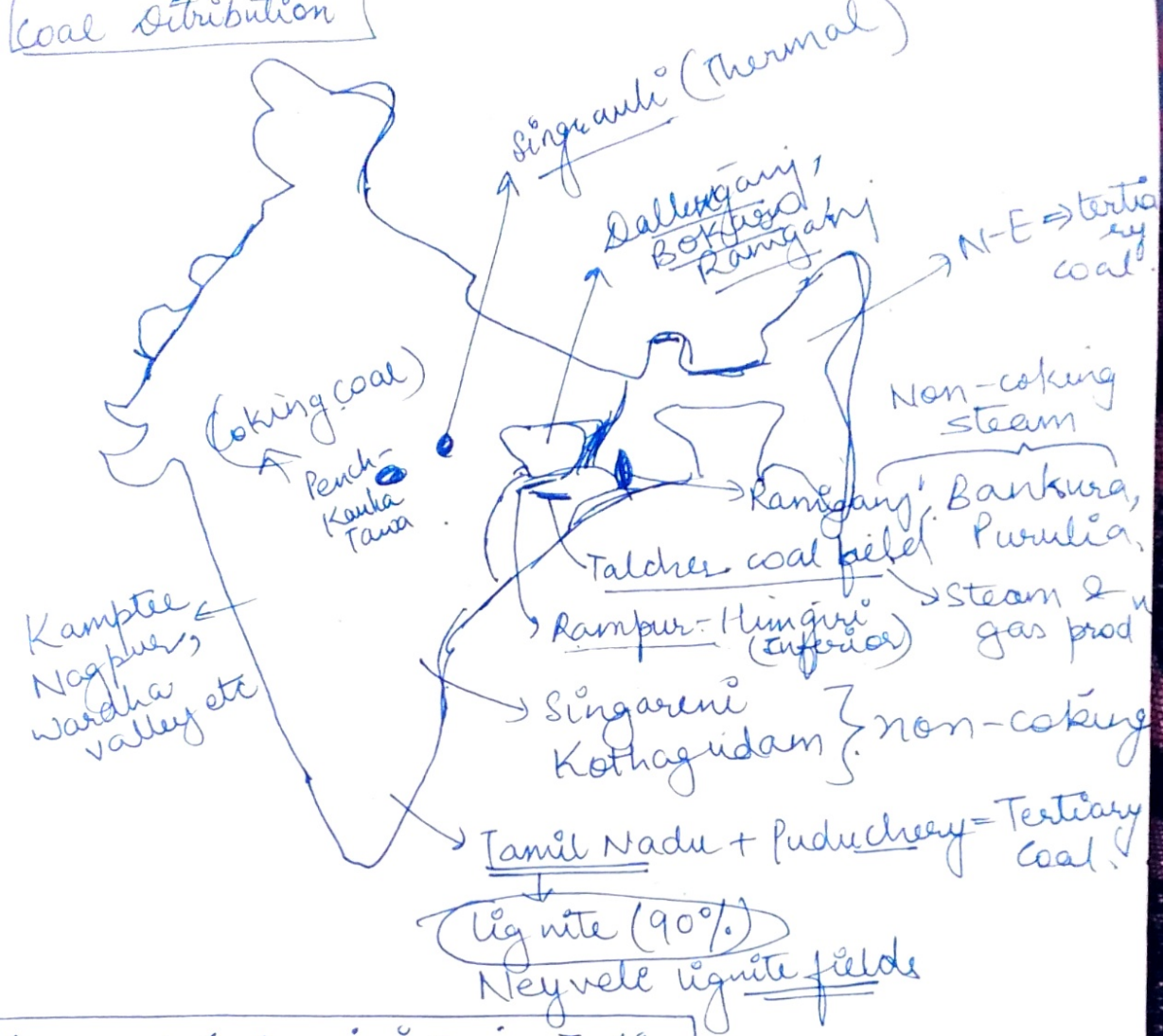
## Coal Distribution




## Problems of Coal mining in India

1. Distribution of coal is uneven
2. High ash content & low calorific value
3. Underground mines → very few open cas
4. Heavy losses due to fires
5. Pilferage → add to losses
6. Bad Transportation infrastructure
7. Environmental pollution (High ash = ~~mo~~isture - Smoke)
8. Safety measures/Technology are costly.
9. Short life of metallurgical coal.
10. Unscientific method of extraction of coal.

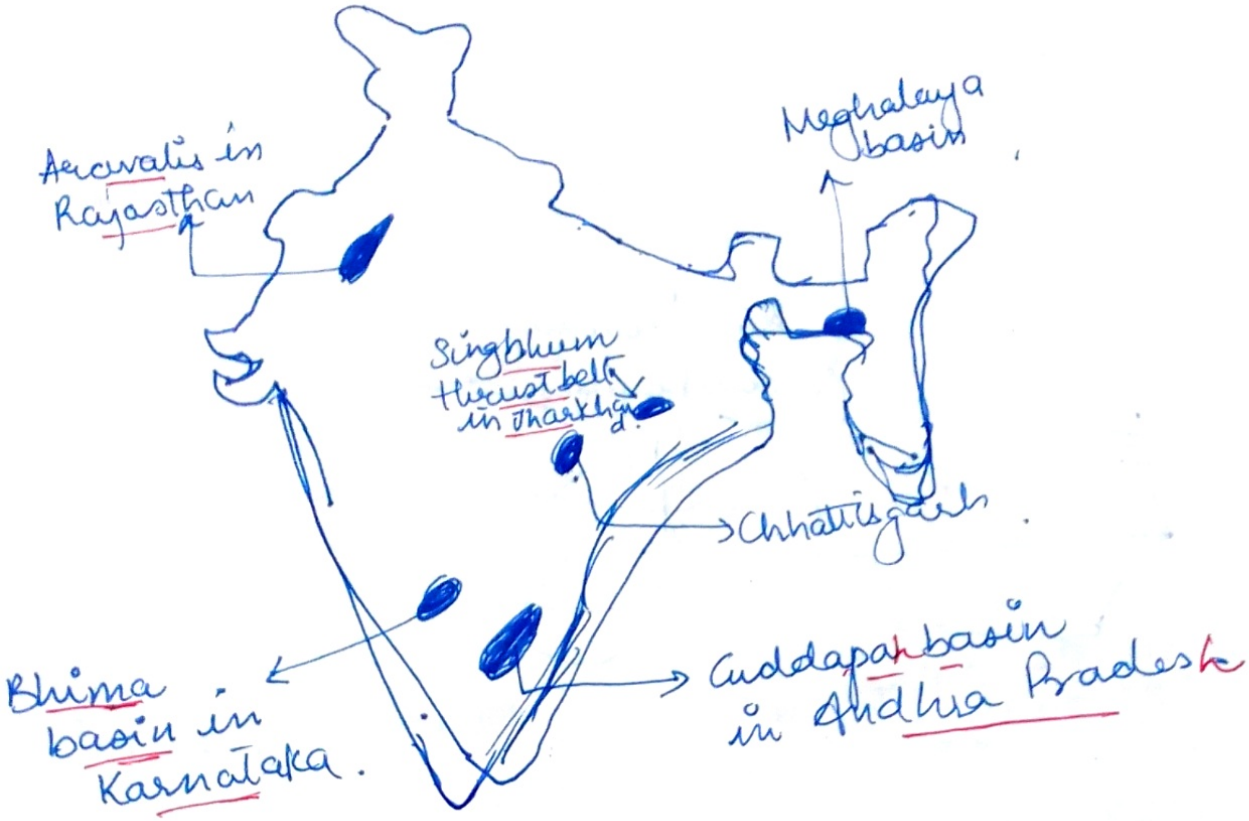



Fig: Uranium reserves in India

# Some Introductions

## ① VOLCANO

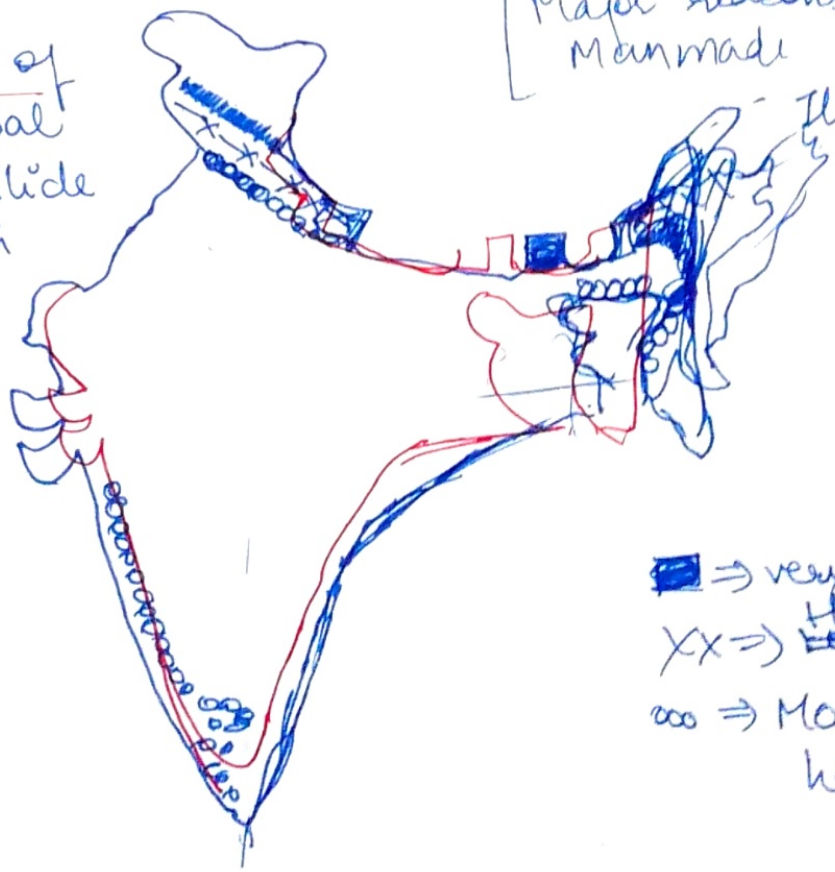
A volcano is an opening or rupture in the earth's surface that allows magma (hot, liquid and semi-liquid rock) volcanic ash and gases to escape.

## ② LANDSLIDES

They are the movement of mass of debris, earth or rock, sliding down under the effect of gravity. Landslides are a common problem across the Himalayas and western Ghats.

[Major reasons = Mining
Manmade Construction
Illegal cutting

India's share = 20% of global landslide death



■ ⇒ very high hazard
XX ⇒ ~~High~~ hazard
ooo ⇒ Moderately high hazard


Drought prone area

I = Extreme zone

II = Severe

III = Moderate

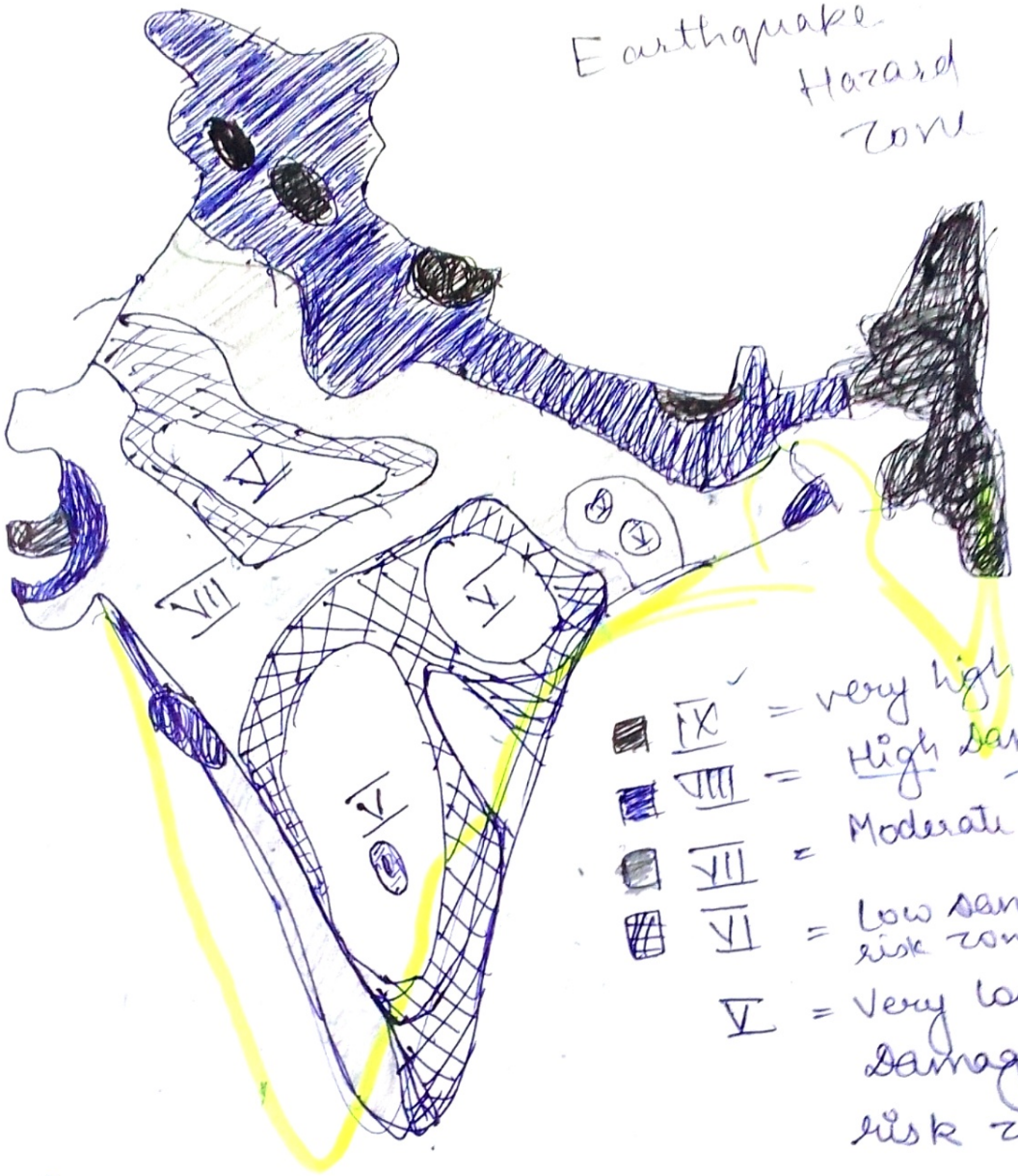
IV = Drought free area.

Extreme drought prone = Thar desert

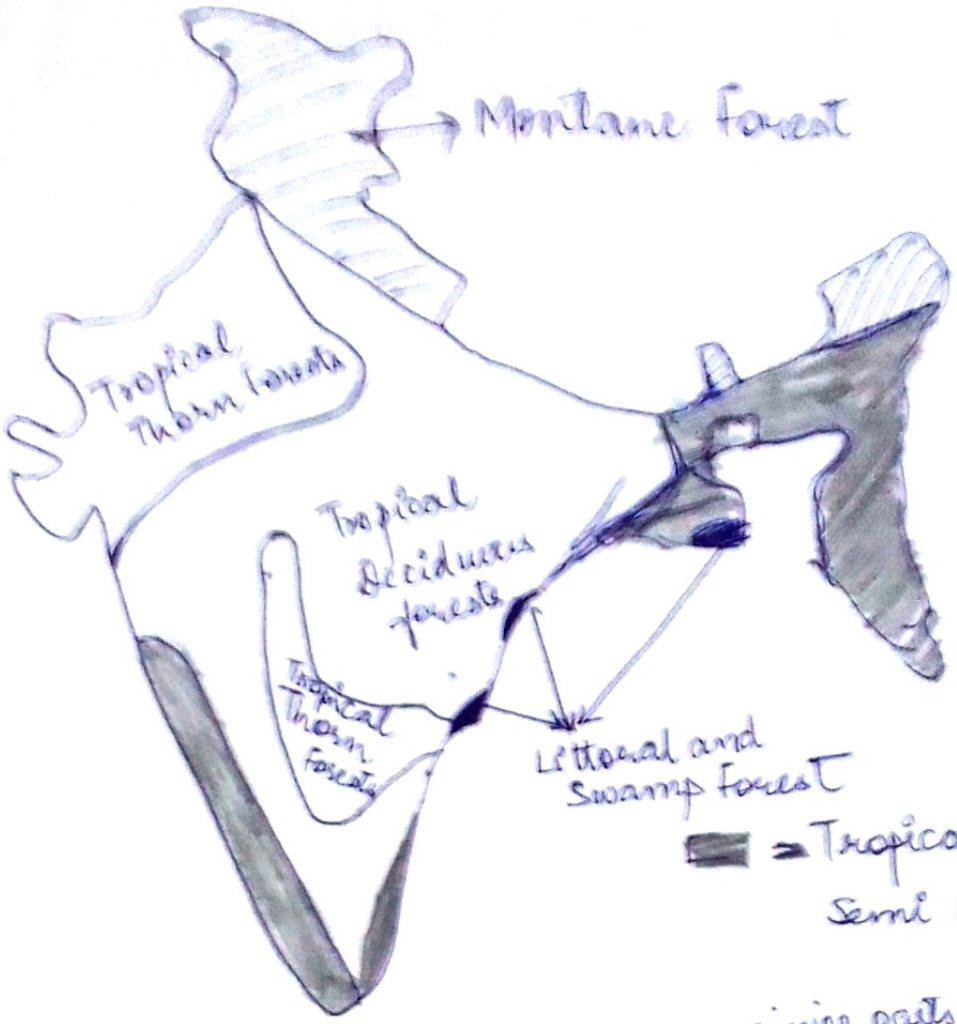
Severe Drought ⇒ MP, Andhra (except coastal), MH (Latur & all)

Moderate drought prone = RJ (Upper), UP (lower) Haryana (lower)

# Earthquake Hazard Zone




Gujarat (some) Northern belt, Delhi = High damage.
Mumbai.
Very High = NE, some upper parts of UK, Ladakh, Bhuj.




**Tropical Evergreen & Semi Evergreen** → less rainier parts, mixture of evergreen & moist deciduous ⇒ Precipitation > 200cm

Mean annual Temp. => 22°C

Species found = Rosewood, Mahogany, Aini, Ebony

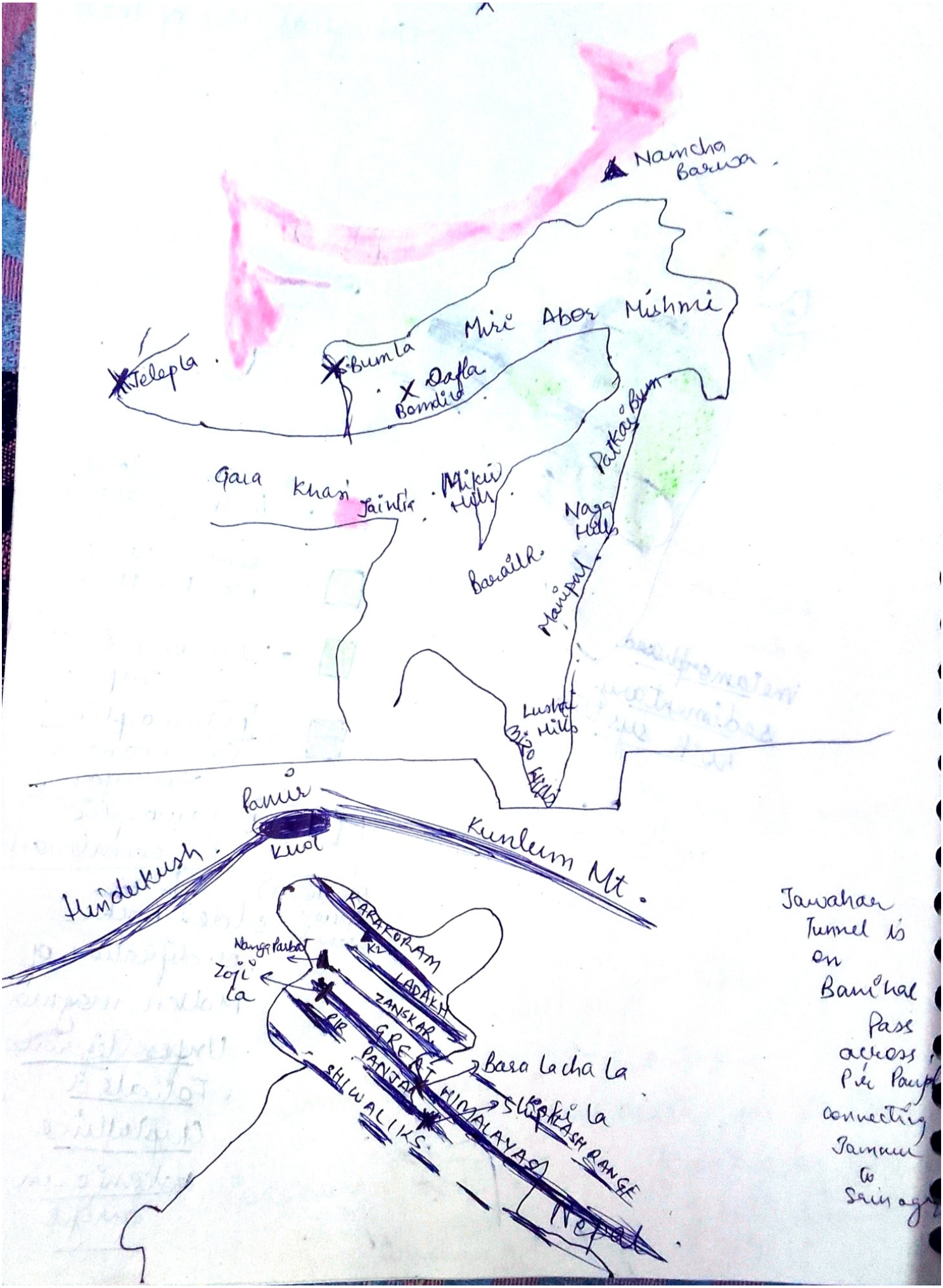
Semi Evergreen main species = white cedar, hollock and Kail

**Tropical Deciduous Forests** (Monsoon Forests) ⇒ 70-200 cm

- Moist deciduous ⇒ R/F b/w 100-200cm, NE, eastern slopes of western ghats, Orissa,
- Dry deciduous ⇒ R/F b/w 70-100cm ⇒ rainier areas of the Peninsula & plains of UP & Bihar. In the higher r/f regions of the Peninsular plateau & the northern Indian plain, these forests have a parkland landscape with open stretches in which Teak & other trees

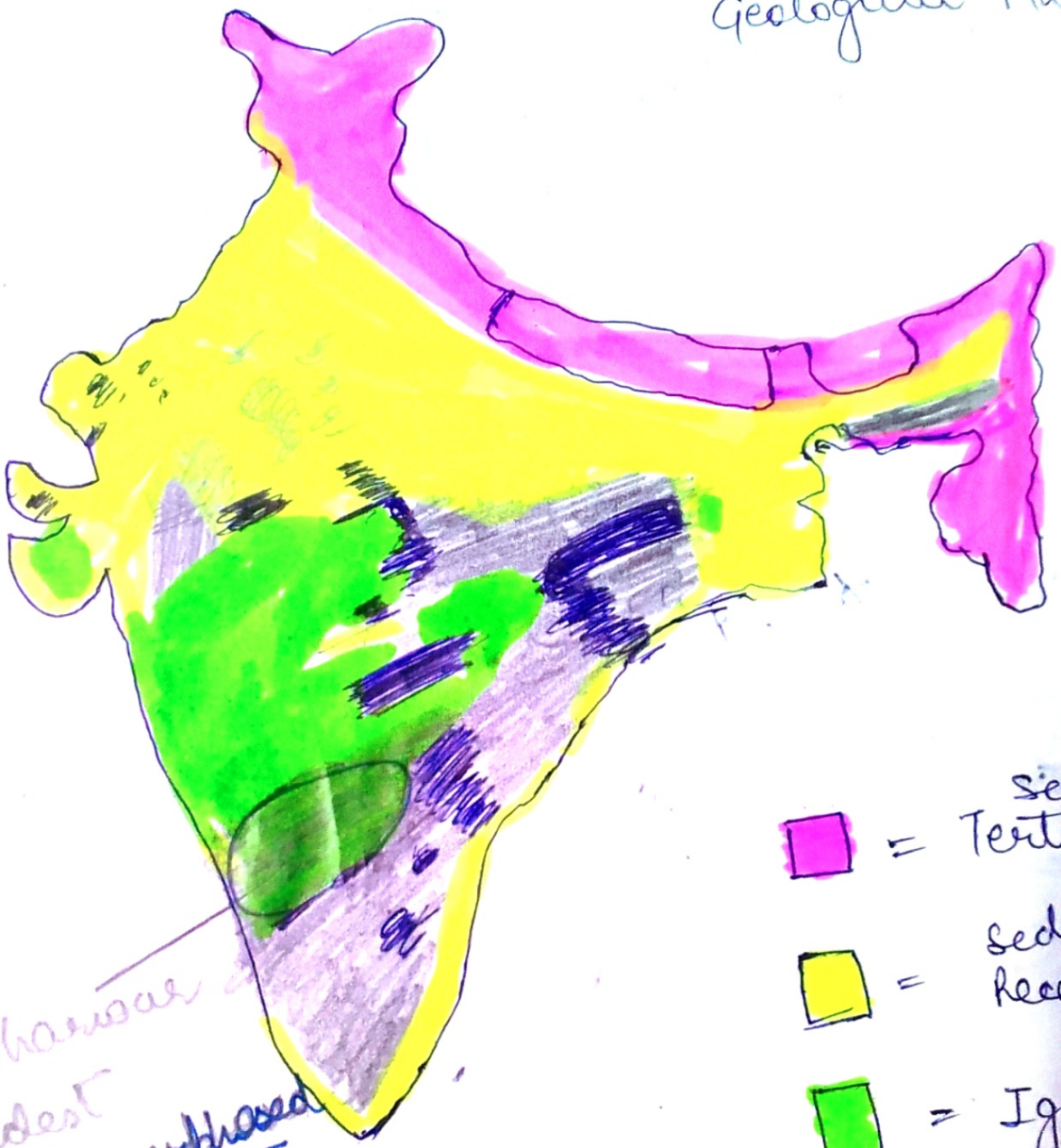
Teak Sal Sheesham, Hurra, Mahua, Amla, Semal, Kusum, Sandalewood etc

Tendu, Palas, Amaltas, Bel, Khair, Axlewood etc




Jawahar Tunnel is on Banihal Pass across Pir Panjal connecting Jammu to Srinagar

Geological Map of I



= Tertiary

= Recent

= Igneou

= Metamo

= Metamo

Pre

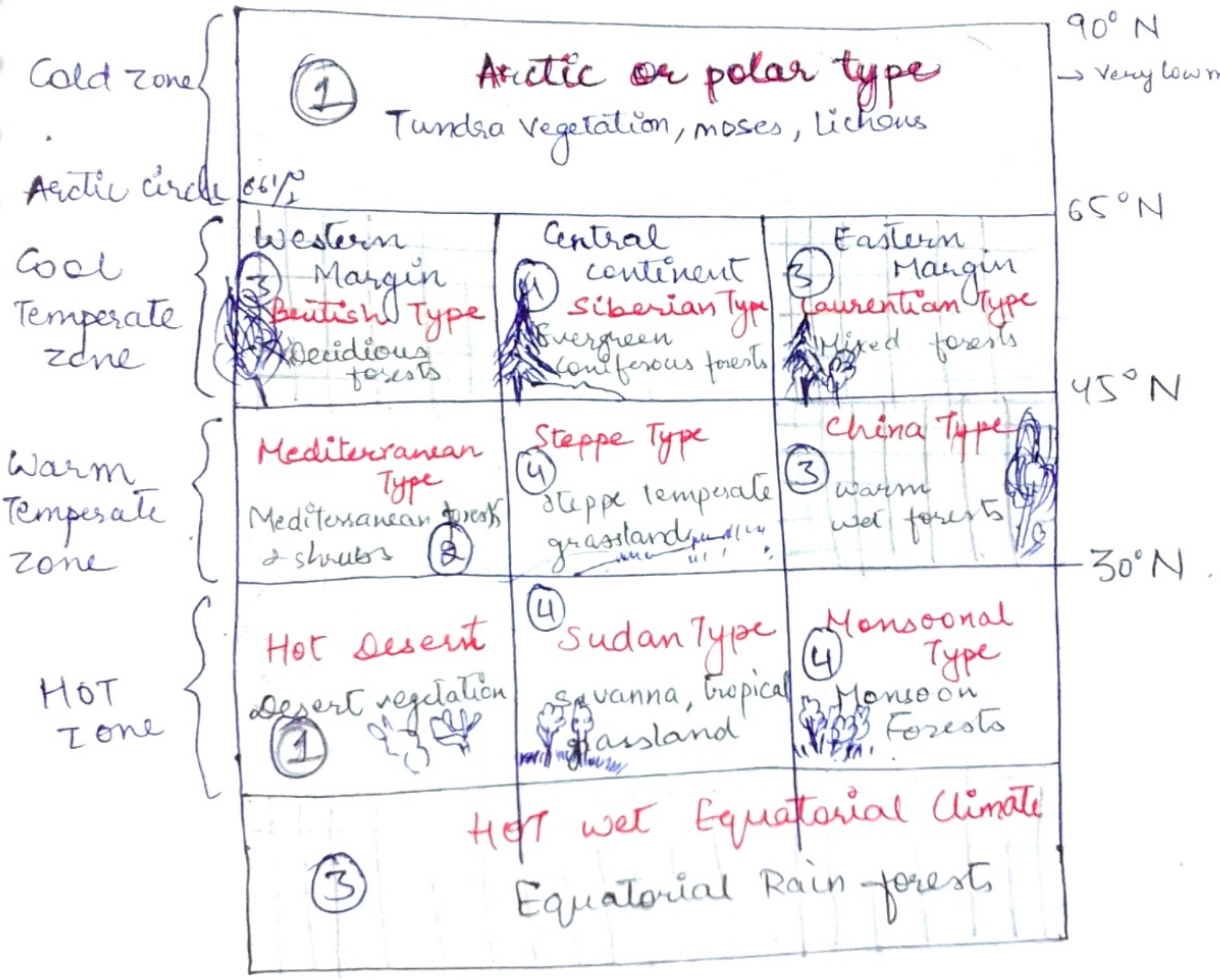
(Archaen)

Dharwar

oldest

metamorphosed sedimentary rock system

Economically most imp.



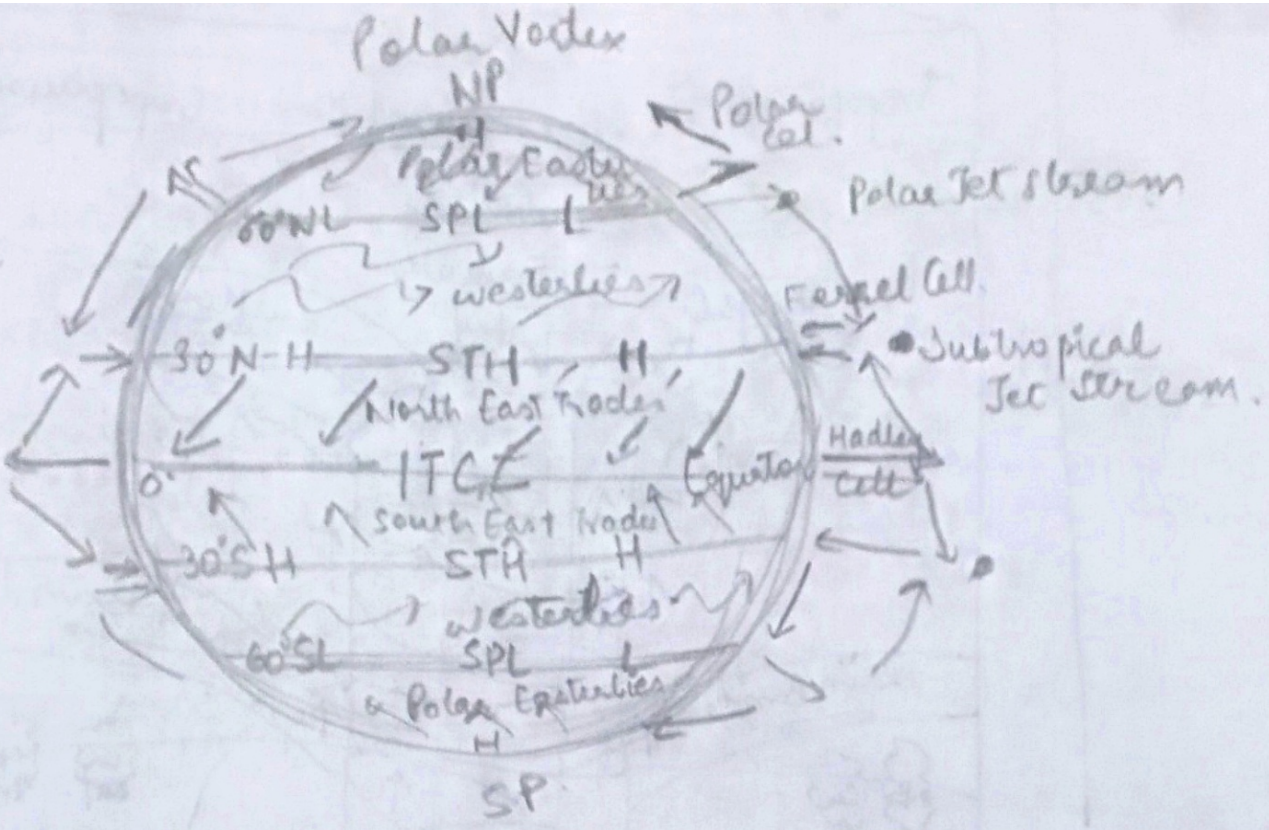

(1) = little rain at any time

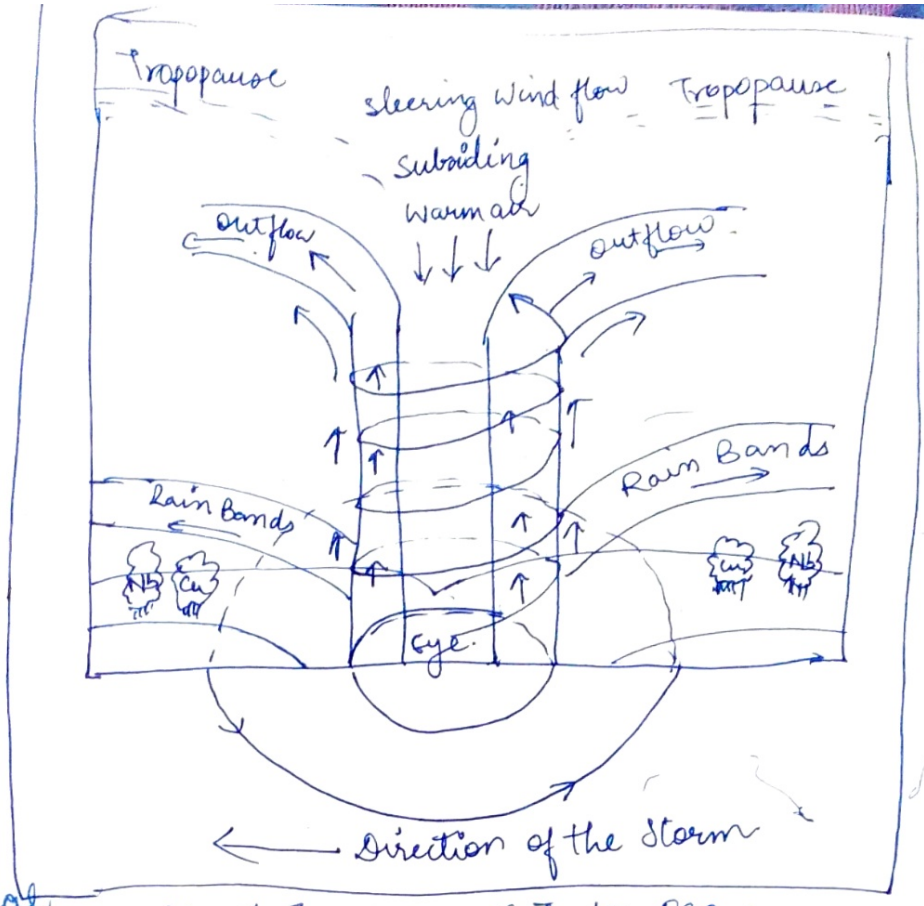
(2) = Winter rain

(3) = Rain all year round

(4) = Summer Rain

Note: In Siberian climate, though the rain has a summer max. but there is precipitation in winters as well thus having precipitation throughout the year. Temp. range annual is very high.


Polar Vodex
NP
Polar Cat.
Polar Easterlies
Polar Jet Stream
60°NL
SPL
Westerlies
Ferrel Cell
30°N-H
STH
H
Subtropical Jet Stream.
North East Trades
ITCZ
Equator
Hadley Cell
0°
South East Trades
30°SH
STH
H
Westerlies
60°SL
SPL
Polar Easterlies
H
SP




Tropical Cyclones = Mar to June  Oct to Dec,

Arabian Sea cyclones

Tauktae (southern GJ)
Nisarga (Alibaug, Mb)
Kyarr
Maha
Vayu

Calmer, lack of constant fresh water

5% of world's Tropical cyclones. Bay of Bengal (5 times more) cyclones

Jawad (OD+AP)
Gulaab (AP)
Yaas (WB)
Amphan (OD+WB)
Fani (OD)
Bulbul (WB)

More rainfall.

Lack of landmass b/w Pacific Ocean + and BoB causes the cyclonic winds to move towards India

Fresh inflow of water from Ganges + Brahmaputra + impossible to mix with cooler water below.

Higher SST → warm → evaporation.

Concave bay or shallow where strong wind push water up.

## Tropical cyclones

* Large sea surface with temp. higher than 27°C
* Presence of coriolis force
* Small variations in the vertical wind speed
* A pre-existing weak-low pressure area or low level cyclonic circulation. (allows storm clouds to rise vertically to high level)
* Upper divergence above the sea level system
* The cyclones, which cross 20°N L generally recurve and they are more destructive

**Eye of cyclone** = Region of calm. It is the centre of the cyclone where the wind system converges and vertically rises. No rainfall & experiences highest temp & lowest pressure within the cyclonic system.

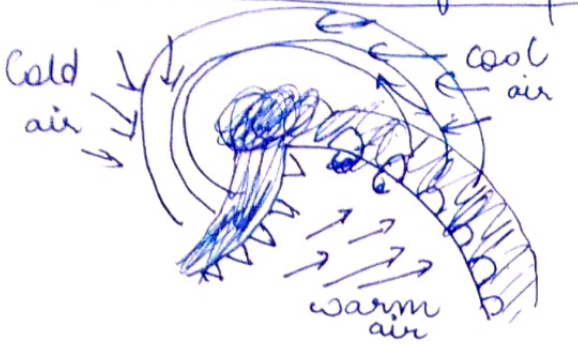
**Eye wall** = Made up of cumulonimbus clouds with no visibility, higher wind velocity (max. 250 kmph) and heavy rainfall with lightning & thunder. The strong spiralling ascent of air to greater height reaching the tropopause.

Move with the direction of Trade wind system i.e East to West

Middle latitude cyclones

Extra Tropical cyclones

## Sector structure of Temperate cyclone

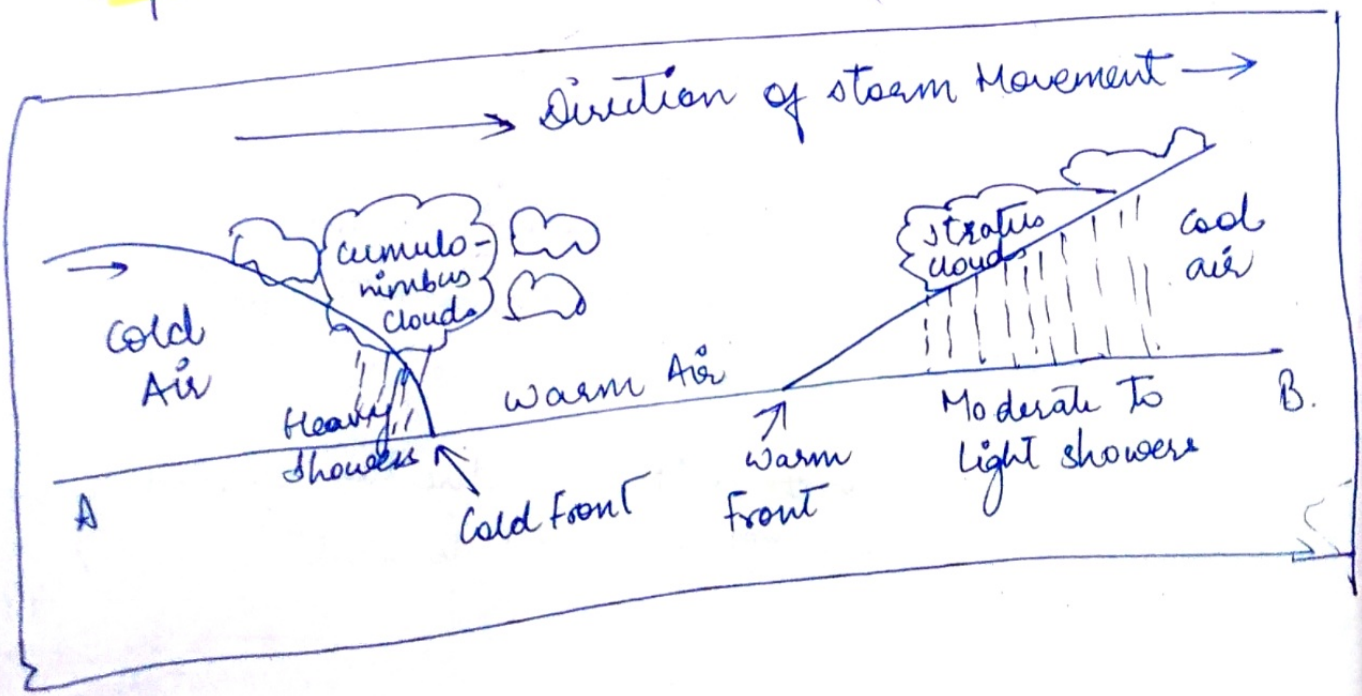



= warm front
= Cold front
= Precipitat

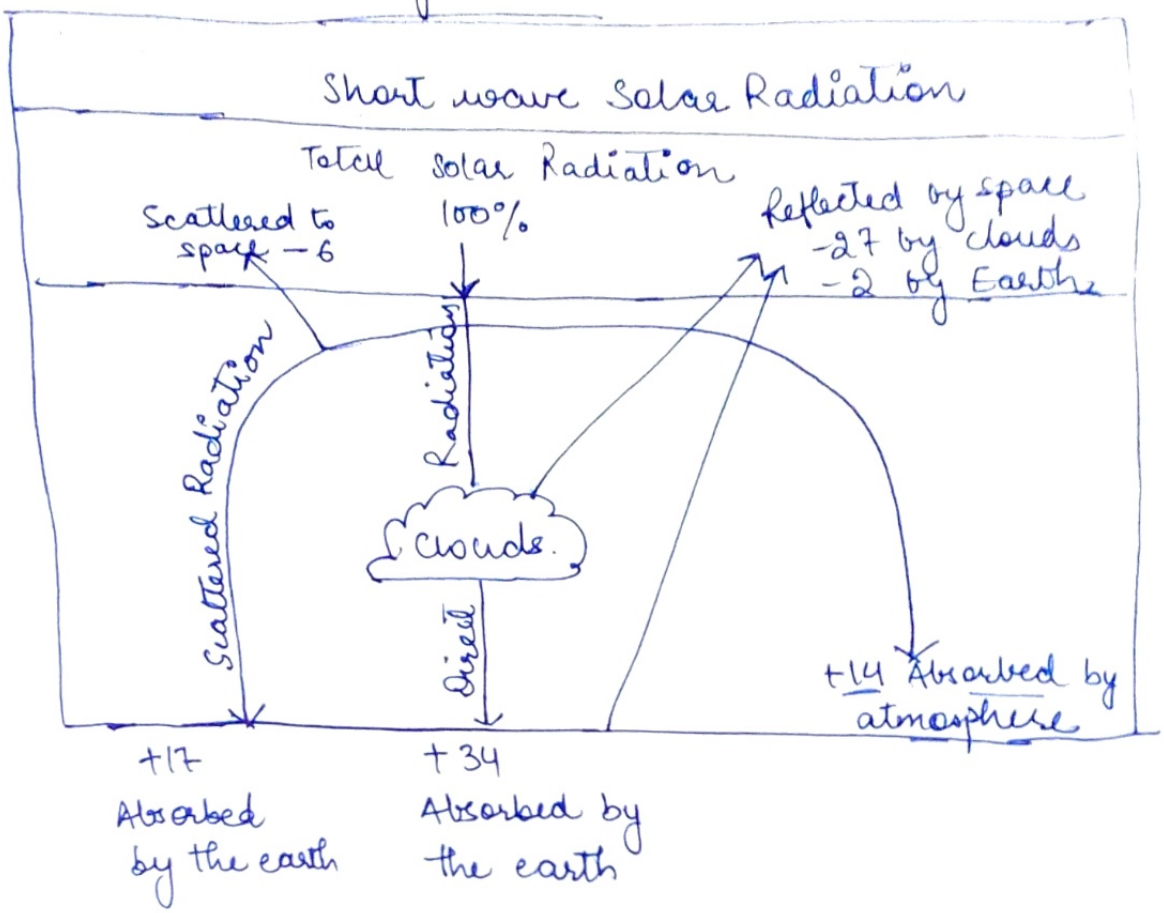
Temp. Cyclones = forms over both land and water in all seasons.

(Anticlockwise cyclonic circulation)

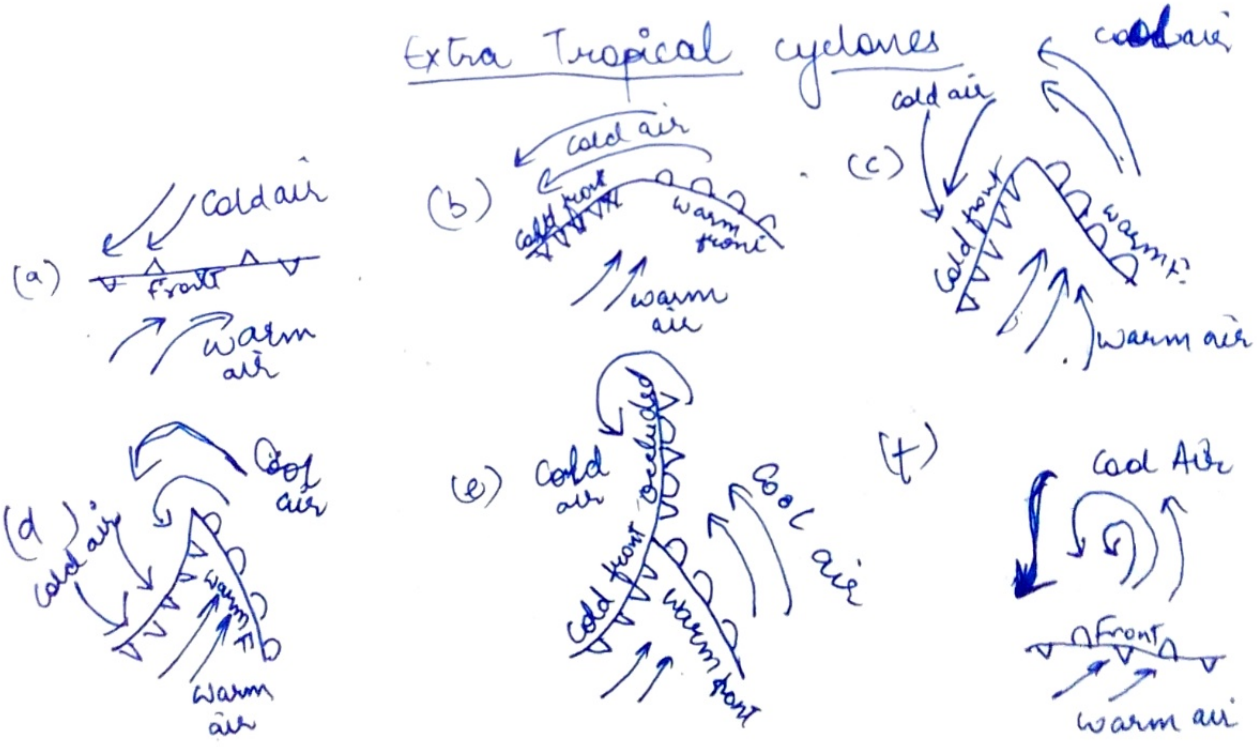
Covers larger area than Tropical cyclone
and stays for a longer period
Moves from west to east (along westerl
wind velocity in a tropical cyclone
is much higher & it is more destru
depressions, Temperate cyclones, extra-Tropical, fronta
depressions and wave cyclones.



# Heat Budget of the Planet Earth

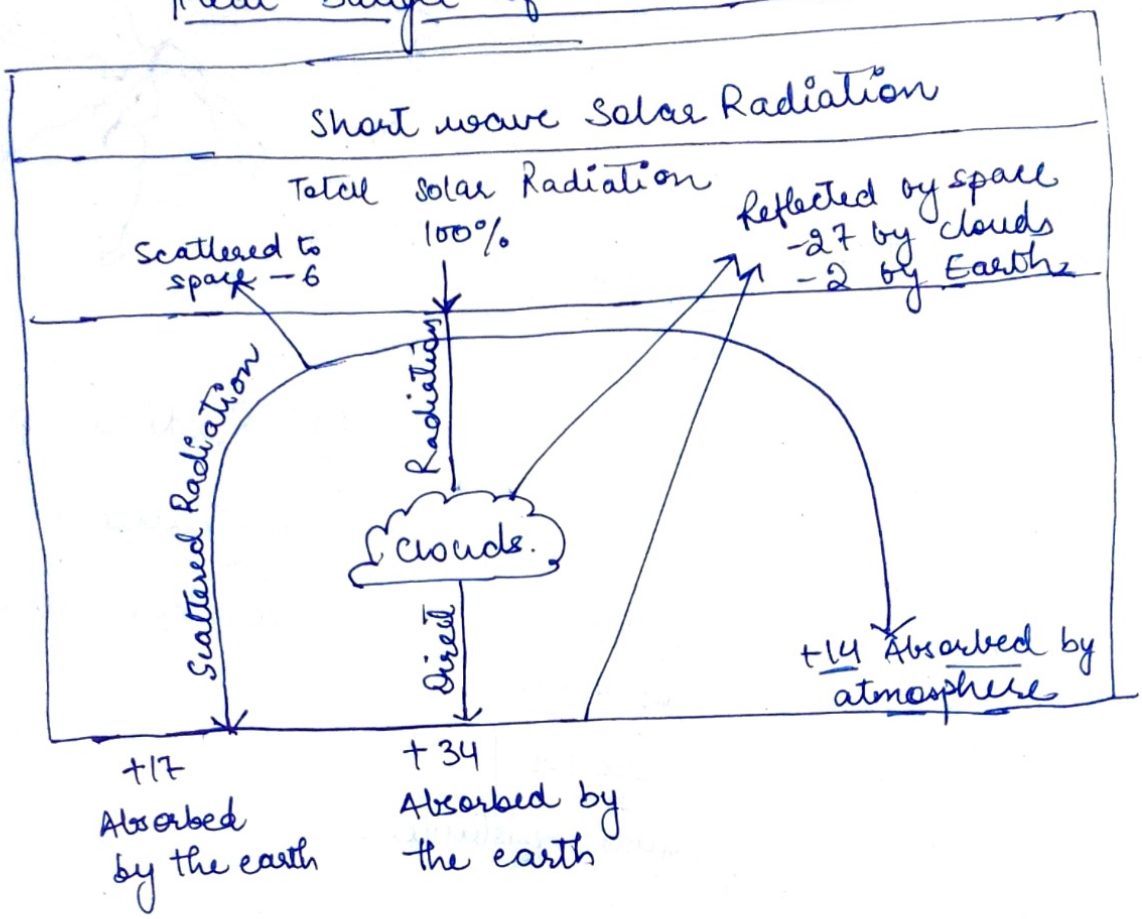



## Extra Tropical cyclones

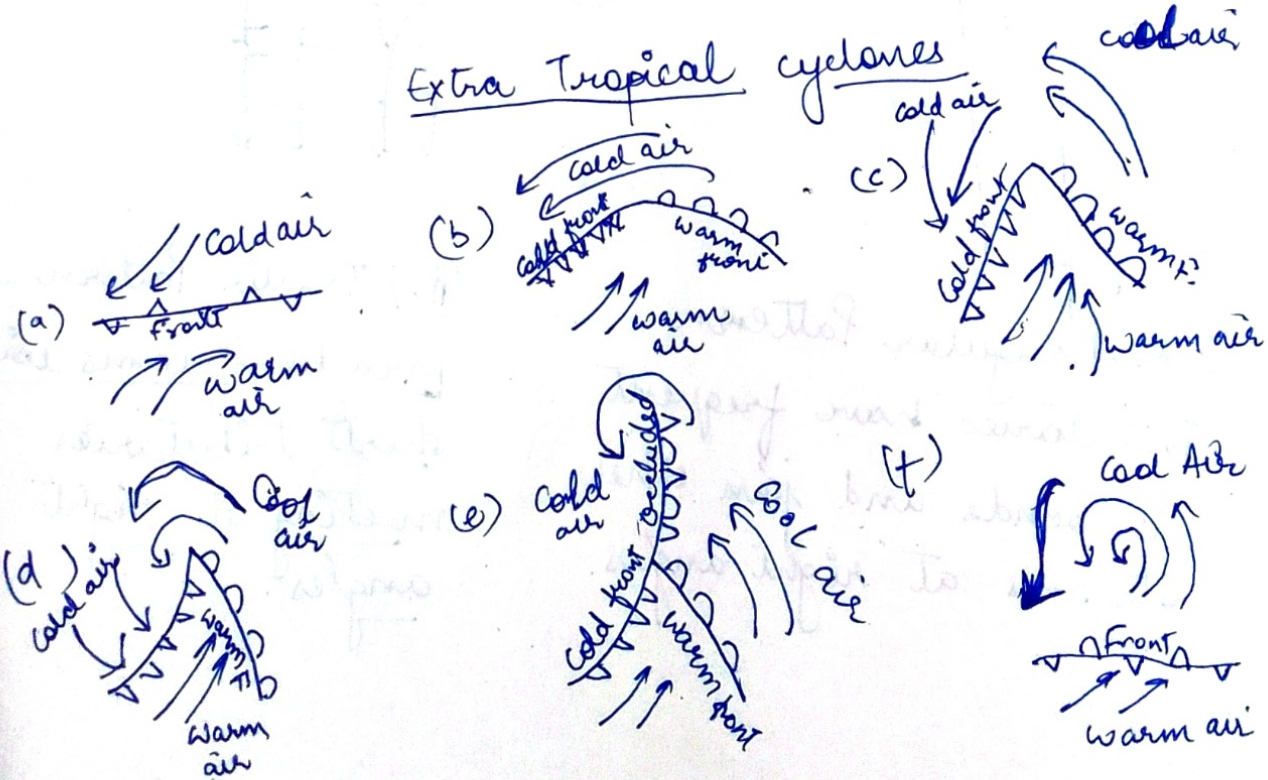



Stages in Development of Temperate Cyclones

# Heat Budget of the Planet Earth



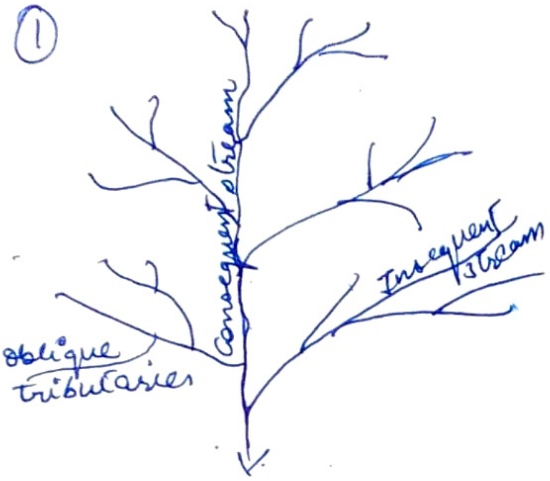

## Extra Tropical cyclones




Stages in Development of Temperate Cyclones

# Types of River Drainage Pattern

(1)

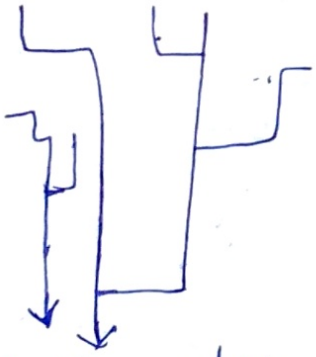



(a) Dendritic or tree-like drainage pattern developed on Homogenous rocks or beds of equal resistance

(2)

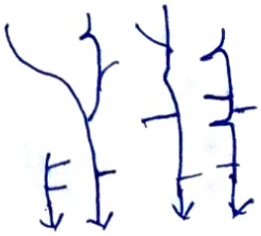
(b) Radial pattern
Typically formed on conical mountains

(3)



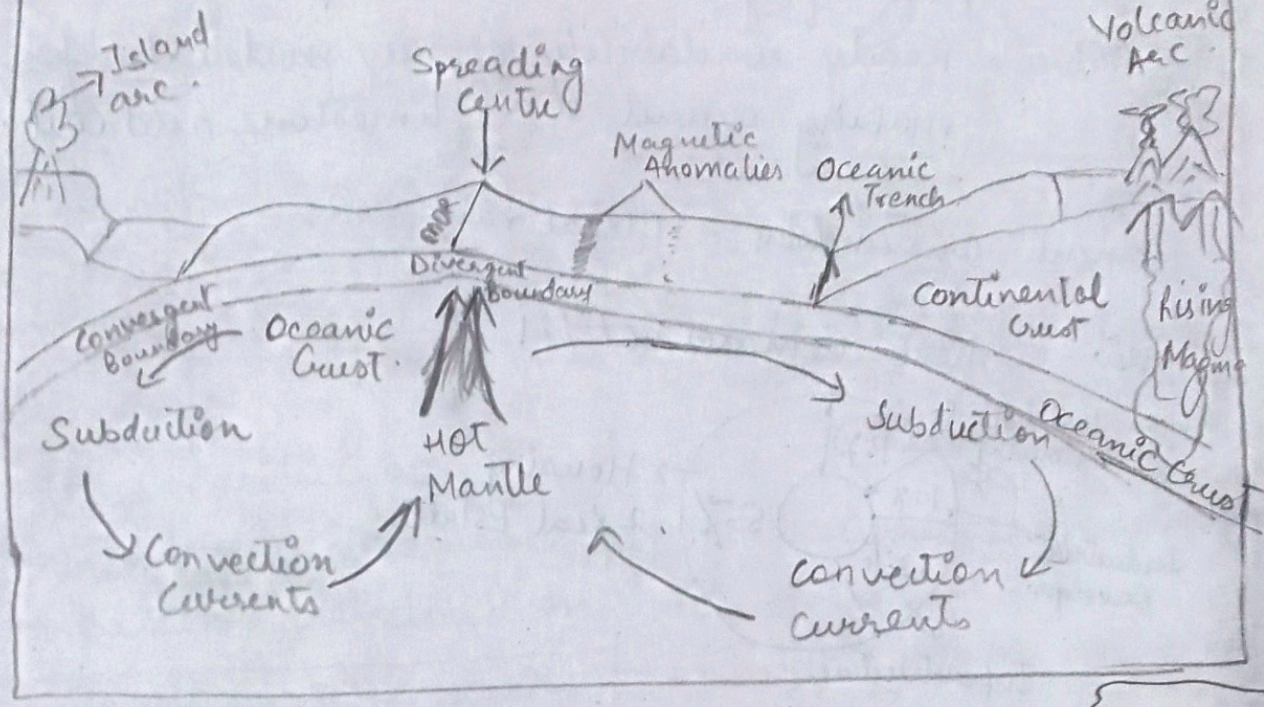
(c) Rectangular Pattern
Tributaries have frequent 90° bends and join other streams at right angles.

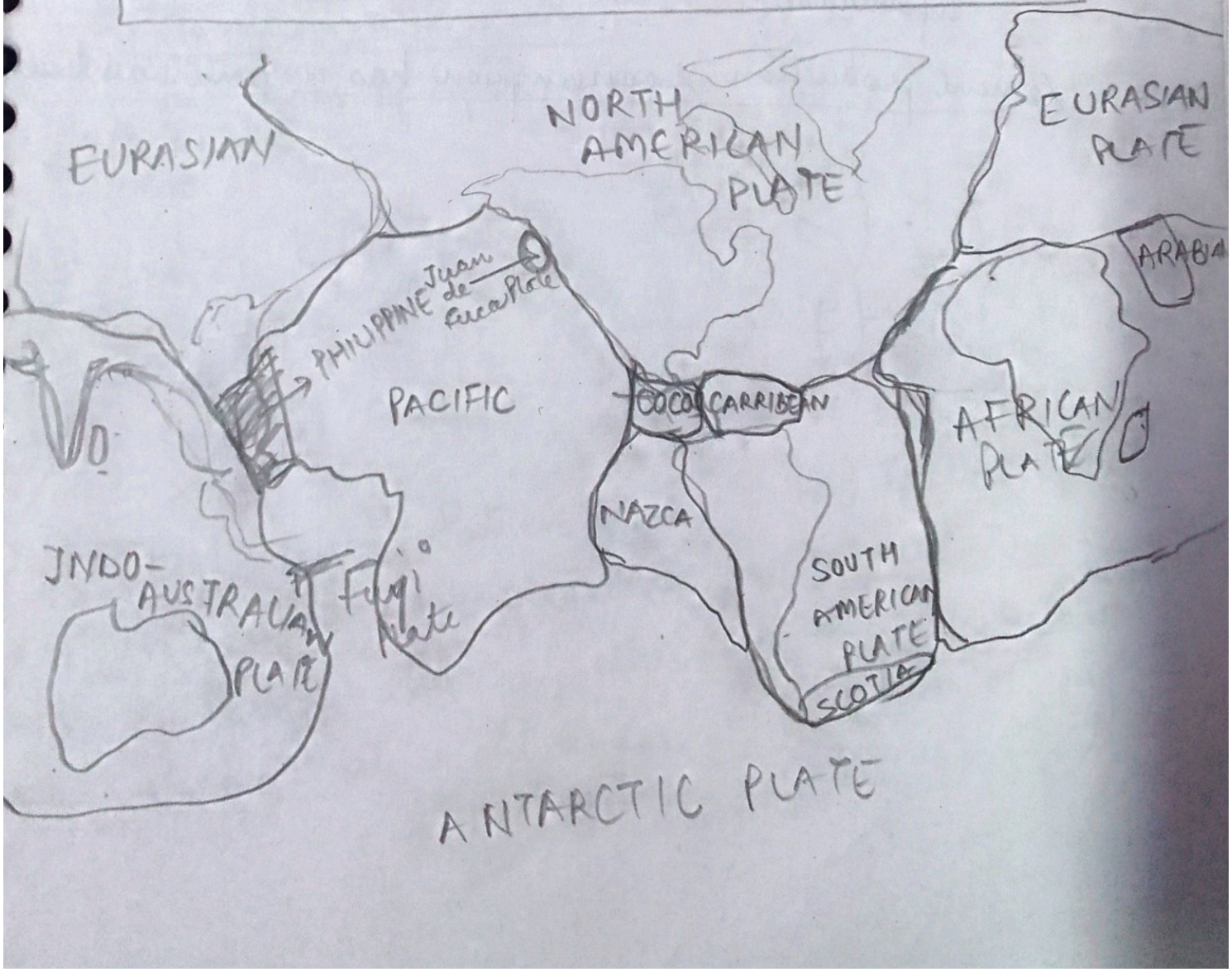
(4)



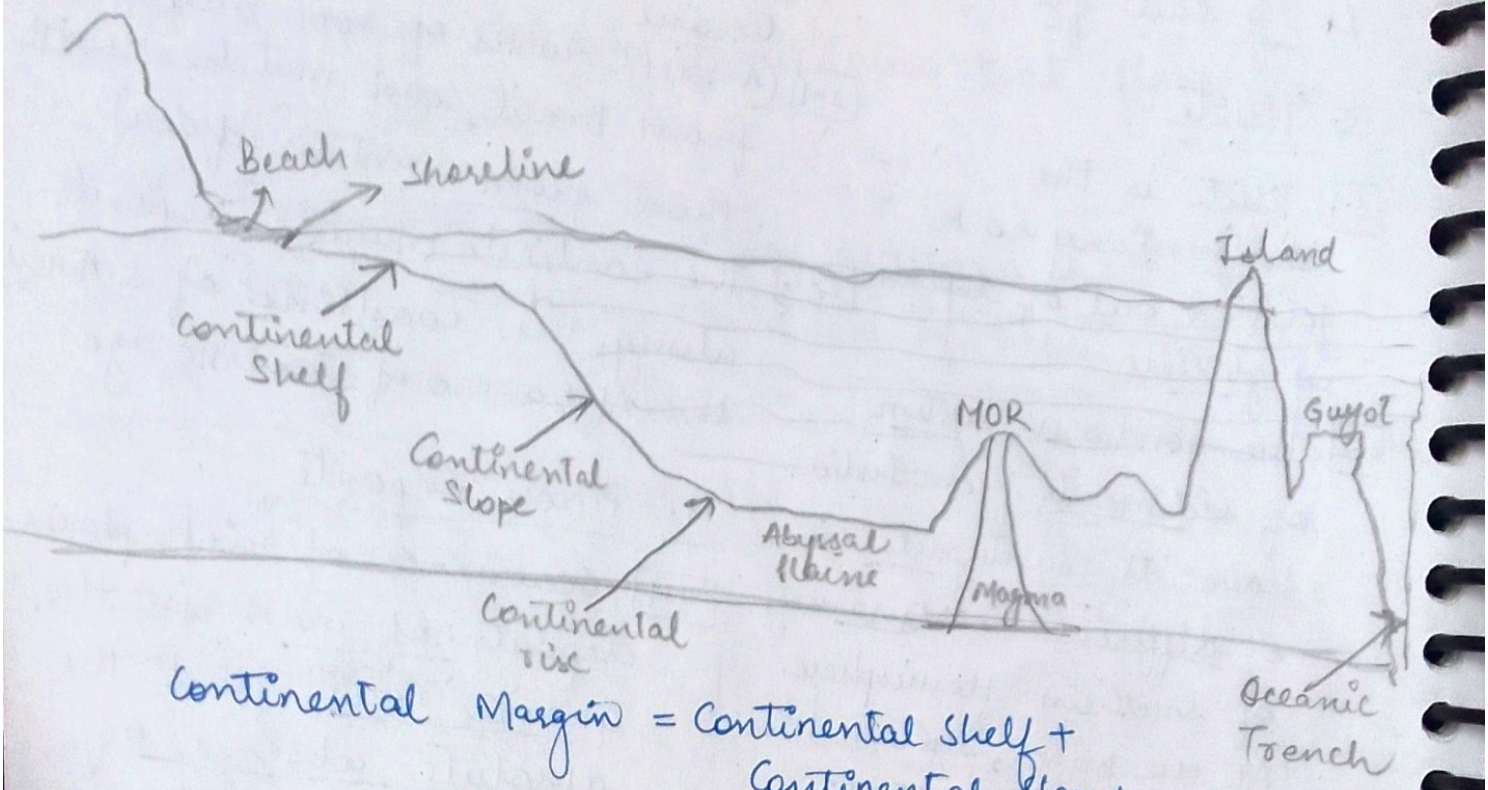
(d) Trellis Pattern – parallel streams with short tributaries meeting at right angles.

Fig: Sea Floor spreading.



# Ocean floor Configuration




Continental Margin = Continental Shelf +
Continental Slope +
Continental rise +
Deep oceanic trenches

Draw a world map here of major distribution of EQs & volcanoes after doing practice of world map

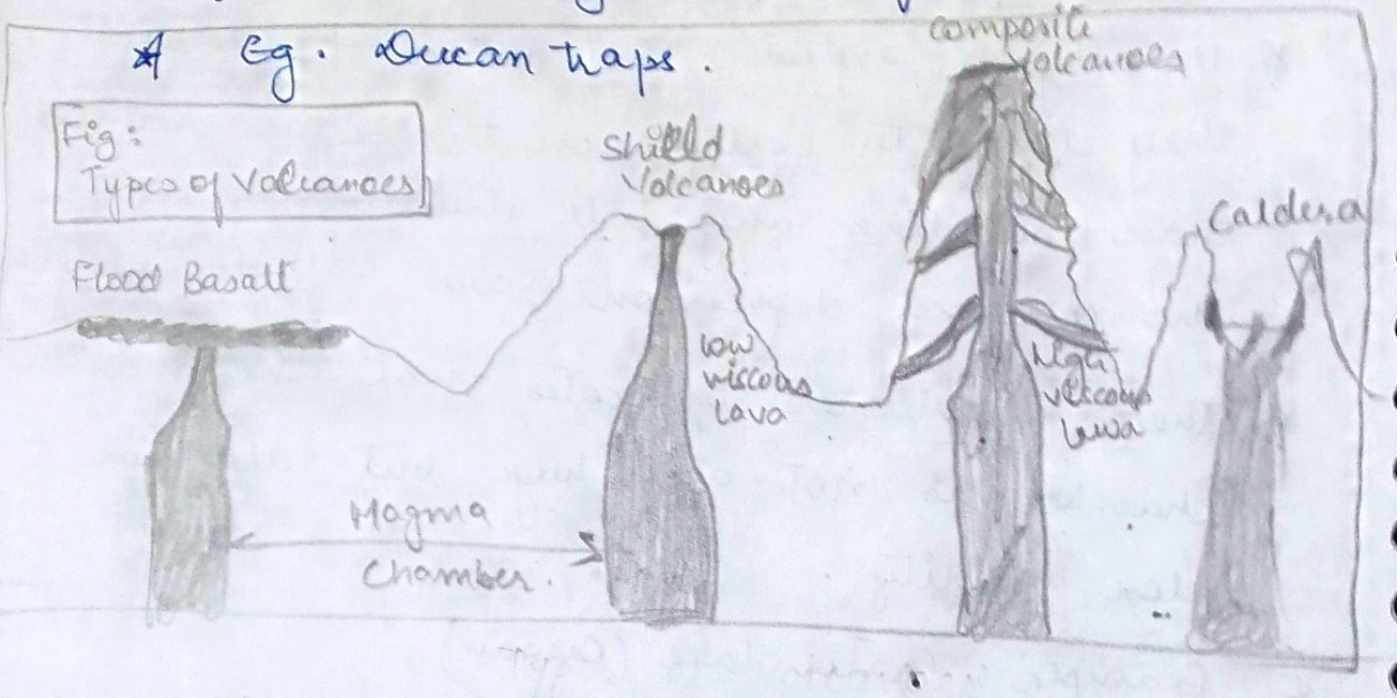
## Recent volcanic eruptions 2021-22

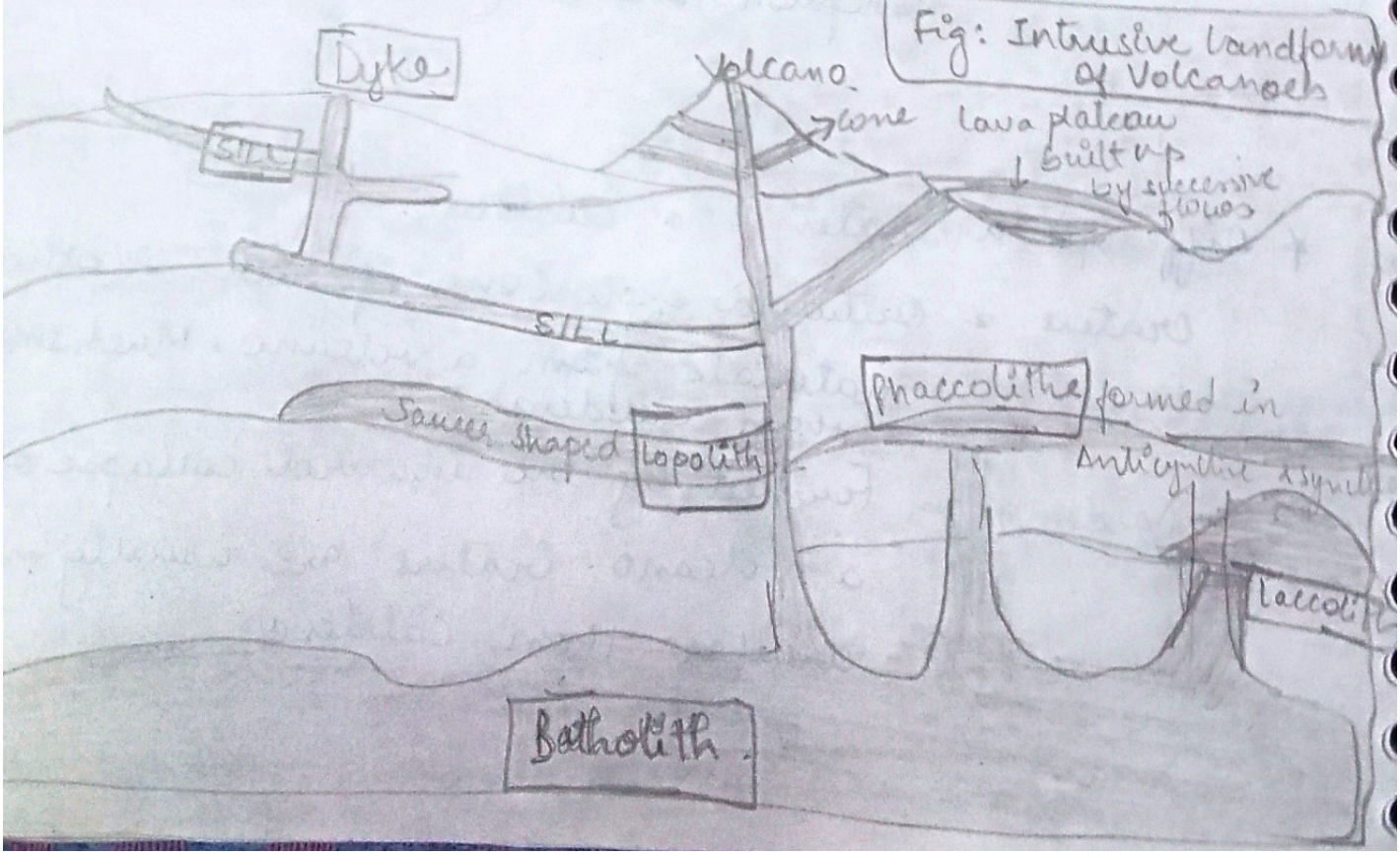
1. Hunga Tonga Hunga Ha'apai → Jan 22 → largest recorded since the eruption of Krakatoa in 1883
   ↓
   tons of water in Stratosphere
   ↓
   vapours will form → warm the earth.
   ↓
   Negative climate forcing.

(2) Mt Sinabung (3) Kilauea.

## 5. Flood Basalt Provinces:

* Outpour highly fluid lava that flows for long distances.
* There can be a series of flows with some flows attaining thickness of more than 50m.
* Eg. Deccan traps.



* The exact composition of a cinder cone usually depends on the composition of the lava ejected from the volcano.

4. Calderas :

* Most explosive of the earth's volcanoes
* Usually so explosive that when they erupt they tend to collapse on themselves rather than building any tall structure
* The collapsed depressions are called calderas
* Their explosiveness indicates that the magma chamber is not only huge but also in close vicinity.
* Example : Crater lake (Oregan), Deception Island (Antarctica)

* Diff. b/w a crater & a caldera.

Craters = Outward explosions of rocks & other materials from a volcano. Much smal than calderas

Calderas = Formed by the inward collapse of a volcano. Craters are usually mo circular than Calderas

2. Shield volcanoes :

* Mostly made of basalt, a type of lava that is very fluid when erupted → not steep but may be very large
* Commonly found at spreading centres or intraplate hot spots.
* Non-explosive, eruptions are mild
* Low viscosity magma can flow not only on the surface as lava but also underground in lava Tubes.
* The upcoming lava moves in the form of a fountain & throws out the cone at the top of the vent and develops into cinder cone.
* Eg : Hawaii ⇒ Mauna Kea (highest mountain from its base)
  Kilauea

3. Cinder Cones :

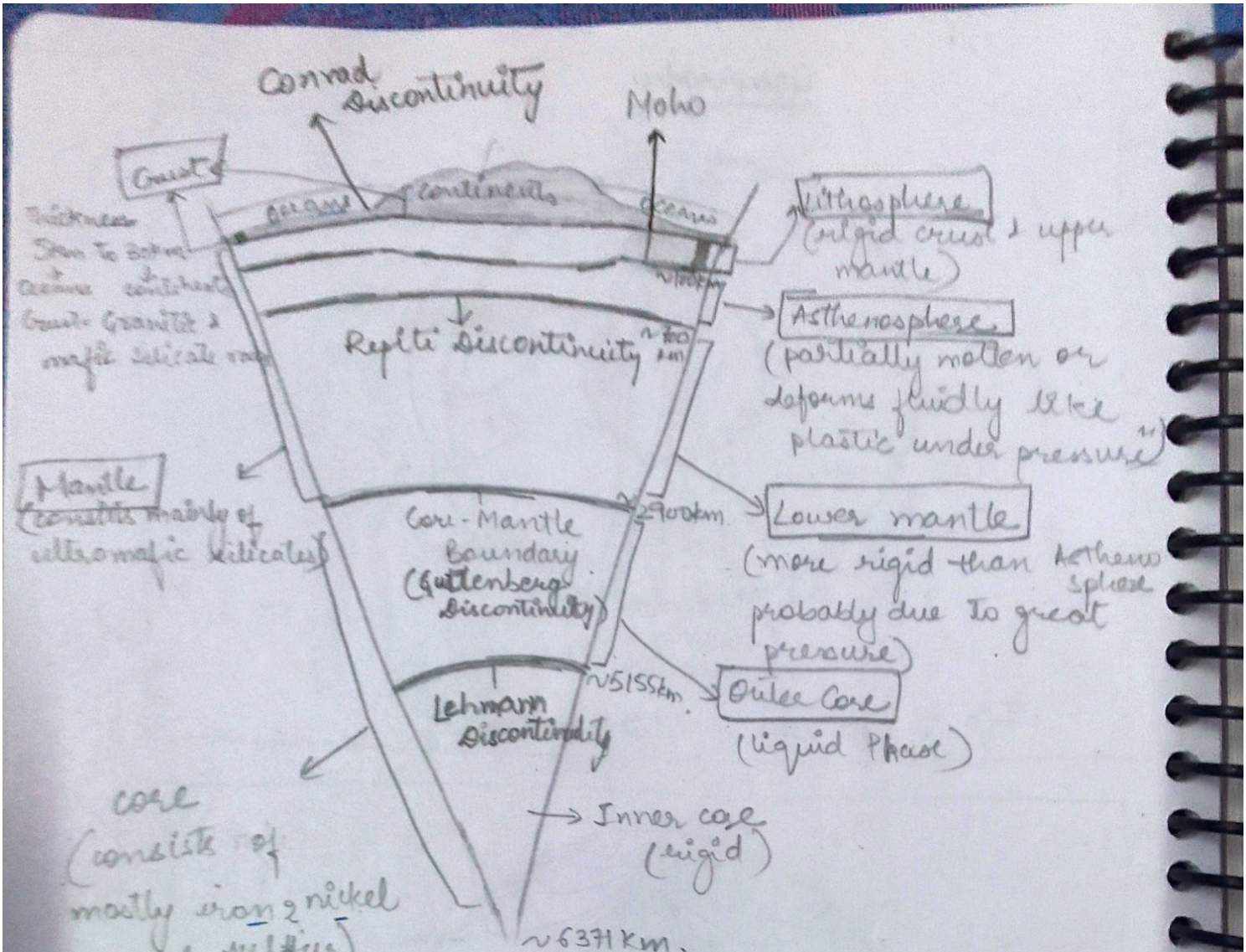
* most common type
* Cone shape but much smaller than a composite volcano.
* Rarely reach 300 m in height but they have steep sides.
* Composed of small fragments of rocks such as pumice, piled on top of one another.

# Types of Volcanoes

1. Composite volcanoes

* Some of the most dangerous
* eruptions of cooler and more viscous lavas than basalt
* Tend to occur along O-O or O-C collisions boundaries ∵ of subduction zones O-O O-C
* More explosive eruption
* The lava (viscous) cannot travel far down the sides of the volcano before it solidifies, which create the steep slopes of a composite volcano.
* The volcano is constructed layer by layer, as ash and lava solidifies, one upon the other and are sometimes called stratovolcanoes or andesite volcanoes
* Classic cone shape of composite volcanoes
* Examples = Mt St. Helens (active Stratovolcano (SV) in Washington USA)
  Mt. Etna (Sicily)
  Mt. Rainer (also known as Tahoma) (active SV, washing. (Seattle) USA)
  Mt. Merapi (Java)
  Mt. Shasta (California)
  Mt. Hood (active SV in Oregon USA)
  Mt. Vesuvius (Naples, Italy)
  Mt. Pinatubo (active SV in Phillipines)
  Mt. Krakatoa (Indonesia)

Mt. Agung (Bali)
Mt. Pelee
Mt. Chimborazo } Equador
Mt. Cotopaxi
Mt. Erebus (Antarctica)
Barren Island
Mt. Sinabung (Sumatra)




Conrad Discontinuity = Upper & lower crust

Mahorovicc Dis. = Upper mantle & lower crust

Repiti Discontinuity = Upper & lower mantle

Guttenberg disc = Lower mantle & outer core

Lehmann disconti. = Outer & inner core

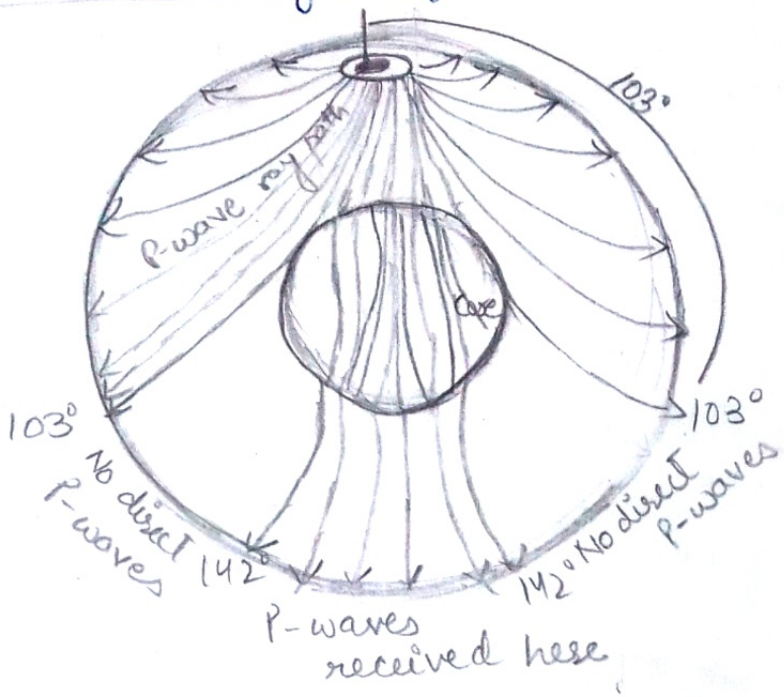



Fig: P-wave shadow-zone

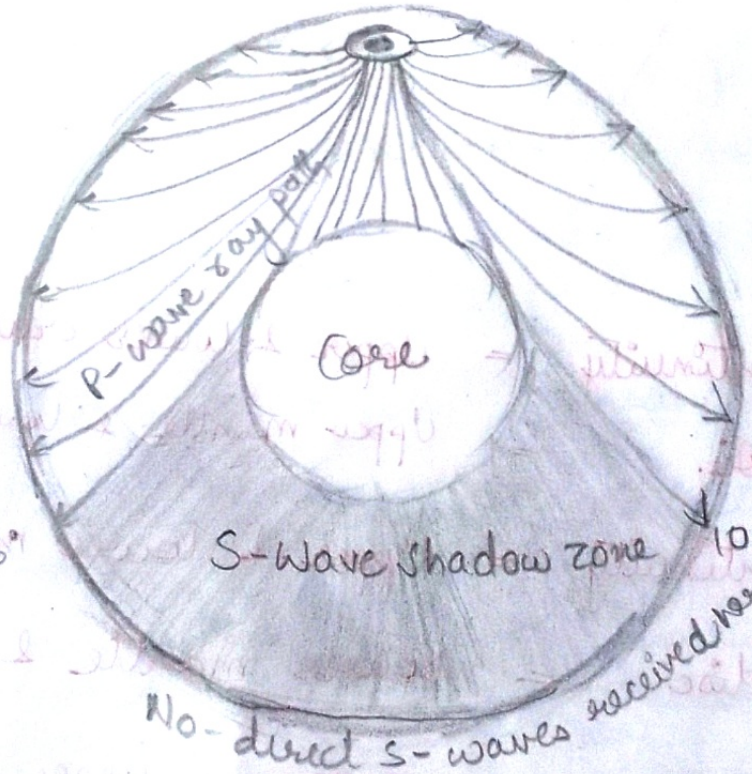



Fig: S-wave shadow zone