

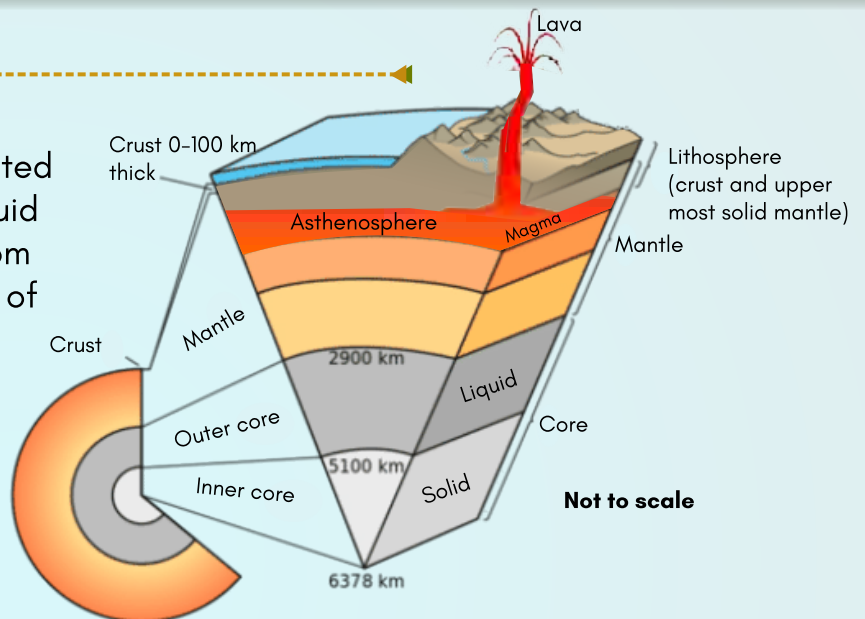


QUICK REVISION MODULE
[UPSC PRELIMS 2024] GEOGRAPHY

VOLCANISM

VOLCANO

A vent or an opening through which heated materials consisting of water, gases, liquid lava and rock fragments are erupted from the highly heated interior to the surface of the Earth.



To scale



VULCANICITY

Processes in which molten rock material or magma rises to the crust to solidify as crystalline or semi-crystalline rocks.

Components of Vulcanicity

Endogenic mechanism
- creation of hot, liquid magma

Exogenic mechanism
- appearance of hot liquid magma on surface.

TYPES OF LAVA

Basic Lava	Acidic Lava
▲ Hottest & highly fluid	▲ Highly viscous & high melting point
▲ Rich Iron, magnesium	▲ Rich in silica
▲ Poor in silica	▲ Forms steep sided volcanic domes
▲ Flow quietly, are not explosive	▲ Throws out volcanic bombs and pyroclasts with loud noise
▲ Forms flattened volcanoes	

CLASSIFICATION OF VOLCANOES

ON THE BASIS OF MODE OF ERUPTION:

Violent/Explosive Type	Effusive / fissure type
● Eruption is rapid	● Slow eruptions
● Destructive volcanoes	● Occurs along fracture, fault or fissure.
● Associated with acidic lavas.	● Associated with basic lava

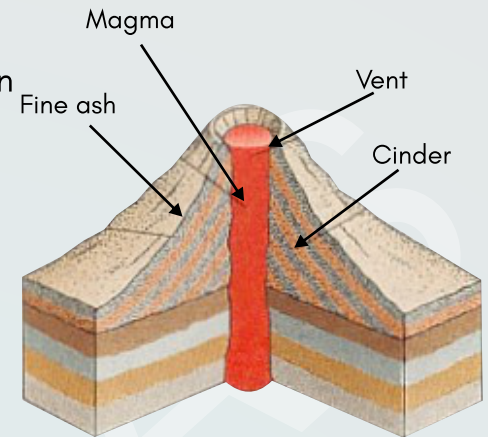
ON THE BASIS OF PERIODICITY OF ERUPTION:

- 1. Active Volcanoes:** Frequently erupted volcano. Example- Etna and Stromboli.
- 2. Dormant Volcanoes:** Have erupted and show signs of possible eruption in future. Example-Mt. Vesuvius
- 3. Extinct Volcanoes:** Volcanoes that have not erupted at all in historic times but retain the features of volcanoes are termed extinct. Example-Ship rock.

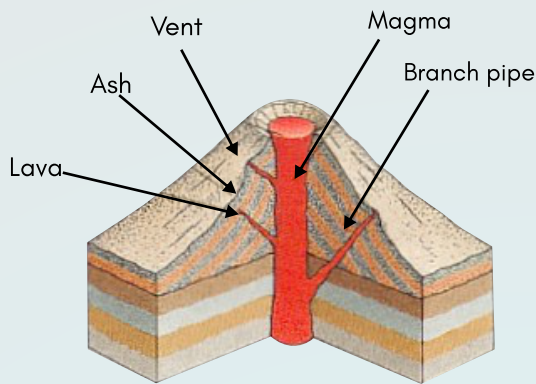
All volcanoes pass through active, dormant and extinct stages but it is impossible to be thoroughly sure when a volcano has become extinct. Various landforms are created due to the cooling and solidification of magma (below the Earth's surface) and lava (on the Earth's surface).

EXTRUSIVE LANDFORMS

1. Cinder or ash cones- are formed due to the accumulation of loose particles around the vent. The lava flows are so viscous that they solidify after a short distance



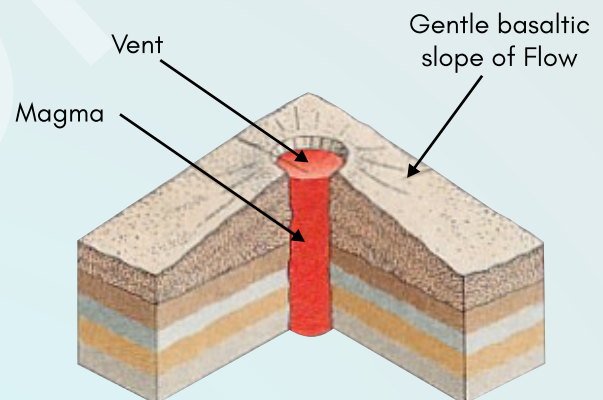
1. Ash-cinder volcano



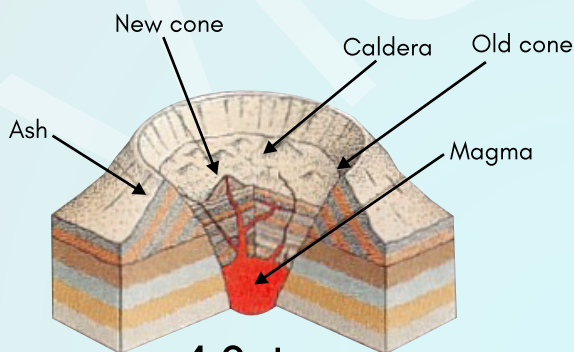
2. Composite volcano

2. Composite cones- They have alternate layers of lava and fragmented material, wherein lava acts as the cementing material.

3. Shield Volcanoes-are built almost entirely of fluid lava flows. These are the largest of all the volcanoes on the earth. These volcanoes are mostly made up of basalt, a type of lava that is very fluid when erupted. For this reason, these volcanoes are not steep.



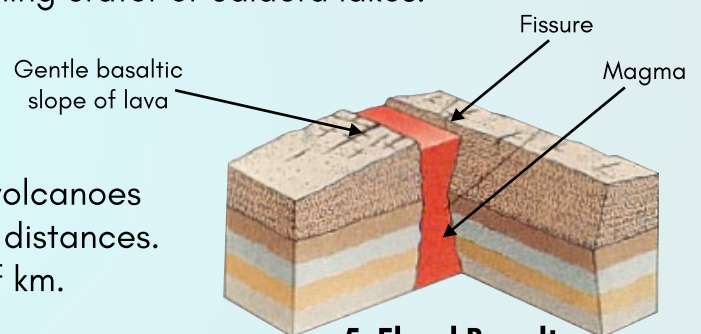
3. Shield volcano



4. Craters

4. Craters- are depressions formed at the mouth of the volcanic vent, which is usually funnel-shaped. Water may collect in the crater or the caldera forming crater or caldera lakes.

5. Flood Basalt- Provinces are formed when volcanoes outpour highly fluid lava that flows for long distances. Individual flows may extend for hundreds of km. Example-The Deccan Traps from India.

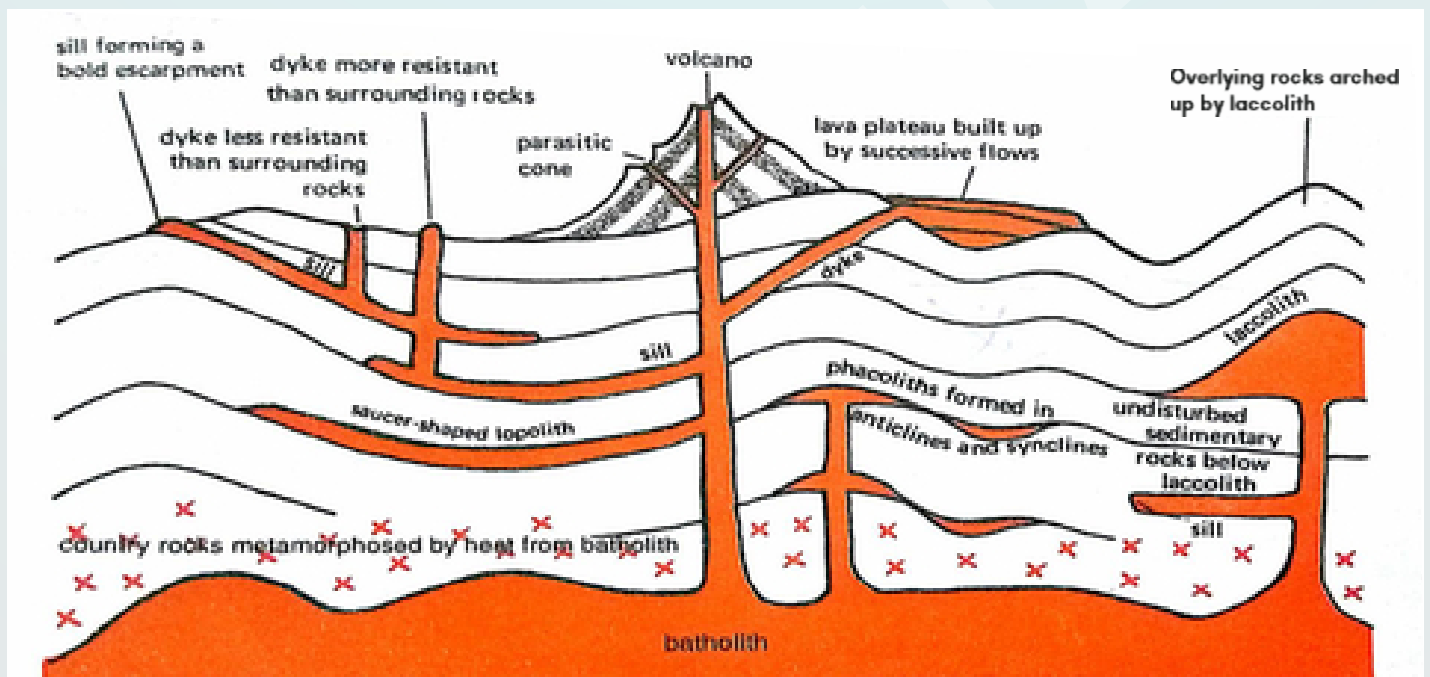


5. Flood Basalt

INTRUSIVE LANDFORMS

The lava that cools within the crustal portion assumes different forms called intrusive forms.

1. Batholiths are long, irregular, undulating and dome-shaped features.
2. Laccoliths are formed due to the intrusion of magma along the bedding planes of horizontal sedimentary rocks. They are usually mushroom or dome shaped.
3. Phacoliths are formed due to the intrusion of acidic magma along the anticlines & synclines.
4. Lapoliths are formed when magma solidifies in shallow basins into a **saucer shape**.
5. Sills and Sheets are rocks usually parallel to the bedding planes of sedimentary rocks. Thinner ones are called sheets while thick horizontal deposits are called sills.
6. Dykes are wall-like formation of solidified magma. These are vertical to the bed of sedimentary rocks.



DISTRIBUTION OF VOLCANOES

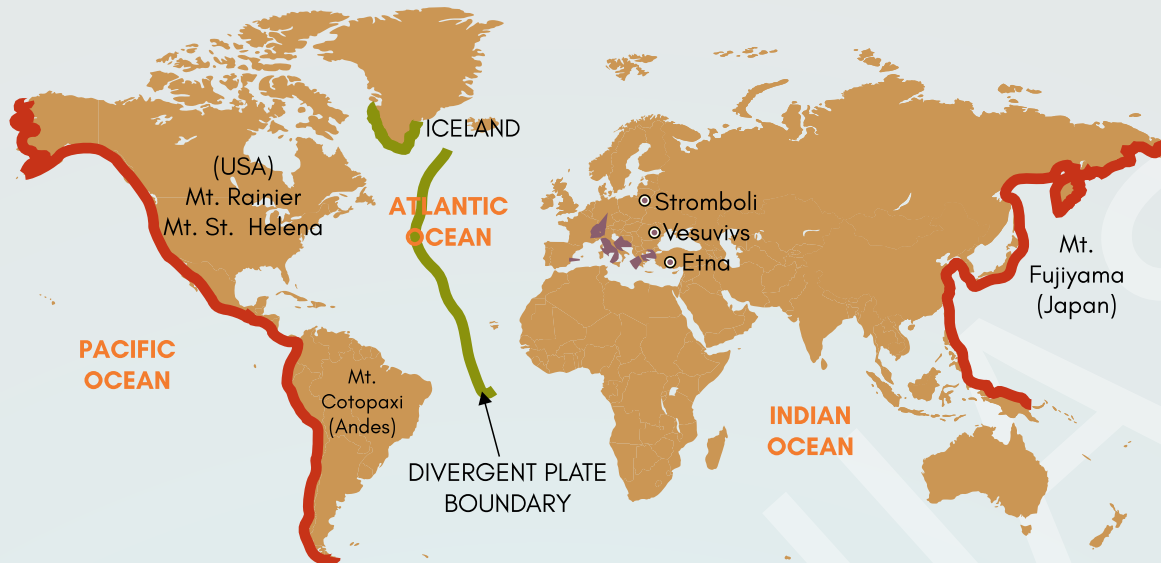
1. The volcanoes are mostly associated with the weaker zones of the Earth's crust.
2. Generally overlaps with zones of seismic activities like the earthquakes.

The main volcanic belts are as under:

1. **Circum-Pacific Belt:** It includes the volcanoes of the eastern and western coastal areas of the Pacific Ocean. This belt is also known as the Ring of Fire of the Pacific Ocean. Most of the high volcanic cones and volcanic mountains are found in the Circum-Pacific Belt. Examples- Cotopaxi in Andes (5896 m) is the highest volcanic mountain in the world, Fujiyama (Japan) Shasta, Rainier, Mt St Helena (USA).

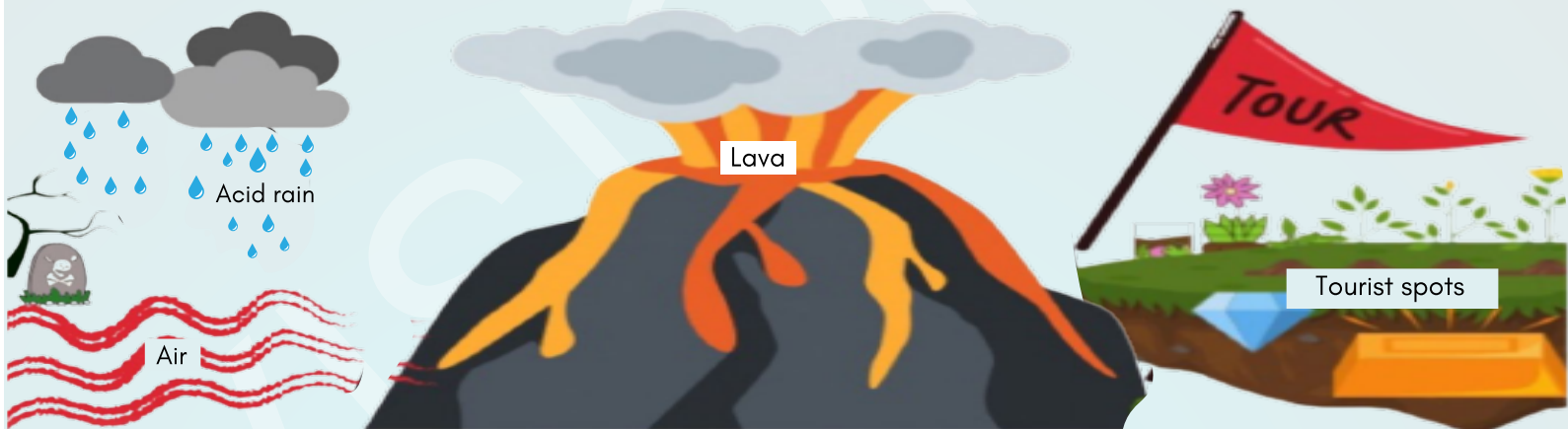
2. Mid-Continental Belt: Volcano of the Alpine mountains and the Mediterranean Sea. The volcanic eruptions are caused due to the convergence and collision of the Eurasian Plates and the African and Indian Plates. Example-Stromboli, Vesuvius, Etna, etc., are in this belt.

3. Mid-Atlantic Belt: It includes the volcanoes along the mid-Atlantic ridge which is the divergent plate zone. They are mainly of the fissure eruption type. Iceland, is the most active volcanic area.



- CIRCUM-PACIFIC BELT/PACIFIC RING OF FIRE
- ALPINE-MEDITERRENIAN BELT/CONTINENTAL BELT
- MID ATLANTIC RIDGE/MID OCEANIC RIDGE

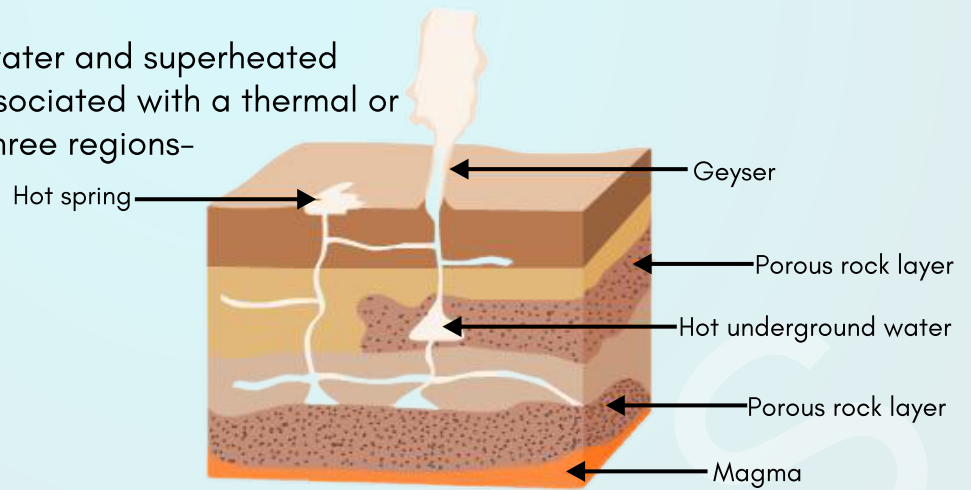
EFFECTS OF VOLCANIC ERUPTION



Negative	Positive
<ul style="list-style-type: none"> ⚠ Buries man and material and other natural wealth. 	<ul style="list-style-type: none"> ⚠ Lava enhances soil productivity.
<ul style="list-style-type: none"> ⚠ Large fall outs and materials makes air poisonous aggravating chances of <u>acid rain</u>. 	<ul style="list-style-type: none"> ⚠ Crater lakes - source of water, tourist spots.
<ul style="list-style-type: none"> ⚠ Earthquakes caused due to heavy eruptions . 	
<ul style="list-style-type: none"> ⚠ Can change heat balance of earth causing climate change. 	<ul style="list-style-type: none"> ⚠ Storehouse of metals and other mineral Resources .

GEYSERS

Geysers are fountains of hot water and superheated steam. The phenomena are associated with a thermal or volcanic region. Confined to three regions- Iceland, New Zealand, Yellowstone park (USA).



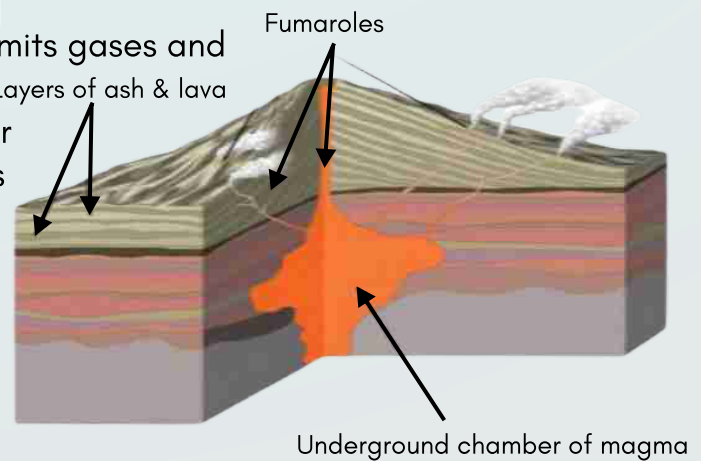
Geyser and Hot Springs

HOTSPRINGS

Hot springs or thermal are found where water sinks deep enough beneath the surface to be heated by the interior forces. The water rises to the surface without any explosion. Springs contain dissolved minerals which have medical value. Example- Manikaran (Kulu), Tattapani (Shimla), Jwalamukhi (Kangra), Rajgir (Patna), Sitakund (Munger) and in Yamunotri and Gangotri.

FUMAROLES

A fumarole is a vent in the Earth's surface which emits gases and water vapour. Sometimes the emission is continuous, but in majority of cases emission occurs after intervals. These are the last signs of the activeness of a volcano.



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