

## 2.17 Types and features of earthquakes and volcanoes.

IGCSE1-THEME 2.17

# Learning objectives:

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1. Earthquakes- power below the surface.
2. Volcanoes- power at the surface.

# Key terms

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Volcano- галт уул

earthquake-газар хөдлөлт

Crust- дэлхийн царцдас

plate tectonic-тектоникийн хавтан

Active volcano-идэвхитэй галт уул

Dormant volcano-унтарч буй галт уул

Extinct volcano-унтарсан галт уул

strato-volcano-давхраат галт уул

Shield volcano-бамбай галт уул

Lava- галт уулын халуун хайлмаг

Ash-үнс

pyroclastic flows-галт уулын  
дэлбэрэлтээс гарч буй материал

mudflows-шингэн шавар урсац

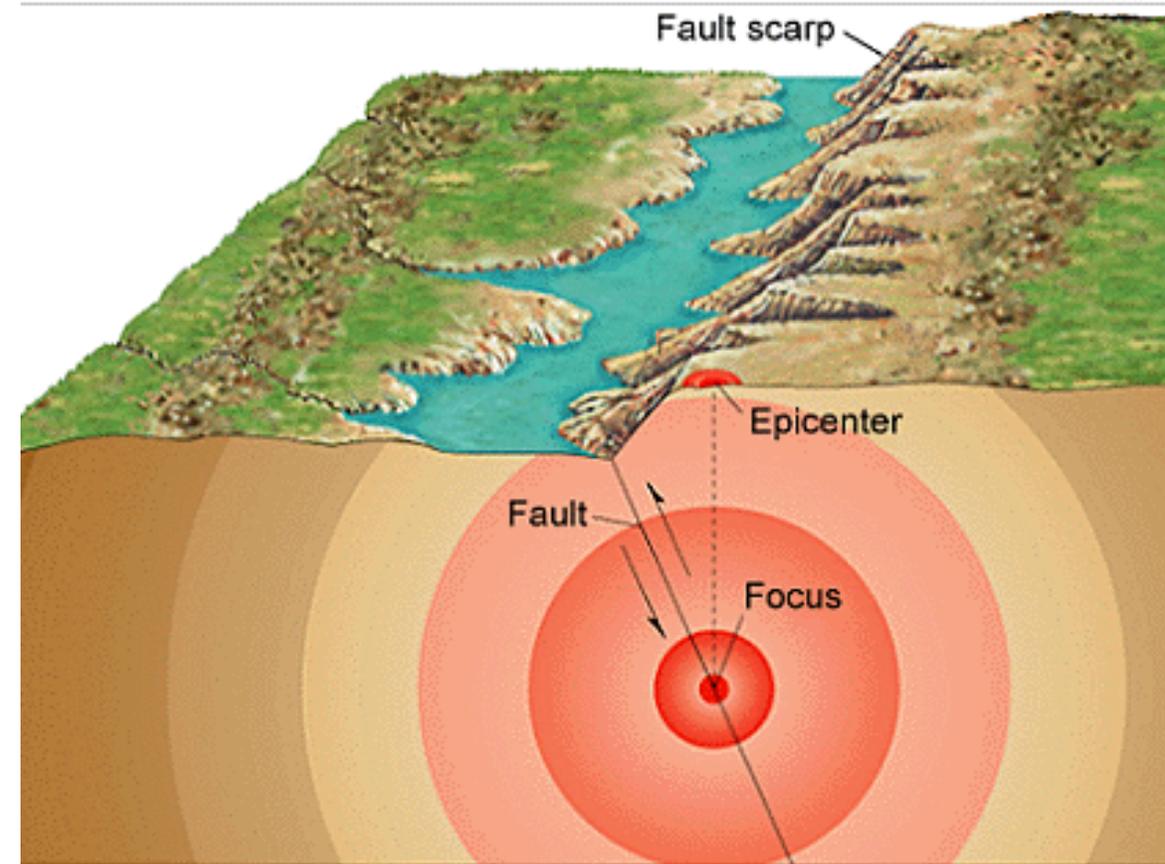
magma-магма

fold mountain-атираад уул

natural hazard-байгалийн гамшиг

# 1. Earthquakes- power below the surface.

Earthquakes are triggered from below the Earth's surface where rocks under great stress and pressure reach breaking point and make sudden jerking movements. Where this takes place is known as the focus or origin. The point on the surface immediately above the focus is the epicenter. Shock waves sent out from the focus cause the surface of the Earth to shake and break. These waves spread in concentric circles around the epicenter and can affect places thousands of kilometres away. How much damage is done depends on the pressure at the focus and how deep it is as well as whether there are people and places within range of the earthquake.



# The Richter scale:

Scientists studying earthquakes use the Richter scale to measure the strength or magnitude of an earthquake. It was devised by Charles Richter in 1935. The scale goes from 0-12 but the effect is not even. Each number of magnitude is ten times the energy of the previous one so an earthquake of magnitude 7.0 is 100 times more powerful than an earthquake of 5.0.

There were 58 earthquakes with a magnitude of over 6.5 on the Richter scale in 2013 alone and 176 over 2.5 magnitude on 25 December 2013 –just one day!

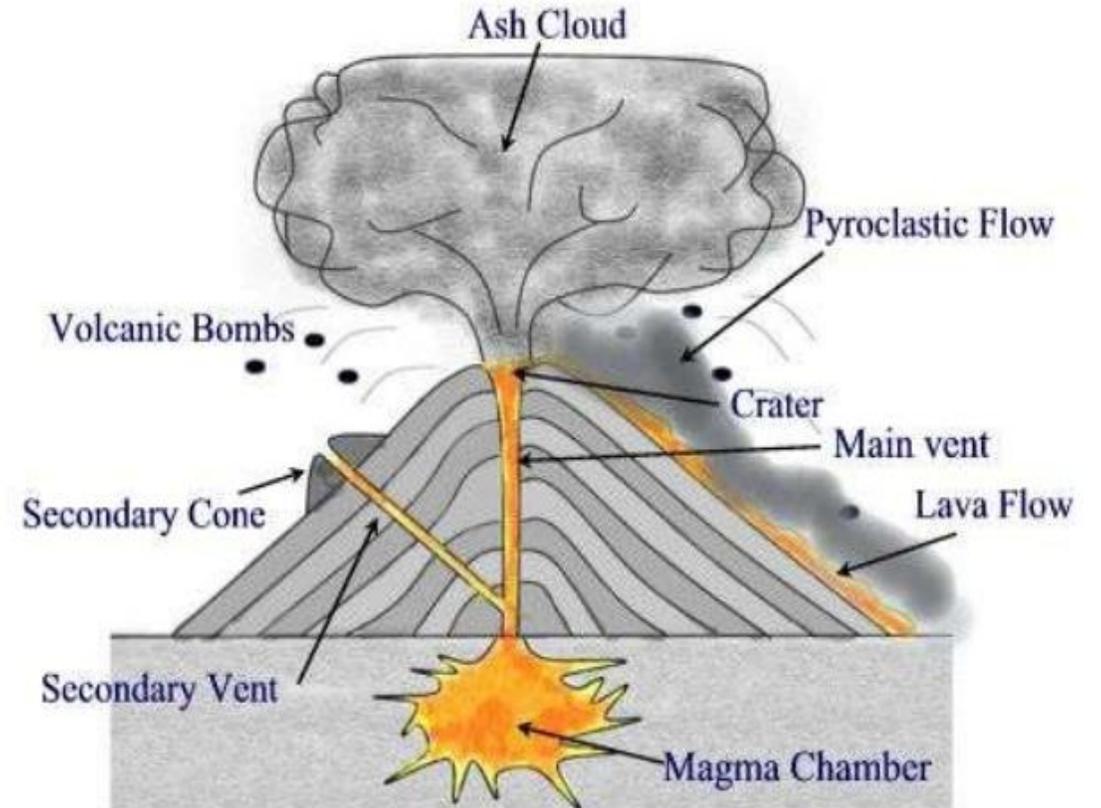


## 2. Volcanoes- power at the surface.

A volcano is formed when a hole, crack or vent in the Earth's crust allows molten rock (magma), solid rocks, steam and other gases to escape onto the Earth's surface and into the air. There are **two main types** of volcano.

1. **Strato-volcanoes** (also known as composite cone volcanoes) are the most deadly of all volcano types. They often erupt with great violence, causing much death and destruction. They usually occur in mountain regions where great pressure can build up beneath the ground.

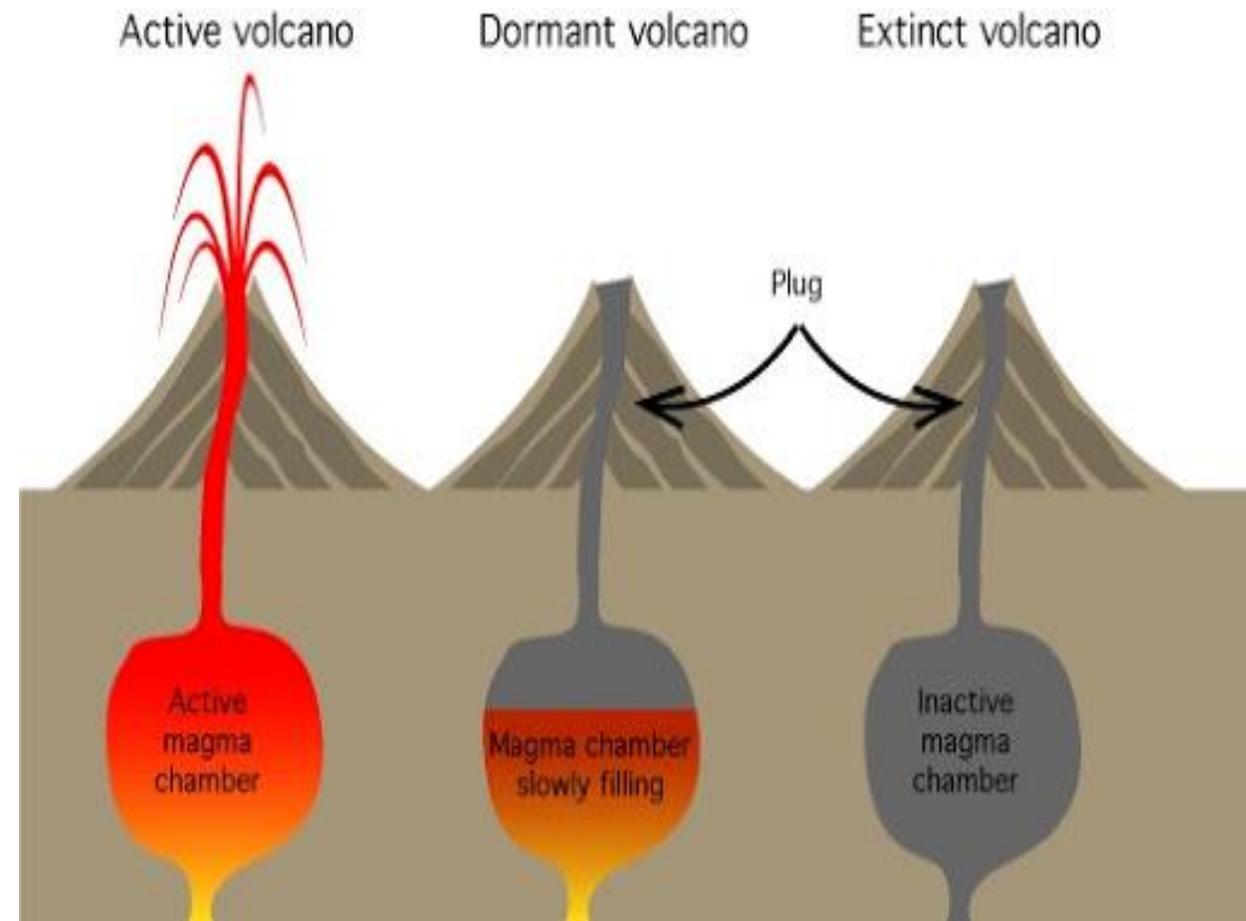
2. **Shield volcanoes** are much flatter than strato-volcanoes and are less violent, dramatic and damaging. This is because they are created where there is no great build-up of pressure so they erupt more often and are less explosive.



**Main Features of a Volcano**

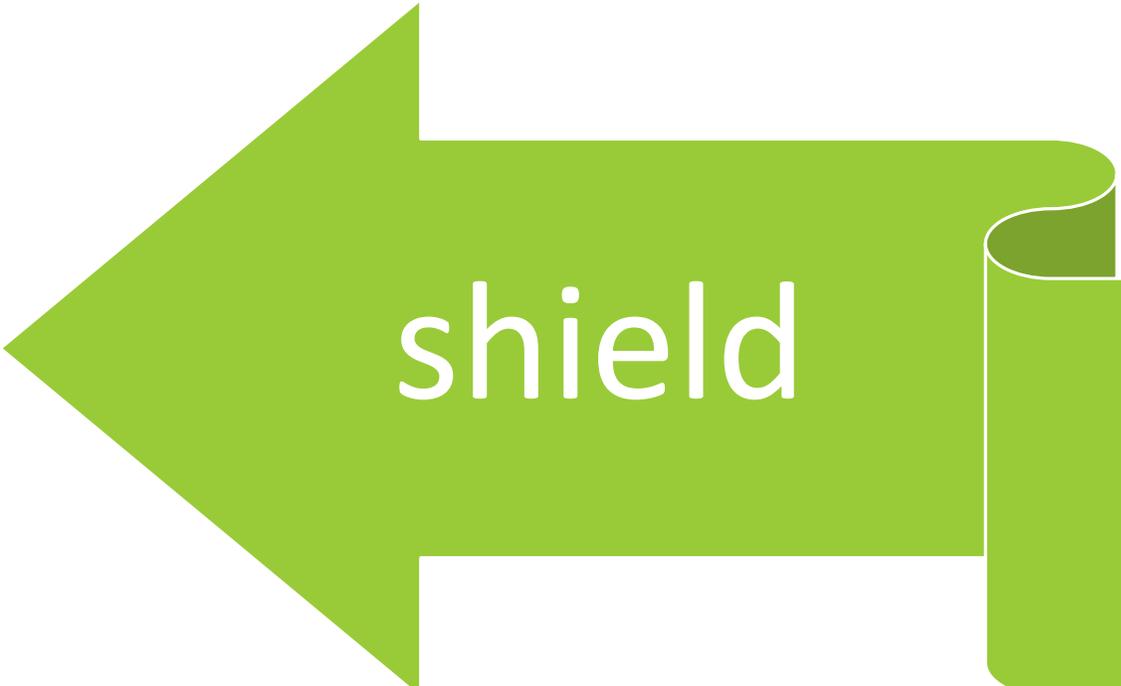
Volcanoes can also be classified by the frequency of their eruption. They may be:

1. **active** volcano- regular eruptions, e.g. Mount Etna-Italy, Mauna Loa-Hawaii.
2. **dormant** volcano- has not erupted for many years but activity can be detected inside, e.g. Mount Fuji, Japan (its last major eruption was in 1708)
3. **extinct** volcano-will not erupt again as no activity can be detected, e.g. La Gomera in the Canary islands.



# Types of volcano.

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A large green arrow pointing to the left, representing a shield volcano. The word "shield" is written in white lowercase letters in the center of the arrow.

shield

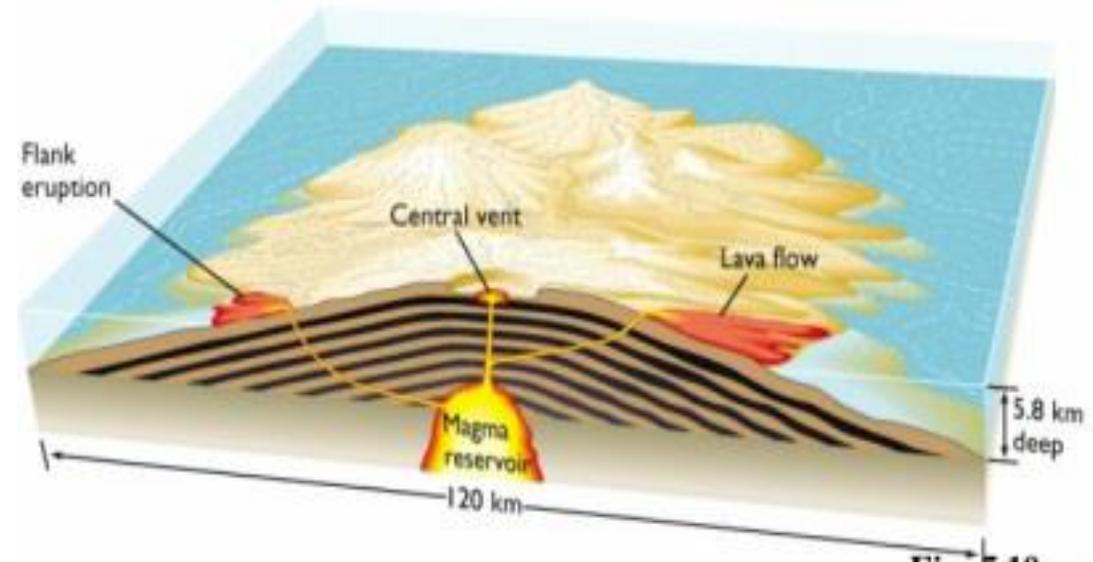
A large green arrow pointing to the right, representing a stratovolcano. The word "strato" is written in white lowercase letters in the center of the arrow.

strato

# 1. Shield Volcanoes

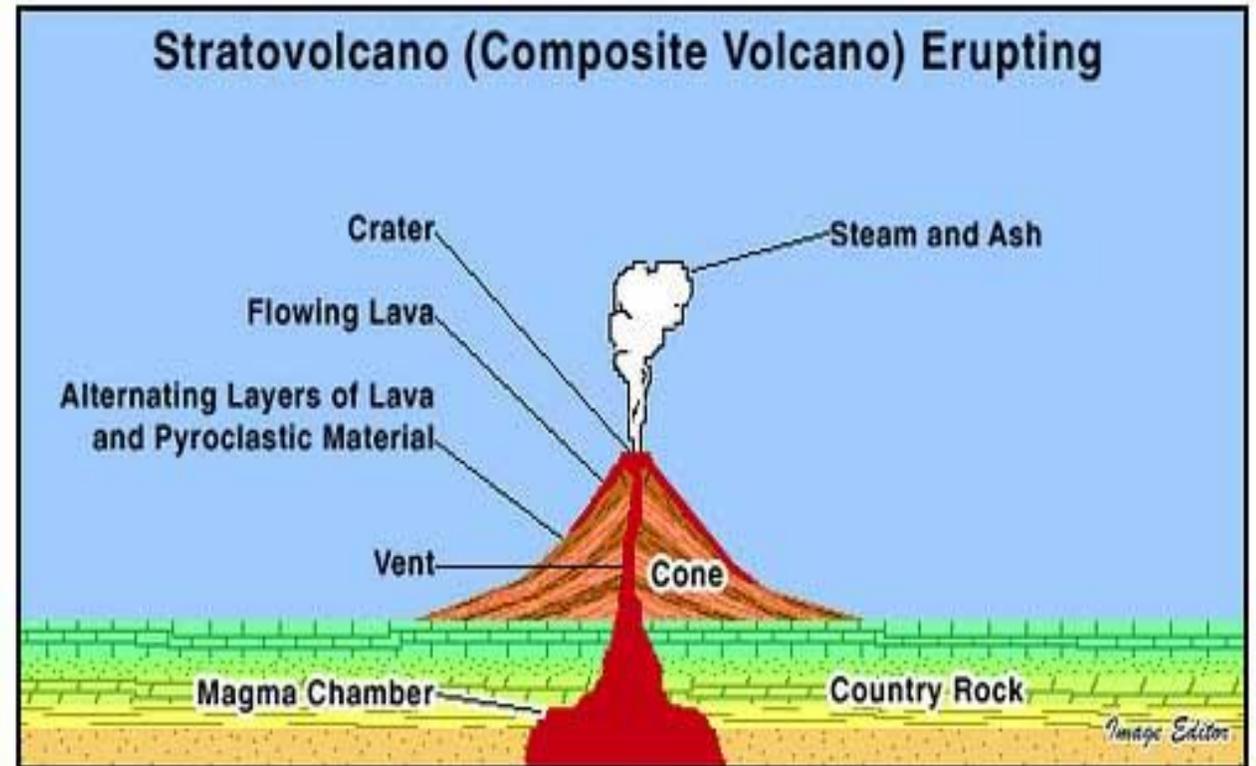
Shield volcanoes are the largest volcanoes on Earth that actually look like volcanoes (i.e. not counting flood basalt flows). The Hawaiian shield volcanoes are the most famous examples. Shield volcanoes are almost exclusively basalt, a type of lava that is very fluid when erupted. For this reason these volcanoes are not steep (you can't pile up a fluid that easily runs downhill). Eruptions at shield volcanoes are only explosive if water somehow gets into the vent, otherwise they are characterized by low-explosivity fountaining that forms cinder cones and spatter cones at the vent, however, 90% of the volcano is lava rather than pyroclastic material. Shield volcanoes are the result of high magma supply rates; the lava is hot and little-changed since the time it was generated. Shield volcanoes are the common product of hotspot volcanism but they can also be found along subduction-related volcanic arcs or all by themselves. Examples of shield volcanoes are Kilauea and Mauna Loa (and their Hawaiian friends), Fernandina (and its Galápagos friends), Karthala, Ertá Ale, Tolbachik, Masaya, and many others.

## Shield Volcano



## 2. Strato-volcanoes

Strato-volcanoes comprise the largest percentage (~60%) of the Earth's individual volcanoes and most are characterized by eruptions of andesite and dacite - lavas that are cooler and more viscous than basalt. These more viscous lavas allow gas pressures to build up to high levels (they are effective "plugs" in the plumbing), therefore these volcanoes often suffer explosive eruptions. Strato-volcanoes are usually about half-half lava and pyroclastic material, and the layering of these products gives them their other common name of composite volcanoes.



# Task 1. Compare to strato and shield volcano.

**COMPOSITE OR STRATO VOLCANOES**

Vent – lava has high gas pressure and is **EXPLOSIVE** – RHYOLITIC or ANDESITIC Lava

Layers of ash and pyroclastic materials

Steep slopes above 10°

Side vent

2,500m+ in height

Layers of solidified Lava

Crust

Magma chamber

Mount Rainier is 18km wide

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Composite volcanoes are called so because they are **COMPOSED** of different materials and are usually found at destructive or compressional boundaries.

**SHIELD VOLCANOES**

Vent

Formed by frequent, gentle eruptions of thin, runny **BASALTIC** lava

Layers of solidified Lava

gently sloping sides

4100m+ in height

5000m+ in height

Crust

Magma chamber

Mauna Loa is 180km wide wide

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Shield volcanoes are usually found at constructive boundaries or over hot spots.

## Task 2. Complete a table.

Type of volcano	Type of lava	slopes	Area covered	Potential damage	Named example
Strato-volcano					
Shield volcano					