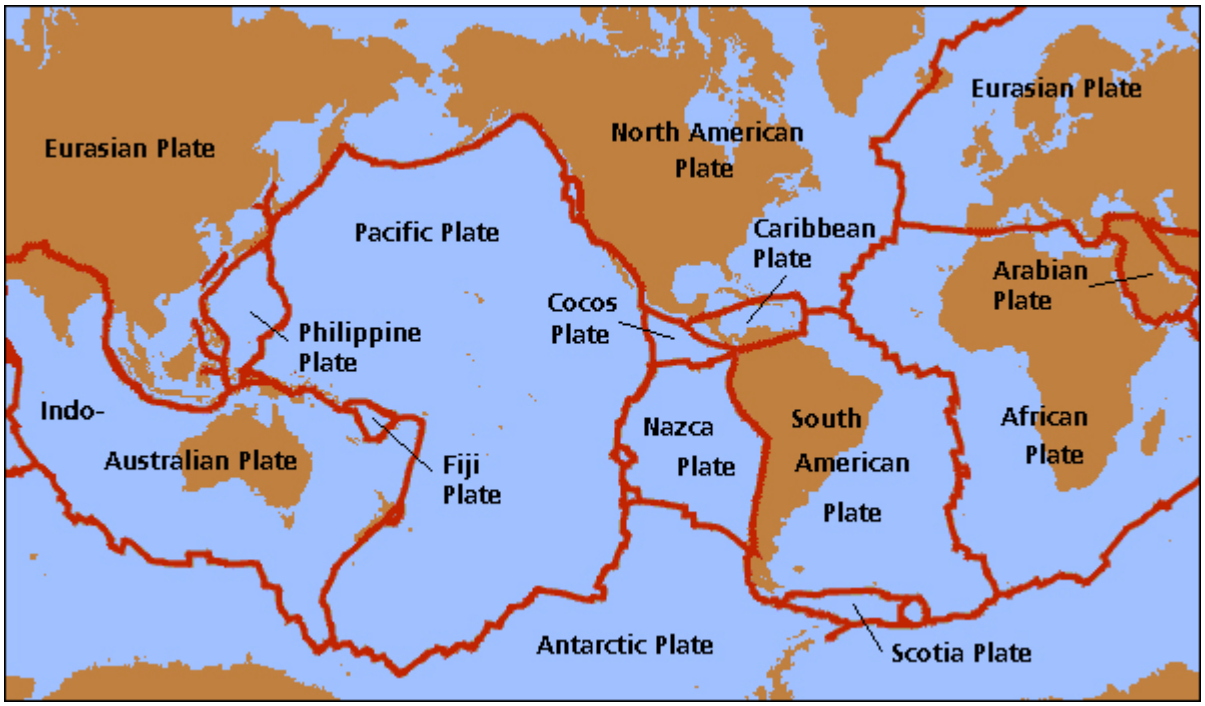
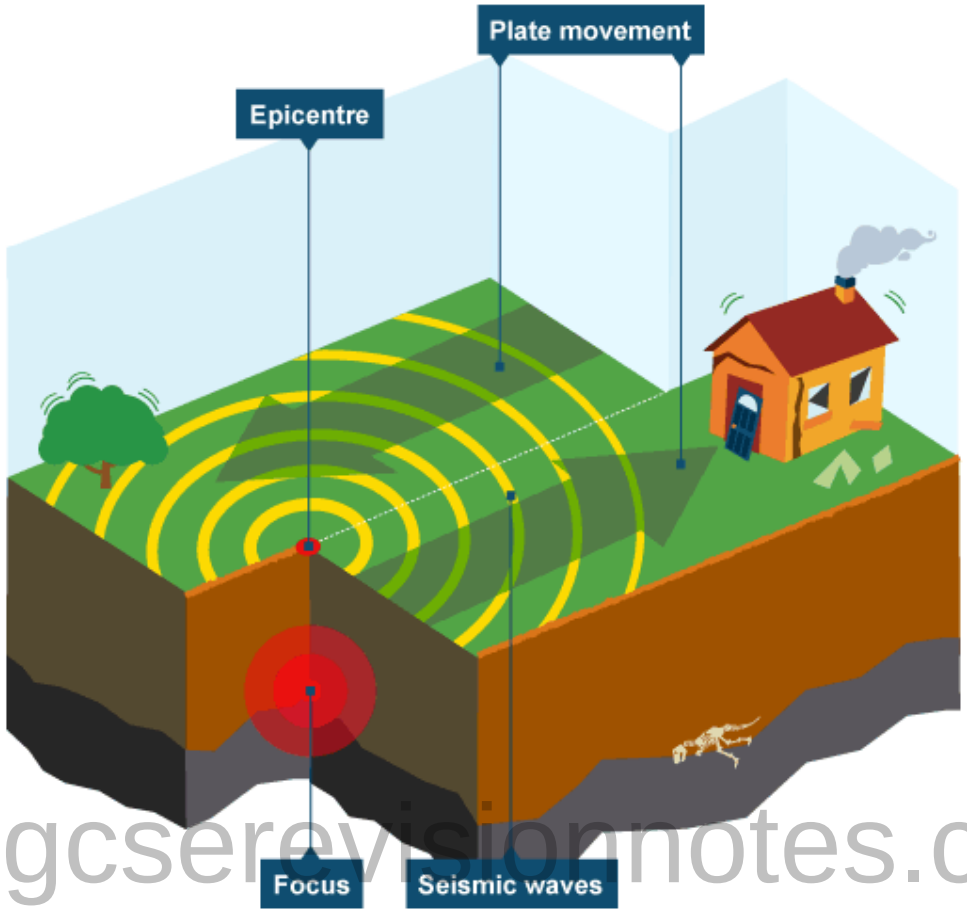
Restless Earth



Oceanic crust	Continental Crust
• Newer – most less than 200 million years old • Denser • Can sink • Can be renewed and destroyed	• Older – most older than 1500 million years • Less dense • Cannot sink • Cannot be renewed or destroyed

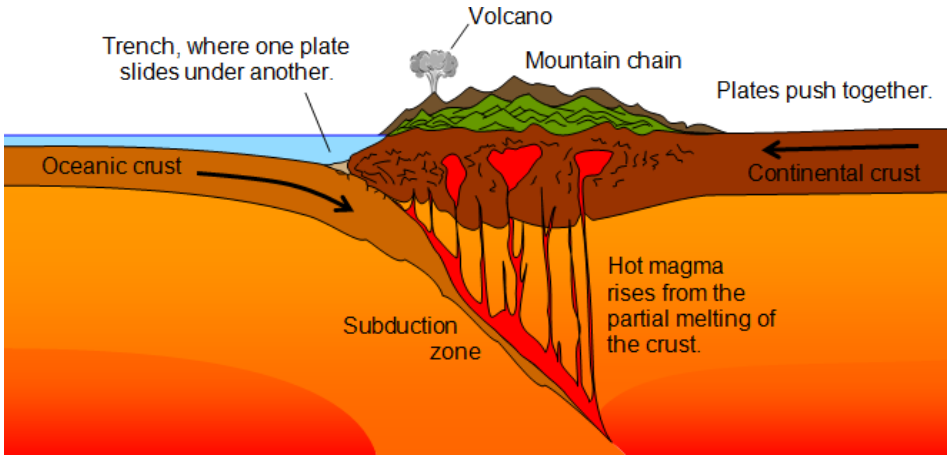
Plate Boundaries

Conservative Plate Boundary



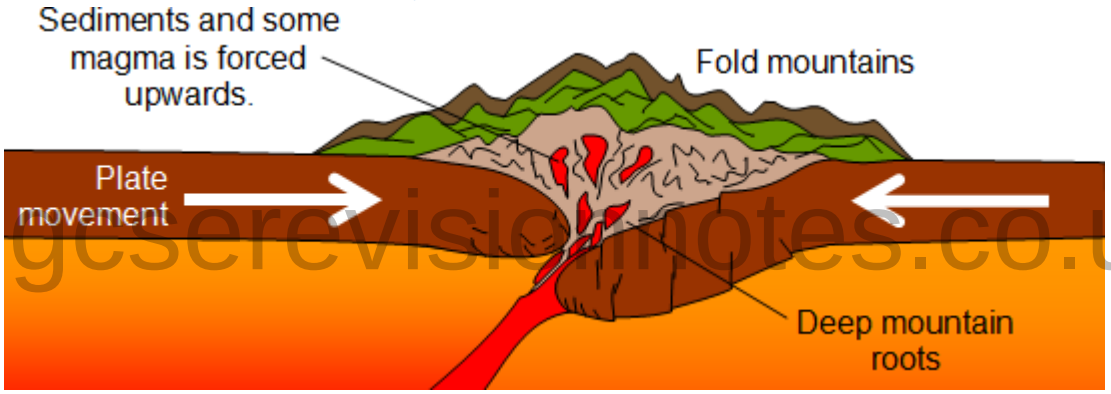
At conservative plate margins the plates are sliding past each other. They can be moving in the same or different directions. They tend to get stuck and when the pressure builds up it is released through an earthquake. At a conservative plate boundary crust is neither created nor destroyed. They have no volcanos.

Destructive Subductive Plate Boundary

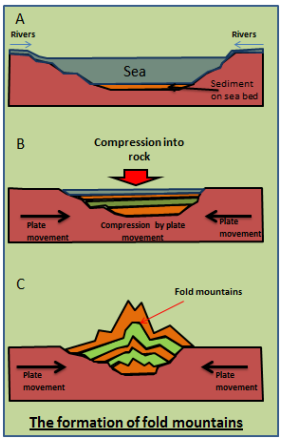


When an oceanic plate and continental plate move towards each other the denser heavier oceanic plate gets forced down into the mantle. The friction from this causes earthquakes and melts the crust into magma. The magma then rises back up through the cracked rock to form volcanos on the surface. The force causes the continental plate to buckle and form fold mountains.

Destructive Collision Plate Boundary

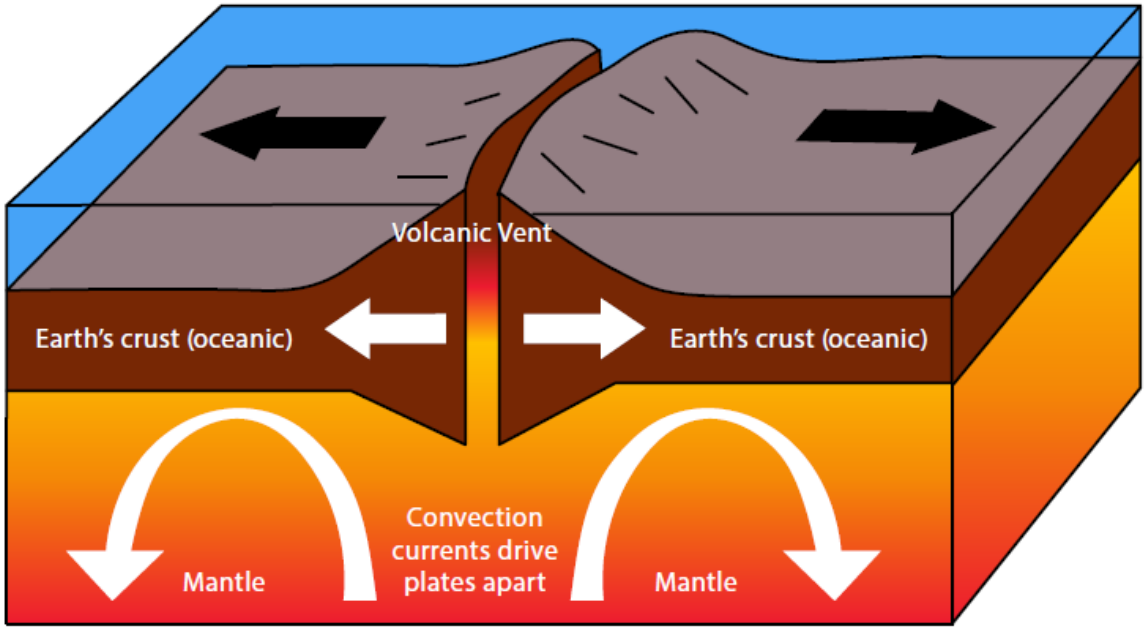


When two continental plates move towards each other they buckle and fold upwards forming mountains. Where an area of sea separates the two plates sediments settle on the seafloor in depressions called geosynclines. These sediments are compressed into sedimentary rock. When the two plates move towards each other the layers of sediment become crumpled and folded. This process is known as Orogeny. Young fold mountains are younger than 65 mya. Rocks folded upwards are called anticlines, downwards are called synclines and severely folded are called Nappes.



Constructive Plate Boundary

Constructive Plate Figure



When plates move apart they create constructive plate boundary. This usually happens under the oceans. As these oceanic plates pull away from each other, cracks and fractures form between the plates where there is no solid crust. Magma forces its way into the cracks and makes its way to the surface to form volcanos. In this way new land is formed as the plates gradually pull apart.

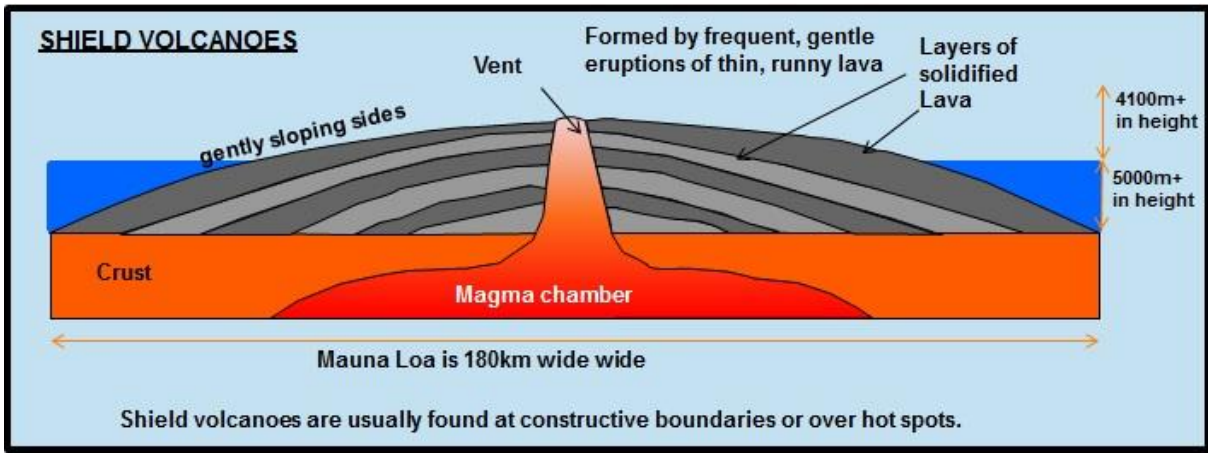
Ocean Trenches

- Ocean trenches are the deepest parts of the ocean
- They are arc shaped depressions formed at subduction zones
- They are many found along the coastline and near young fold mountains
- The occur most on the edge of the Pacific Ocean
- Ocean trenches in Indonesia and Caribbean
- Must be reference to location in answer

Volcanos

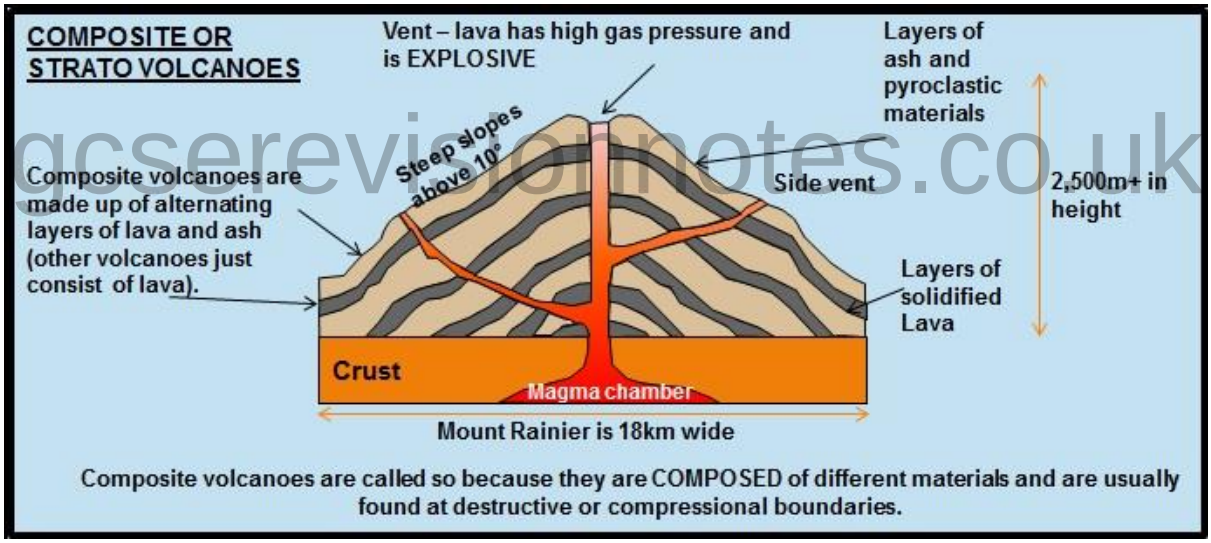
- Found at constructive and destructive plate boundaries

Shield Volcanos



- Higher fluidity is a result of less silica

Composite Volcanos



- Sticky lava
- Erupt at speeds of up to 200 mph
- E.g. Mount St. Helen and Mount Pinatubo

Eyjafjallajökull – Case Study

- Eyjafjallajökull erupted for seven months from 20th March to October 2010
- It last erupted in 1823
- Iceland is located on the North American and Eurasian tectonic plates
- These plates are separated by the mid-Atlantic ridge
- The eruption badly affected freight and producers of specialised crops as well as air travel
- However, it positively affected the rail industry with Eurostar gain 50,000 extra passengers

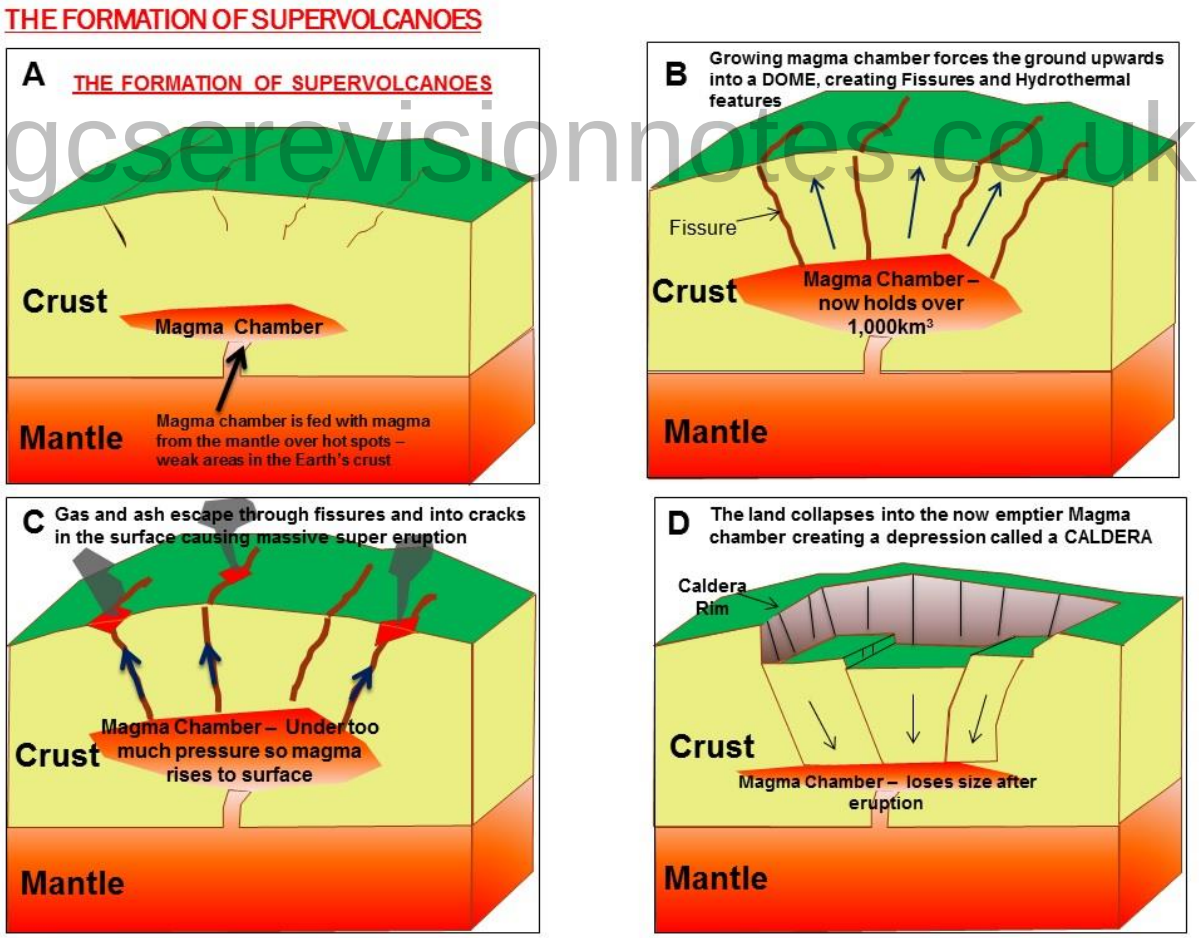
Nyiragongo – Case Study

- On 17 January 2002 Nyriagongo volcano in the Democratic Republic of Congo erupted
- This led to three streams of lava spilling south at a rate of 60 kph
- It flowed across the runway and through Goma, splitting it in half
- Many homes, roads and water pipes were destroyed
- It caused explosions at fuel stores and power plants
- It killed 45 people
- 500,000 people fled to neighbouring Rwanda to escape the lava
- Rwanda was not prepared for this and the refuges faced severe conditions
- Cholera became a large risk
- Aid agencies such as Oxfam supplied water tankers to support the residents of Goma
- They also supplied food, medicine and blankets

Hot spot Volcano

- These are not formed at plate boundaries
- A hot spot is an area of persistent volcanic activity. Hot spots originate at unusually hot areas of the mantle-core boundary. Overlying mantle melts forming plumes of magma that rise and penetrate the crust forming volcanos.

Super Volcanos



- Super volcanoes erupt every 50 000 to 100 000 years
- We cannot figure out how extreme SV eruptions are as we only have fossil records as the last one was 2,000 years ago
- Scientists think a SV eruption will blast massive sections of the crust into the atmosphere and pyroclastic flows

- Super volcanoes form at destructive plate boundaries where a large amount of material begins to rise back to the surface. They also form above continental 'hotspots; where a large bubble of magma is rising up through the crust.

- The caldera is a depression in a super volcano marking the collapse magma chamber

- If Yellowstone was to erupt it would destroy 10,000 km^3, kill 87 000 people and cover everything within 1000km with ash killing 1 in 3 people. It would cause large scale disruption to transport and water. It would trigger a volcanic winter.

Predicting Volcanos

- An increase in earthquake activity is an indication that magma is rising beneath a volcano, causing rocks to crack and fracture. Earthquakes are recorded using instruments called seismometers that are placed in the ground
- Tilt meters can be placed on the ground to measure light changes in the tilt of the ground caused by rising magma. Just before Mt St Helens erupted in 1980 the north face bludged as magma rose within the volcano. GPS is used to measure very slight changes as smalls as 1mm. Laser beams can also be used to measure the volcano slope
- Digital cameras can be placed to record small eruptions indicating volcanic activity
- Gases emitted by the volcano change concentration prior to an eruption

Benefits of living in a volcanic area

- Good soil
    - Ash acts like fertiliser
    - Gives of nutrients
- Geothermal energy
    - Cheaper energy prices
    - Abundant from volcano
- Lots of jobs
    - Tourism
    - Volcanos have good nature and scenery

Earthquakes

- A sudden and brief period of intense ground shaking

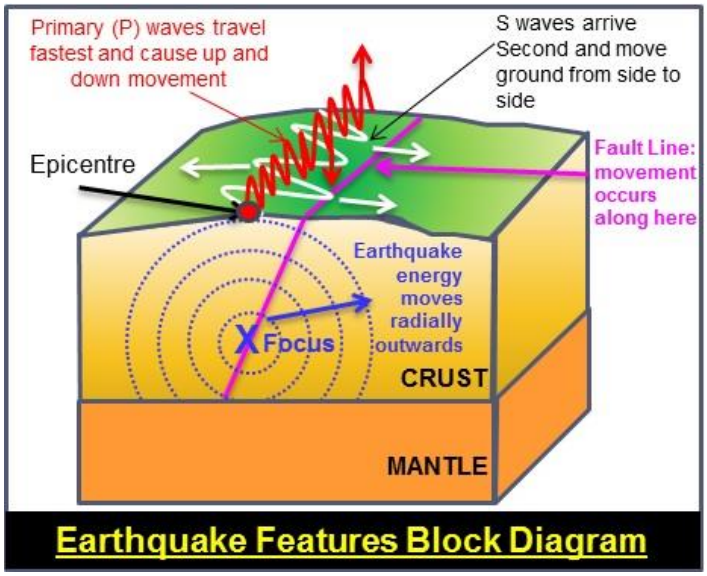
Focus – The point on the Earth's crust where the earthquake begins

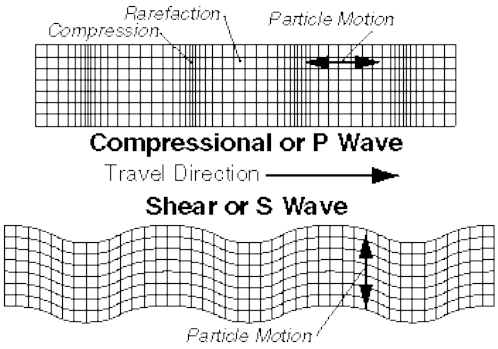
Epicentre – The point on the Earth's surface directly above the focus

Shock Waves – Seimsic waves generated by an earthquake that travel through the Earth's crust

Seismograph – A graph which shows the size of a ground tremor during an Earthquake: "an instrument that measures and records earthquakes"

Liquefaction – Ground turning into water during earthquake





Hati – Case Study

- On 12th January 2010, a earthquake measuring 7.0 on the Richter scale struck Hati
- Between 170,000 - 230,000 people were killed
- Hati is situated between the North American and Caribbean Plate along the Euriquillo-Plaintain Garden Fault which is a conservative plate boundary.
- Hati was a poor country as shown by:
    - ¾ of Haitians live on less than $2 a day
    - ½ live on less than $1
    - 2015 life expectancy was 64
    - Less than ½ have access to drinking water
- The focus of the earthquake was relatively shallow and the epicentre was close to Port-au-Prince
- 1.3 million were made homeless
- 300,000 buildings collapsed
- 30,000 businesses were destroyed
- 9 months after the quake an epidemic of cholera broke out causing 8,000 deaths
- The reasons for these consequences were:
    - Poor building quality – Lack of building regulations
        - Houses built on steep slopes without foundations
    - Poor services and infrastructure
- Short term responses:
    - NGO (non-government organisations) such as charities provided humanitarian aid

    - Hygiene tents given out
    - Food canteens set up
    - Oxfam provided sheets for shelter and water
    - Government provided camps
- Long term response:
    - Camps set up to house people

Marassa camp