



**IQRA NATIONAL UNIVERSITY**

# **ENGINEERING GEOLOGY**

## **Lecture 05**

**Volcanoes . Types, product, shapes and plate tectonic**

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# Volcanoes

A volcano is a vent or fissure that allows hot lava, **volcanic** ash, and gases to escape from a magma chamber below the surface.

The super-heated particles that eject out of a volcano come from deep below the earth's surface where temperatures can become so hot that rock actually melts.

**Magma** is the term used to describe this hot molten rock from deep within the earth.

Volcanic eruption may be quite or explosive.



# Types of Volcanoes

```
graph TD; A[Types of Volcanoes] --> B[Active Volcanoes]; A --> C[Dormant Volcanoes]; A --> D[Extinct Volcanoes];
```

Active  
Volcanoes

Dormant  
Volcanoes

Extinct  
Volcanoes

# Active Volcanoes

which erupts very often. Mostly occur at crustal plate boundaries, often makes a great arc along the oceans.

An **active volcano** is a volcano that has had at least one eruption during the past 10,000 years..



# Dormant Volcanoes

Which shows eruption after long interval of time. During dormant period they appear quite inactive.

A **dormant volcano** is an active volcano that is not erupting, but supposed to erupt again



## Extinct Volcanoes

An **extinct volcano** has not had an eruption for at least 10,000 years and is not expected to erupt again in a comparable time scale of the future.

Doesn't show any volcanic activity since a very long time.



# Volcanic Products

```
graph TD; A[Volcanic Products] --> B[Gaseous Products]; A --> C[Liquid Products]; A --> D[Solid Products];
```

**Gaseous  
Products**

**Liquid  
Products**

**Solid  
Products**

# Gaseous Products

An erupting volcano will release gases and heat into the atmosphere. The largest portion of gases released into the atmosphere is water vapor.

Major amount of carbon dioxide (CO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), Nitrogen

Smaller amount of hydrogen fluoride (HF), hydrogen sulfide (H<sub>2</sub>S), carbon monoxide (CO), hydrogen gas (H<sub>2</sub>), Sulfur chlorine



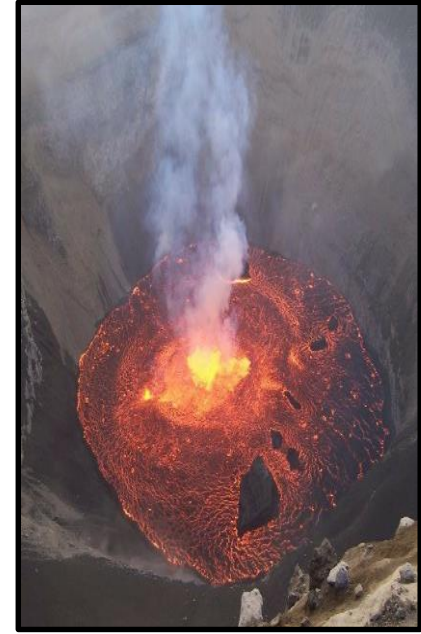


# Liquid Products

Lavas are the major and the most important liquid product of a volcano.

**ACIDIC:** More viscous and solidify quickly. Travel short distance .

**BASIC:** less viscous takes time before cooling down and travel long distance.

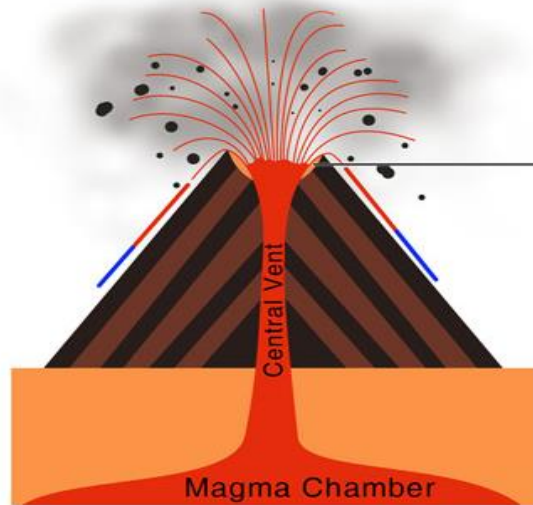


## Solid Products

The ejection of the solid materials are usually accompanied by violent explosions. The solid materials, during the initial stages of volcanism, mostly contain the fragments of the crustal rocks through which the pipe of the volcano passes.



# Four Major Types of Volcanoes by shape



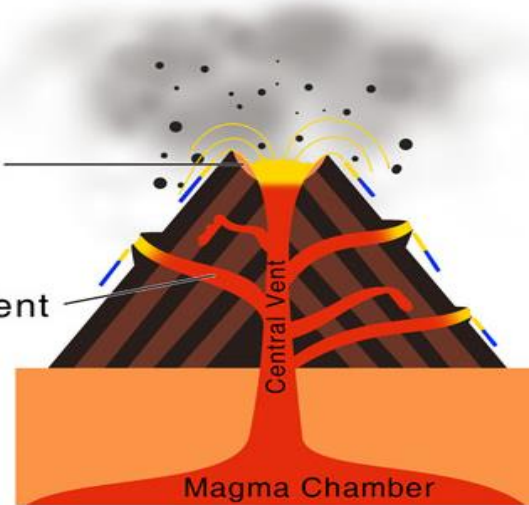
**1. Cinder Cone Volcano**

Crater

Side Vent

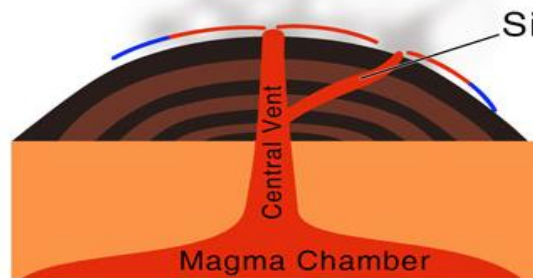
Central Vent

Magma Chamber



**2. Composite Volcano**

- Fluid Lava
- Viscous Lava
- Cooled Lava
- Solidified Lava Layers

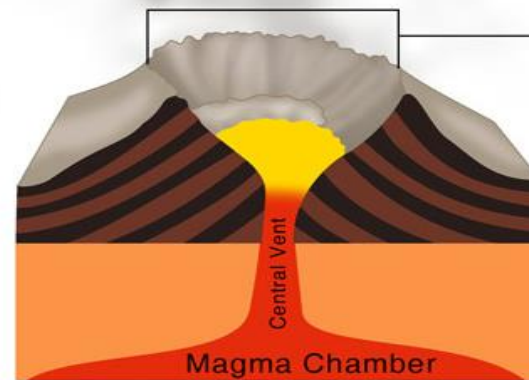


**3. Shield Volcano**

Side Vent

Central Vent

Magma Chamber



**4. Lava Dome**

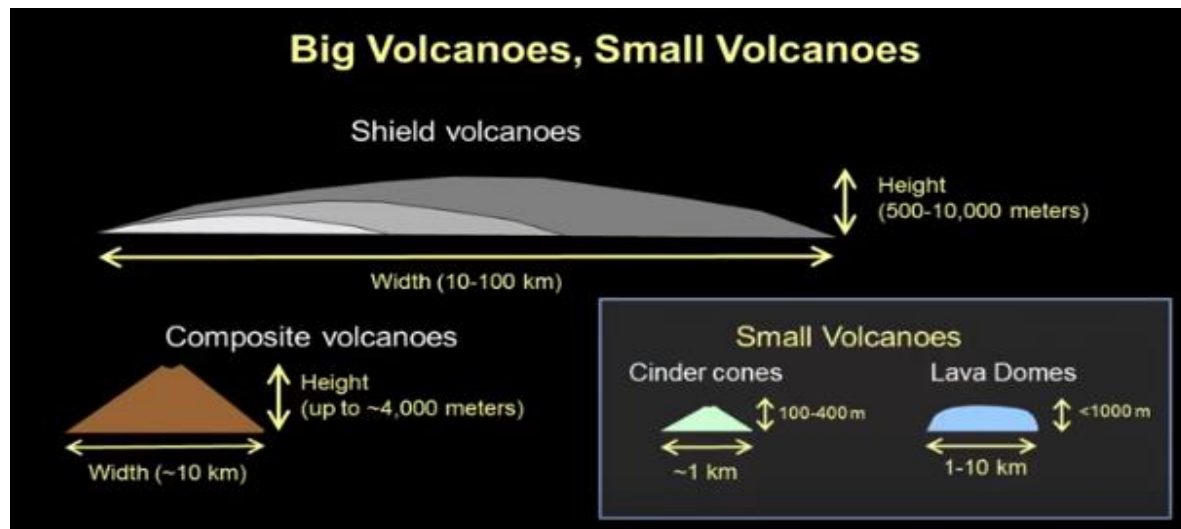
Crater

Central Vent

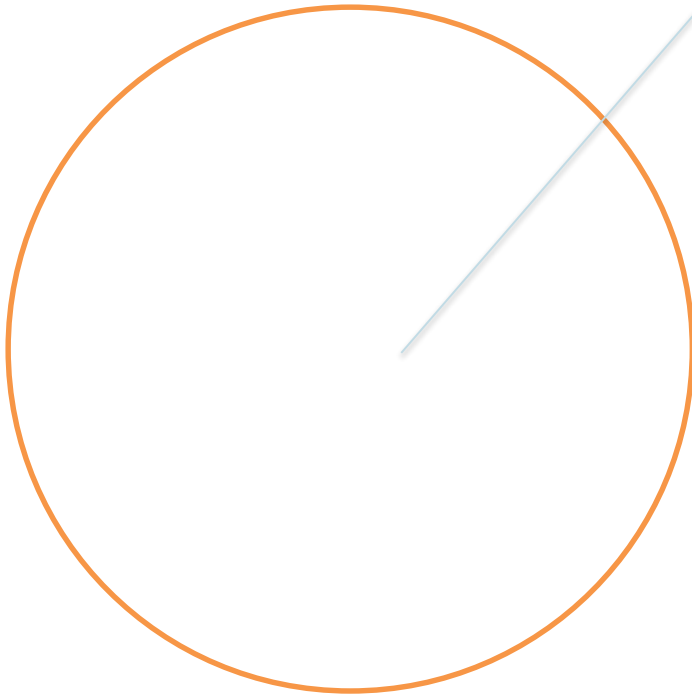
Magma Chamber

# Four Major Types of Volcanoes by shape

Type of Volcano	Shape	Height	Slope
Cinder Cone, AKA Scoria Cone	Symmetrical cone	Up to 1,200 feet (370 meters)	30-40 degrees
Shield	Tall and broad	Up to over 30,000 feet (9,000 meters)	Roughly 10 degrees near the base and 5 degrees near the top
Composite, AKA Strato	Tall, steep, and symmetrical	Up to 8,000 feet (2,400 meters)	Roughly 6 degrees near the base and roughly 30 degrees near the top
Lava Dome	Dome	Up to 330 feet (100 meters)	25-30 degrees

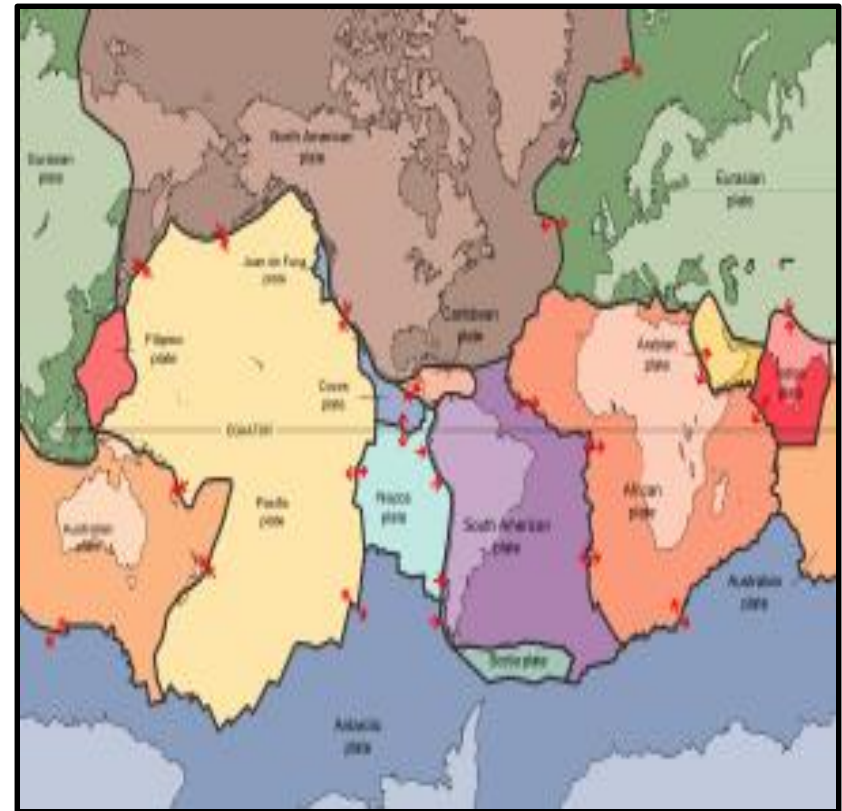


# PLATE TECTONIC



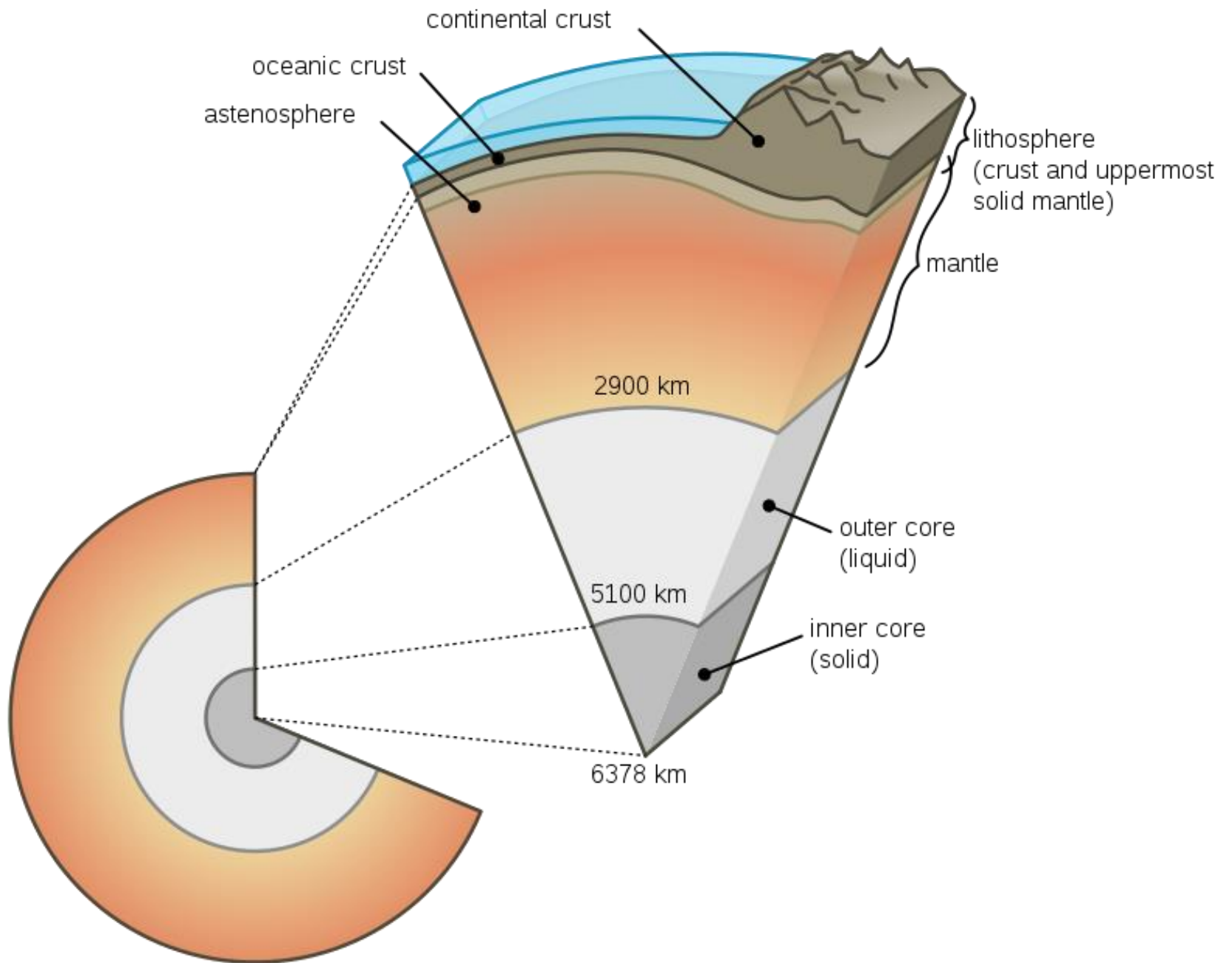
# Plate tectonic

**Plate tectonics** is a scientific theory describing the large-scale motion of seven large plates and the movements of a larger number of smaller plates of the Earth's lithosphere.



# History Plate tectonic

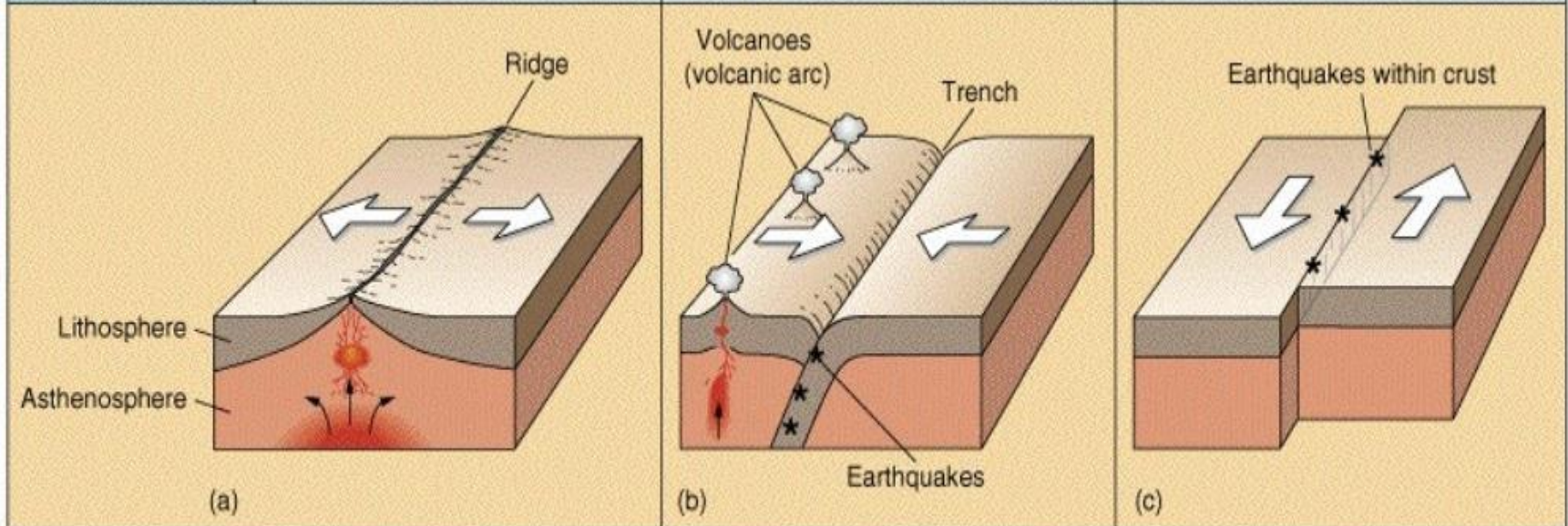






# Types Plate tectonic

Type of Margin	Divergent	Convergent	Transform
Motion	Spreading	Subduction	Lateral sliding
Effect	Constructive (oceanic lithosphere created)	Destructive (oceanic lithosphere destroyed)	Conservative (lithosphere neither created or destroyed)
Topography	Ridge/Rift	Trench	No major effect
Volcanic activity?	Yes	Yes	No



# Summary of Plate tectonic

The Plate Tectonics Theory is based on concepts proposed by Alfred Wegener.

Volcanoes and mountains form as a result of convergent boundaries colliding.

The lithosphere is divided into continent-sized plates that are constantly moving.

Earthquakes and tsunamis occur at convergent and transform boundaries.

The continents were once part of a supercontinent called Pangaea.

Lithospheric plates move 1-2 inches per year.

**END OF THE LECTURE**

