

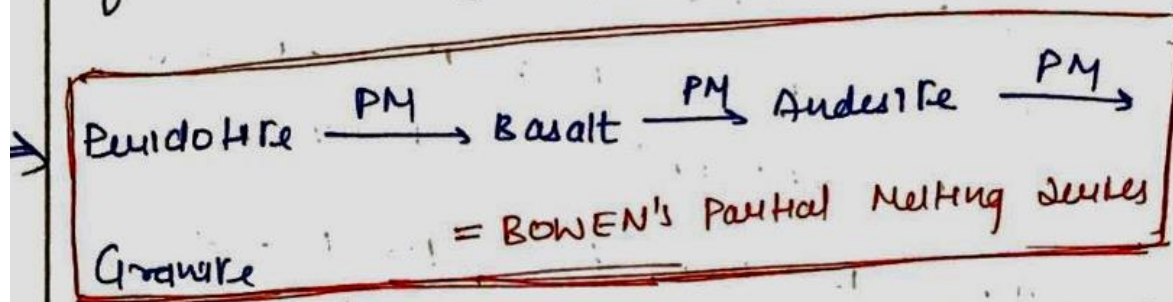
## Volcanism -

- Process in creation, movement & its eruption of molten magma/lava as it move from mantle to superficial crustal layer.
- Volcanism is a part of larger process where internal heat of interior melts the rocks & forces the movement of magma.
- Rocks - made up of aggregate minerals etc which have differential melting point

◦ BOWEN'S Partial Melting - PM is a process where different volcanic rocks with their constituent minerals when molten & move through igneous, it converted into new igneous rocks with different mineral compositions.

◦ The transformation is a consequence of different melting points of minerals & also their conversion by under pressure or heat

• ACC. to Bowen, there are different type of partial melting series, simplest one is:



• This explains why diff type of volcanism are associated with different type of lava

### ① Hotspot and Intra plate Volcanism -

• source of magma is deep lower-mantle boundary ∴ Basalt is very very basic & fluid  
Basalt Lava

fluid

∴ Hot spots on continent form Basalt Lava  
Plateau

### ② At MOR Location -

• Source of magma is molten rocks ∴  
Lava again is Basalt due to PM of  
Peridotite but it is not as fluid as  
Hotspot Lava



### ③ At Ocean Subduction Zone -

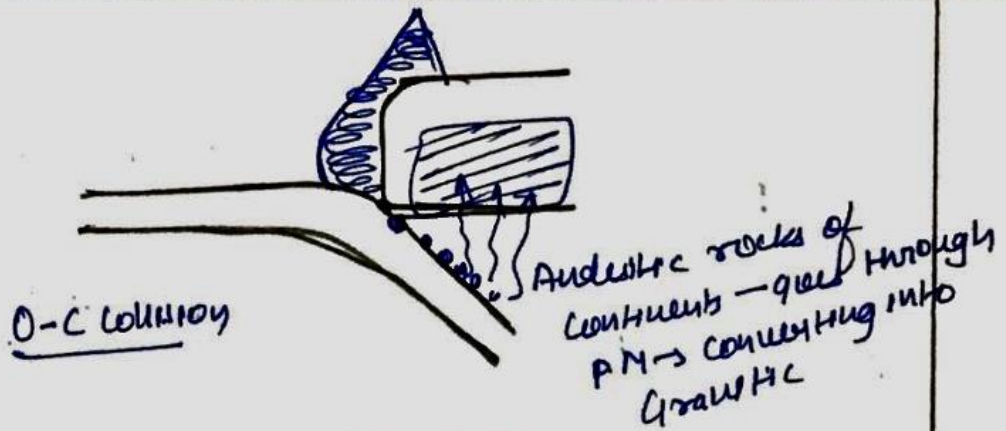
• Source of magma is Partial Melting of Ocean  
Basalt

∴ Such eruptions are Andesitic - Island arc  
at O-O boundary

- Volcanism at  
Andean type of  
Mountain at  
O-C boundary

④ At O-C collision margin, some of crushed broken rocks of continents - Andesitic rocks get forced into mantle with subducting ocean slab, these undergo partial melting to form granite.

• Granite lava is very thick & viscous & as it gets deeper its PM increases  $\therefore$  granite remains as intrusive rocks & forms batholiths and plutons inside continental crust.



Distribution of Volcanism -

- ↳ AT MOR location → Atlantic MOR (quiet MOR)
- ↳ Pacific MOR (more active)
- ↳ Indian Ocean MOR (Not active)
- Rising & diverging mantle cells

2] Hot spots - Intra Plate Volcanism

- o Localised

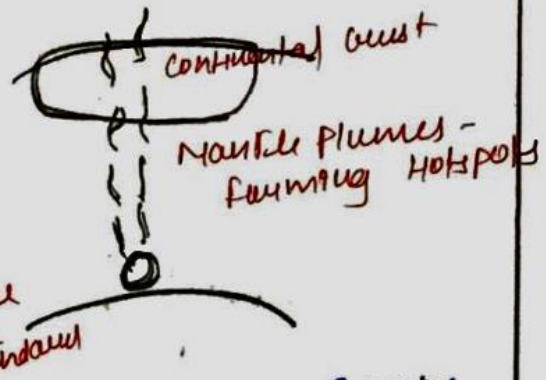
- o At mantle - core boundary

- o Associated with mantle plumes

EX Hawaiian Hot spot, Reunion Hot spot, Azores

Hot spot, Iceland Hot spots, Ascension Island

Galapagos Island



o O-C L O-O boundary - Southern Europe

- o Mt Stromboli (Ipani Island)
- o Mt. Etna (Sicily)
- o Vesuvius = Pompei



## Types of Volcanoes -

Ⓐ On the basis of Rocks

Andesitic  
or Rhyolitic  
↓  
At subduct  
boundaries

Basaltic  
↓  
MOR  
Hotspots

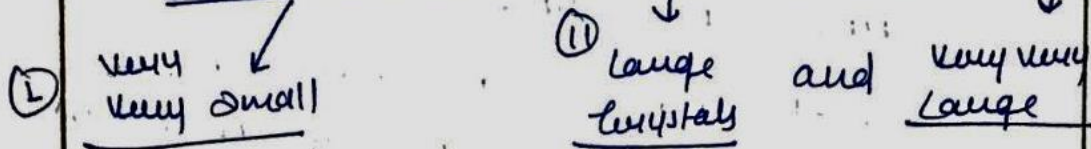
Ⓑ On basis of Plate Interactions

- MOR
- O-O' Type
- O-C Type
- Hotspot - Intra plate eruptions

© On the basis of Intensity of Eruption

- Hawaiian type - Quietest
- Strombolian type - A bit more explosive  
(low mass gases & erupt more frequently)
- Mount Vulcan type - explosive, partly lava +  
high amount of moisture
- Pellean Type of eruption - Most explosive  
(most powerful type of  
Mt. Vulcan type)  
→ (on St. Martinique Island)

b) Igneous Rocks on the basis of Types of Crystals



o Aphanitic Rocks

(looks like glass)

o Small crystals are formed when rocks will cool fast

o very fine - Extrusive

Rocks - eg Basaltic

work on Obsidian work

o Pegmatitic Rock

o large C - when

lava cools slowly

formed as Intrusive

Rocks For eg - Granite Rock

## Volcanic Land forms

### Intrusive Land forms

(Granite & Diabase rocks)

- (a) • Batholiths (largest & deepest)
- (b) • Dykes (Vertical)
- (c) • Sill (Horizontal)
- (d) • Lava flow (filled volcano)
- (e) • Lopolith (saucer)

(b), (c), (d), (e) -

Hypabassal - 500m depth

(shallow depth)

### Extrusive Land forms

## Properties of Igneous Rocks -

- Crystalline rocks
- They are non porous rocks
- They are not good aquifers
- They are also non stratified
- They are also non fossiliferous

Hypabassal - 500m depth  
(shallow depth)

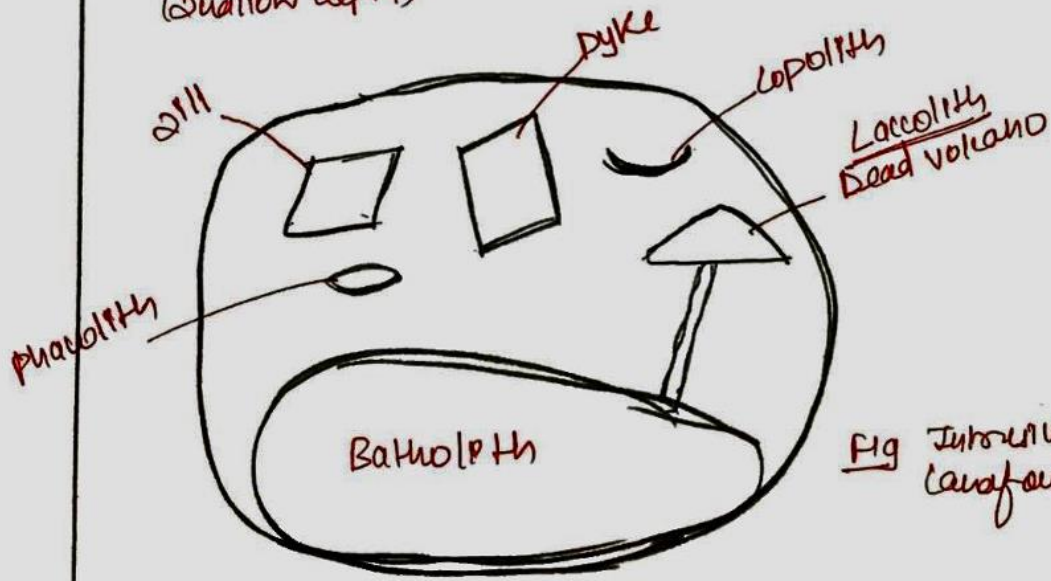


Fig Intrusive landforms