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Chapter 7

Volcanoes

(1) Introduction

→ Vulcanicity is the process that involves the intrusion of magma in the Earth's Crust or extrusion of Molten materials on Earths Surface.

→ Volcano is a vent or opening in the Earth's Crust that is connected by a pipe to an underlying magma chamber from which lava, steam, Ash etc are elected to the surface of the Earth

→ Volcanology is the science that deals with the study of Volcanoes along with its various aspect

(2) Causes of Volcanoes

(A) Formation of Gases:

When water present in Earth's Interior converts into water vapours due to excessive heat, it breaks the weaker portion of the Earth's Crust and reaches the surface of the Earth. This ultimately results in occurance of Vulcanic Eruption.

(B) Passing of Lava:

When hot lava along with Gases are trapped together in folds, so due to excessive pressure of Gases, Lava tries to find route to the surface of the Earth that leads to Volcanic Eruption.

(C) Plate Tectonic Theory:

The movement of Tectonic Plates creates fissures and Cracks in the Earth's Crust from which the lava comes out.

CLASSIFICATION OF VOLCANOES

1. On the Basis of Mode of Eruption :

MODE OF ERUPTION

- CENTRAL OR EXPLOSIVE ERUPTION TYPE
  - HAWAIIN TYPE VOLCANO
  - STROMBOLIAN TYPE VOLCANO
  - VULCANIAN TYPE VOLCANO
  - PEELEAN TYPE VOLCANO
  - VISUVIOUS TYPE VOLCANO
- FISSURE ERUPTION TYPE

(A) Central OR Explosive Eruption Type Volcano :

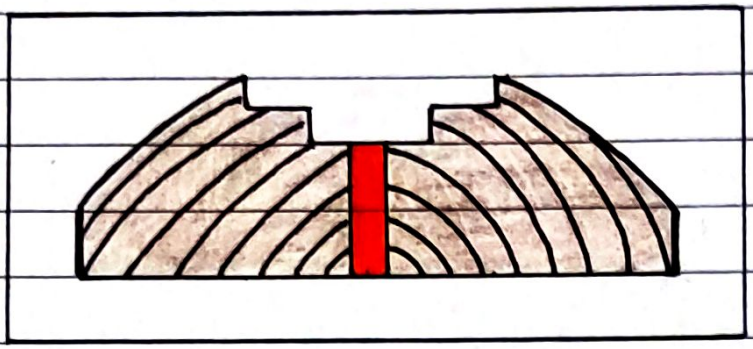
These type of volcanoes occurs through a central Pipe and small opening by blowing off the Crustal Surface due to violent and explosive Gases, that Accumulates deep within the Earth. The Eruption of these Volcanoes are very violent and Rapid and they are very destructive in Nature.

Thus, these Volcanoes are classified into following Types:

→ Hawaiin Type Volcano:

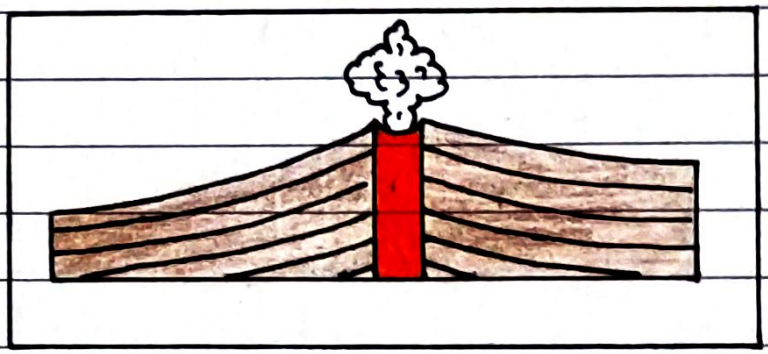
These Volcanoes are named as Hawaiin Type of Volcanoes because such Eruptions are very common on Hawaiin Islands and when these Volcanoes erupts, the Hawaiin People considers the Red Molten Lava as Pele's Hairs because it looks like Pele's Hairs.

For Example: The Eruption of kilavea Volcano of Southern Hawaiin Island.



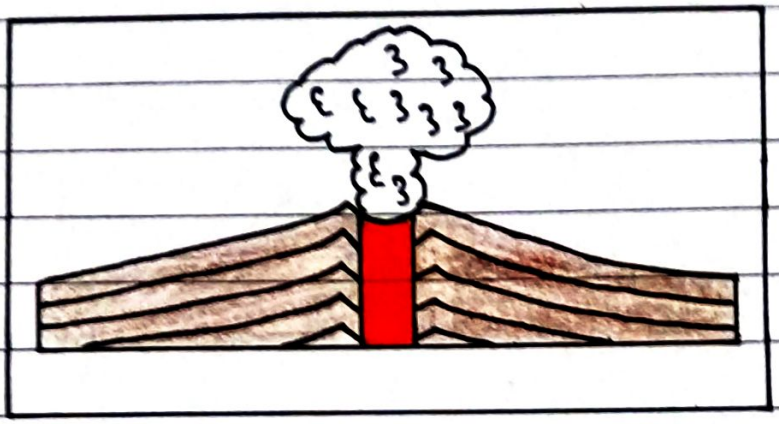
→ Strombolian Type Volcano:

These Volcanoes are named after Stromboli Volcano of Lipari Islands and these Volcanoes erupt with moderate intensity. Besides Lava, other Volcanic Materials like Pumice, bombs etc are elected and again they fall in the Volcanic craters. The Eruption of these Volcanoes are nearly continuous in Nature but Sometimes they erupts after long intervals.



→ Vulcanian Type Volcano:

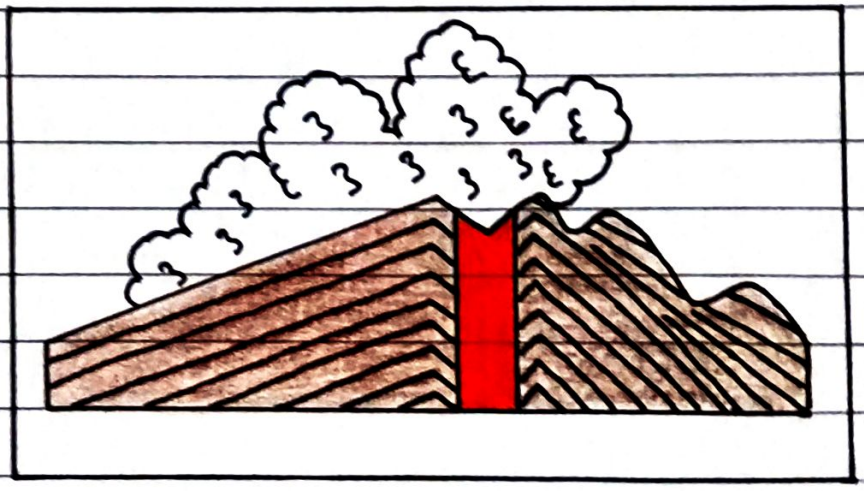
These Volcanoes erupt with Great force and Intensity. The Lava of these Volcanoes are so Viscous and Pasty that these quickly Solidifies between two Eruptions and forms crust over the Volcanic Vents. These lava obstructs the escape of Violent Gases and when these Gases appear in the Sky in next explosion with great force, they Appear like Cauliflower.



→ Peelean Type Volcanoes:

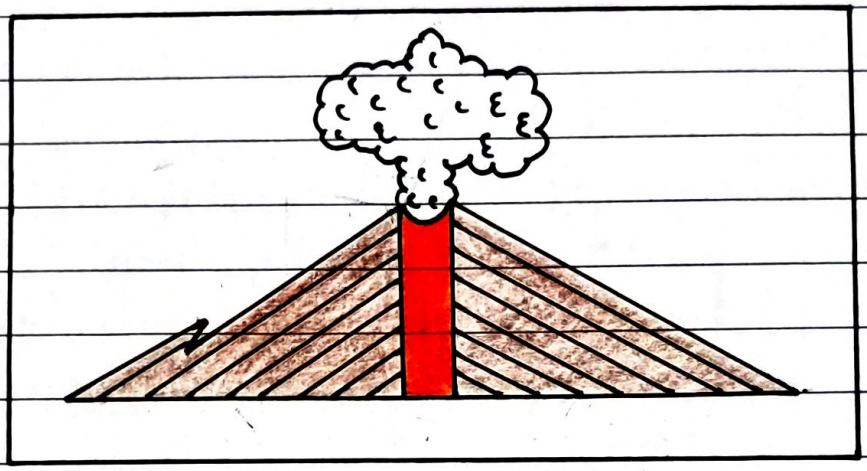
These Volcanoes are named after the Pelee Volcano of Martinique Islands. These are the most Violent and explosive type of Volcanoes. The ejected Lava is Viscous and Pasty and each eruption occurs with Great force making roaring Noise.

For Example: Volcanic Eruption of Mount Pelee in 1902.



→ Visuvious Type Volcanoes :

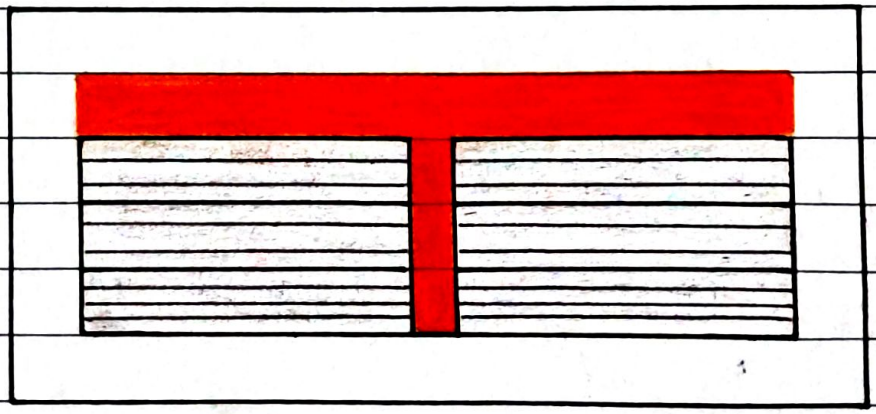
The Volcanoes are more or less Similar to Vulcanian and Strombolian Volcanoes. In these type of Volcanoes there is Violent expulsion of Magma due to enormous Volume of explosive Gases. The elected Volume of Gases and Ashes from these Volcanoes forms cauliflower shaped cloud.



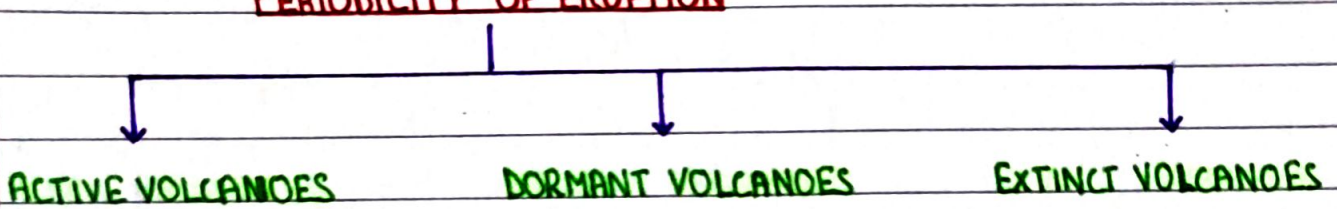
(B) Fissure Eruption Type Volcano :

These Volcanoes occur along a long Fractures, Fault and Fissure. There is Slow upwelling of Magma from below and the lava spreads over the Ground surface. In this type of Volcano, the Speed of lava depends upon the Nature of Magma, Volume of Magma, Slope of Ground surface and Temperature conditions.

For Example: The Lake Fissure Eruption of 1783 in Iceland.



2. On the Basis of Periodicity of Eruption



→ Active Volcanoes:

These are those Volcanoes which constantly ejects Volconic Lava, Gases etc. Most of the Active Volcanoes are found along the Midoceanic Ridges and these volcanoes represents divergent and converging Plate Boundaries.

For Example: Mt. Etna, Mt. Fuliama, Hawaiin Volcanoes etc.

→ Dormant Volcanoes:

These are those Volcanoes that becomes quiet after their eruption and there are no indications for future Eruption but they Suddenly erupt very Violently and cause damage to Human health and wealth.

→ Extinct Volcanoes:

These Volcanoes are considered extinct when there is no indications of Future Eruptions. In these Volcanoes, craters is filled up with water and Lakes are formed

For Example: Kamchatka Volcano.

Volcanic Topography

→ **Shield cones:**

These are made up of Lava alone and are broad and gentle sloping cones that is constructed by solidified Lava. These are formed by filling up of flow after flow of fluid Lava; thus a round dome like mass is produced. This is known as Shield cones.

→ **Lava Plateau:**

A Lava Plateau is a large flat Area of land Created by lava filling in all the Valleys and other depressions. These plateaus are created by low Viscosity basaltic Magma, that Spread very quickly before it cools, allowing it to cover a large area.

→ **Lava plains:**

A Lava plain is a large expanse of neatly flat-lying lava flows. Such features are generally exposed of highly fluid basalt Lava and can extent from 10 to 100's of miles across the underlying Terrain.

→ **Lava Domes:**

Lava Domes are largest and more extensive in size than the Shield cones. These are formed due to accumulation of solidified Lavas around the volcanic vents.
It is divided into three subdivisions :-

- Plug Dome.
- Endogeneous Dome.
- Exogeneous Dome.

→ Caldera

It is enlarged form of Crater having steep walls. It is formed due to Subsistence of a crater.

World Distribution of Volcanoes

(1) Circum Pacific Belt:

→ This belt is also known as Volcanic Zone of Converging Oceanic Plate Boundaries.

→ It includes Volcanoes of Eastern and Western coastal areas of Pacific Ocean and islands that lies in this ocean.

→ It extends from Antarctica to Alaska in eastern coast from where it turns towards Western Coast of Pacific Ocean in Asia. This belt also includes Volcanoes of many islands.

→ The volcanic eruption in this belt is due to collision of American Plate and Pacific Plate and also due to subduction of pacific plate below asiatic plate.

→ Most volcanic mountains are found here. eg: Mt. Fuziama of Japan, Mt. kilavea of Hawaii.

(2) Mid-Continental Belt:

→ This belt is known as Volcanic Zone of Continental Plate Boundaries.

→ In this belt, eruption is caused due to convergence and collission of Eurasian, Asian and African plate.

→ This belt does not have continuity of Volcanic Eruption due to several gaps between Alps and Himalayas.

→ eg: etna, kilimanjaro, Stromboli etc

(3) Mid Atlantic Ridge:

→ This belt includes Volcanoes of Mid-atlantic ridge.

→ Here two plates diverges in opposite direction.

→ The Volcanoes here are of fissure eruption type and there is continuous upwelling of Lava along this belt.

→ This belt starts from Iceland and continues upto Southern part of Atlantic Coast.

→ eg: Laki Fissure Volcano, Hekla Volcano etc.