PHYSICAL GEOGRAPHY
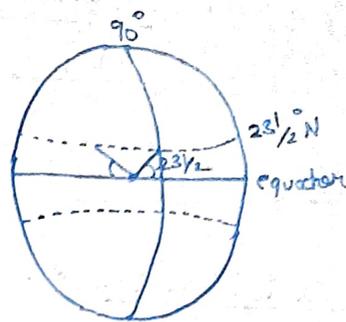
⇒ __Latitude :-__ Also Called Parallel / Temperature
'181total' Co-ordinate.

∠ 60° Latitude = ½ of equator length

∠ 75 Latitude = ¼ of equator length

- Indian main land, Kanyakumari
  Southern point makes angle of $8°4'28''$

- Distance b/w equator and 1° latitude is 111km.
  ↳ 110·5 at poles

$1° = 60'$, $1' = 60''$ i·e second.
{ Angular distance from centre of earth }

⇒ __Longitude :-__ Angular distance of place East or west of prime Meridian or Zero degree Longitude.

__Prime Meridian__ passes through 'Royal Astronomical observatory GreenWitch'
Near London, UK
22nd oct, 1884 International Conference decided
by Sir George Airy
Also Called __IST / Greenwich line__.

- Longitude form Semi-Circle, but when opposite combine it become circle

- Not Equi-distance but equal length. (angular distance is equal but not Distance)

- Maximum distance b/w 2 Longitude at equator.

∠ India's Longitude :-
- Mirjapur.
∠(1) $82½°$ E in allahabad (indian Standard time line)

(IST-2) ∠(2) $89°52'$ E in chicken Neck (near Sikkim) → proposed but not passed
↳ for Railways

| Total latitude → 90+90+1 = 181 |
↳ 179 parallel by 2are point

Time line is 0° longitude
Day line is 180° Longitude

__Graticule :-__ Network of parallels & Meridian drawn on globe to find places.
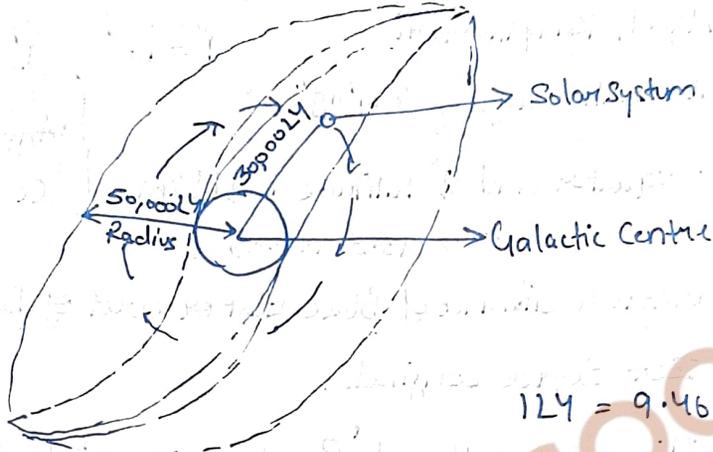
$$24 \text{ hours} = 360°$$
$$1 \text{ hour} = 15°$$
$$\boxed{1° = 4 \text{ min}}$$

(1) Galactic Movement
(2) Rotation
(3) Revolution
(4) Obliquity
(5) Eccentricity
(6) Precession

⟹ **Motions of Earth :-**

(1.) **Galactic Movement :-**

→ Solar System

50,000 LY
30,000 LY

50,000 LY Radius

→ Galactic Centre

Milky Way Galaxy
Spiral Shape

$$1 LY = 9.46 \times 10^{12} \text{ km}$$

⤳ Solar System takes 250 Million Year to Revolve around Galactic Centre

$$\boxed{250 \text{ Million year} = 1 \text{ Cosmic}}$$

(2) **Rotation :-**

Side View (West to East)
Northpole (Anticlock Wise) } View of Earth
South pole (Clock Wise)

Currents are Clockwise ↓
Currents are Anti-clockwise ↙

Fact :- Uranius & Venus Rotate opposite to earth

⤳ **What is Sideral and Solar Day ?**

↓	↓	
Earth wrt any other Star	Earth wrt Sun	} Rotate on axis
+	+	
Not Revolve around any star	Revolve around Sun	} Revolution → Create Variation of ≈ 3 min
⇓	⇓	(Solar Year wrt Axis)

$$\boxed{23h \ 56min \ 4.09 \ Sec} \ < \ \boxed{24 \text{ hours}}$$
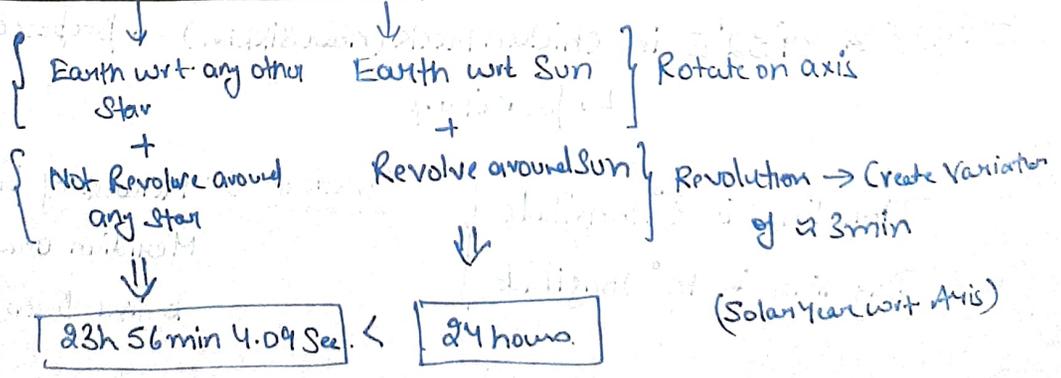
Impact of Rotation :-

(1.) Rotation is Responsible for Generation of Centrifugal force
$\downarrow$ Outward force

(2) → Cause equitorial Bulging

$\downarrow$

(3) → Promotes Geode shape of Earth

(4) → ← (3)
Variation of Gravity at Surface Due to diff in Radius

$R_E > R_P$ (21.38 km Difference)

(5) Coriolis force :- named after French Mathematician Coriolis

- It is ⊥ force to rotational axis & it increase with increase in speed of motion. (It is a psedeuo force)

- Zero at equator and Maximum over poles.

- Occurres due to Rotation of Earth. It becomes effective on any object which is in motion, eg Bird, Wind Missile

Deflect Direction Not speed

Ferell's Law → Deflect Right Side in Northern Hemisphere

Deflect Left Side in Southern Hemisphere

Rotational Velocity Calculated by dividing length of latitude by 24

$\downarrow$

Maximum Velocity at
= Equator (1700km/h)
= Pole → 0km/h

(6) Basic of Direction

ie Face → East (SunRise)

Back → West (Sunset)

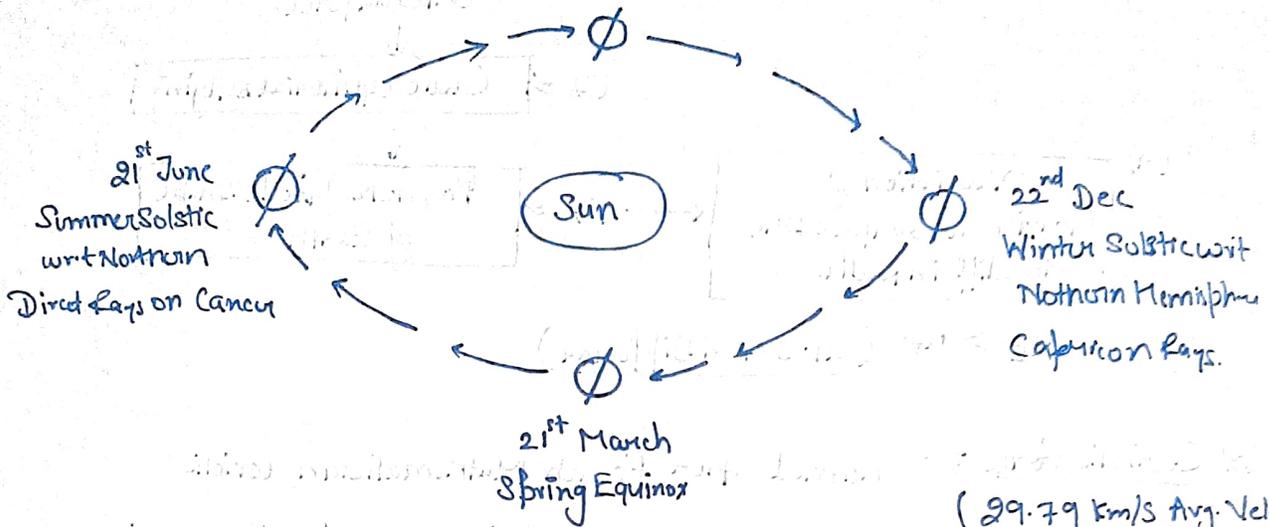Left Hand → North

Right → South

Equator → 40075 km

EarthRadius → 6378.1 km

(7) Magnetism of Earth (internal fluid create Magnetism effect)

(8) Ocean Current

(3) Revolution :— not only Revolution but with tilt of earth (23½°)

25th Sept, Autumn Equinox

21st June
SummerSolstic
w.r.t Northern
Direct Rays on Cancer

Sun

22nd Dec
Winter Solsticw.r.t
Nothern Hemisphere
Capricon Rays.

21st March
Spring Equinox

(29.79 km/s Avg. Velocity)
or 105444 km/h

Inclination of Earth :—

(1.) 23½° w.r.t to Vertical Axis.

(2) 66½° w.r.t to Horizontal Axis.

(4) Obliquity :— Variation of angle of inclination of Earth's axis from

22.1 Degree to 24.5 Degree in long time span of 40000 to 46000 years

Present → 23½°

(5) Precession :— Earth wobbles on its axis in longtime 21000 to 26000 years

— Due to Sun & Moon tidal force

— Responsible for Geoide shape with Rotation

(6) Eccentricity :— Orbit of earth becomes more circular to more elliptical in a long time of 96000 to 125000 year

⇒ **Aphelion & Perihelion :-**

'circle of illumination' (ie Sun light Divide
                              earth in 2 parts)

January
Perihelion   147 Mkm   Sun   152 Mkm   July Aphelion
'3rd January'   '4th July'

Mean Distance = 149 Mkm = A·U

1 Astronomic Unit = 149 Mkm

Which of the following are natural causes of Climate change ?

   (1) Rotation ✗   (2) Revolution ✗   (3) obliquity ✓

   (4) Eccentricity ✓   (5) Precession ✓

Which is Responsible for Geoid Shape of Earth

   - 'Rotation and Precession'

What is Mercator Projection ?

   Difference in Original Global & Global present in Atlas.

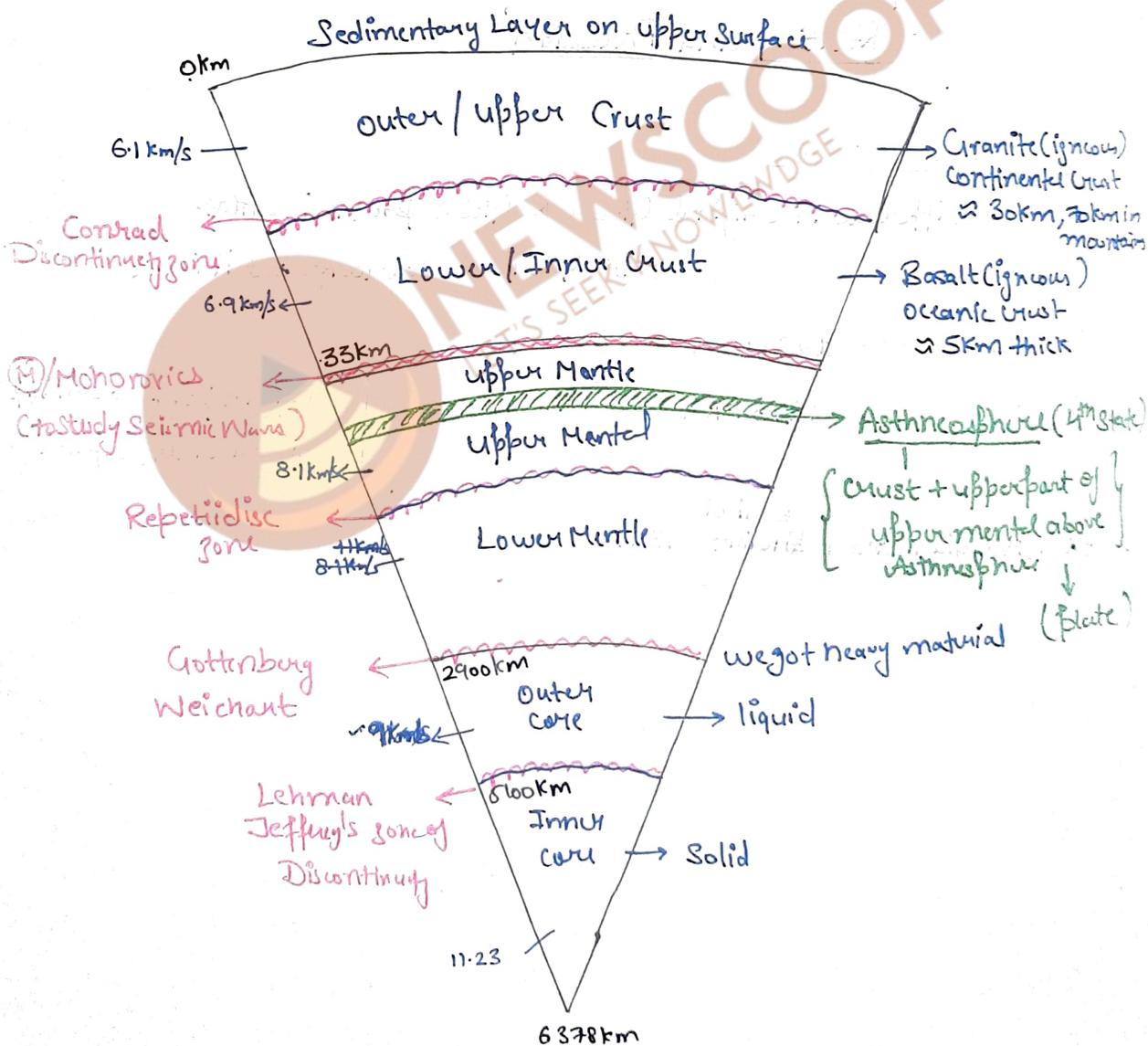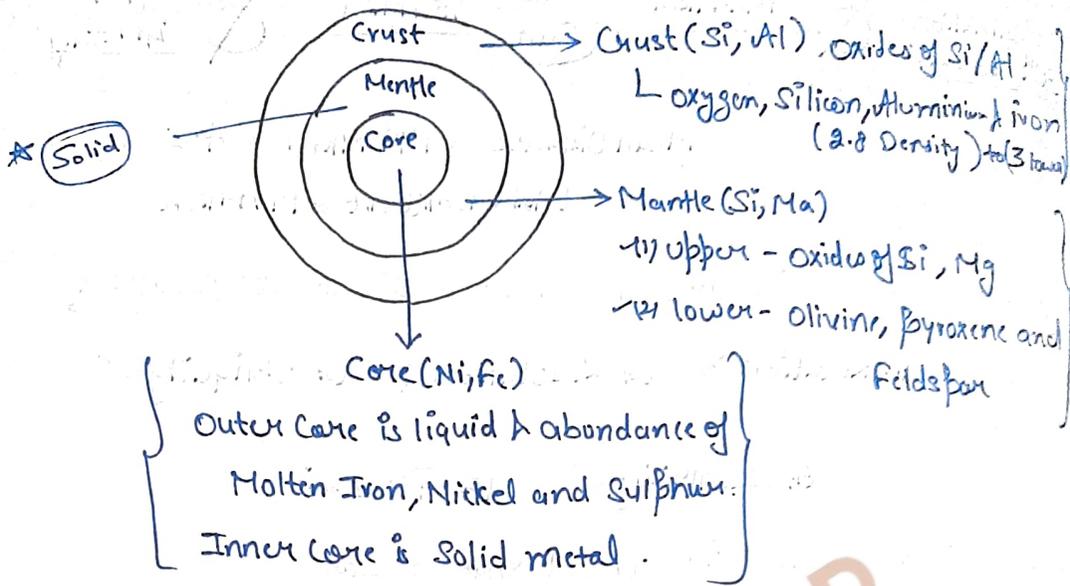   9: Greenland show large but it is not

Polar Diameter — 12714 km

Equator Diameter — 12757 km

'Subpolar point' → Sun Rays falls
90° on Cancer / Caprion

�½ Prime Meridian 5·5h behind IST.

Internal Structure of Earth

Crust
Mantle
Core

* (Solid)

→ Crust (Si, Al), Oxides of Si/Al:
  └ Oxygen, Silicon, Aluminium & iron
     (2.8 Density) to (3 low)

→ Mantle (Si, Ma)
  (1) upper - Oxides of Si, Mg
  (2) lower - Olivine, Pyroxene and
              Feldspar

Core (Ni, Fe)
Outer Core is liquid & abondance of
Molten Iron, Nickel and Sulphur.
Inner Core is Solid metal.

Sedimentary Layer on upper Surface

0km

Outer / upper Crust

6.1 km/s →

Conrad
Discontinuety zone ←

6.9 km/s ←

Lower / Inner Crust

33km

M/Mohororvics ←
(to study Seismic Wave)

upper Mantle

8.1km ←

upper Mantel

Repetiidisc ←
zone
+1km
8km/s

Lower Mantle

Gottenberg ←
Weichart

2900km

~9km/s ←

Outer
Core

Lehman ←
Jeffery's zone of
Discontinuty

5100km

Inner
core

11.23

6378km

→ Granite (igneous)
  Continental Crust
  ≈ 30km, 70km in
                mountain

→ Basalt (igneous)
  oceanic Crust
  ≈ 5km thick

→ Asthneasphere (4th state)
  │
  { Crust + upperpart of
    upper mantel above
    Asthnesphere }
  ↓
  (Plate)

→ we got heavy material

→ liquid

→ Solid

⇒ **Earthquake** :- is release of energy in the form of waves which causes oscillations & tremors in Crustal Rocks / upper Crust.

- Crust
- Asthnosphure
- Point is called Focus / Hypocentre
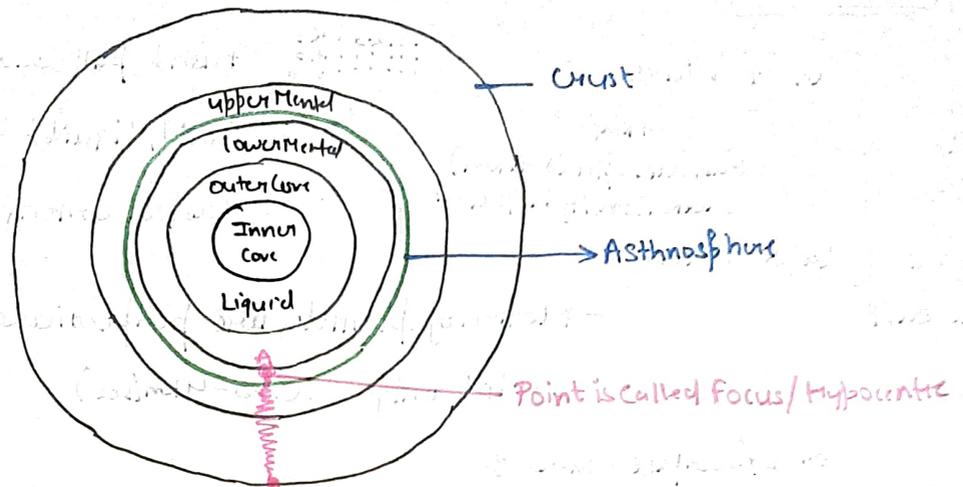
'EPicentre' - Vertically above focus (max. damage)

What is Isoseismal Line ?

- Intensity of EarthQuake is same at Various location of join line

What is Isoseist Line ?

- Line Joining places at Same time (equake at Sametime)

Magnitude of EarthQuake ?

- Amount of energy released during specific equake

✓ - Measured in ' Richten Scale '

↓

- 2.5 — not felt but recorded
- 4.5 — local damage
- 6.0 — Destructive in dense population
- 7+ → Major (once in 5 to10 year)

Isoline:-
joing pt where Sismal Waves
like at Sametime

Intensity of Earthquake ?

↳ Amount of Damage measured in 'Modified Mercalli Scale'
  ↳ Depend on Density of population
    More dense → More damage

⇒ **Seismograph :-** Sensitive instrument used to record earthquake/Seismic waves
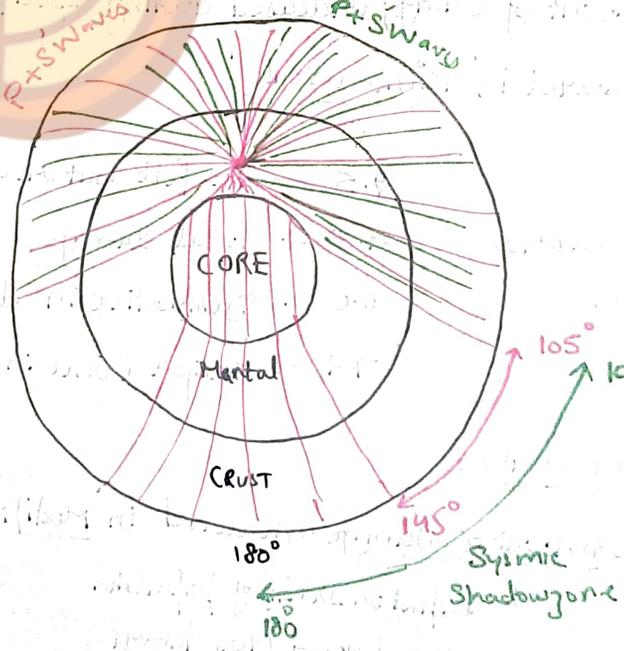
- Based on Principle of Inertia

Seismic Waves :-

Body Waves
↓
They are inside earth
{
(1) **P-Waves**
   6-7 km/s
   Faster at Depth (8-11 km)
   Create Density Difference

(2) **S-Waves**
}

Push & pull waves
- Solid, liquid & Gaseous
- fastest among all.

- Motion of particles are perpendicular
- Solid only   (3.5-4 km/sec)

(3) L/Surface waves :-

- Love waves / Rayleigh waves

- Most dangerous, because it come on surface
  create damage.
- Report on Seismograph.

[∵ Denser to Rarer → Curve path]

P-Waves
S-Waves

CORE
Mantal
CRUST

P+S Waves
P+S Waves

105°
105°

180°

145°

Sysmic Shadowzone

180

⇒ Causes of Earthquakes :-

    (1) Volcanism

    (2) Plate Tectonics

    (3) Folding & faulting (Compression & Tensional forces)

    (4) Deep mining

    (5) Pumping of groundwater /oil

    (6) Blasting of Rocks for construction purposes.

    (7) Reservoir-induced Seismicity (Koyna Dam / Shivaji Sagar Reservior Sagar, 1967)
                                        Mahavati   Mahanadi

    (8) Nuclear Explosion

    (9) Landslides.

    (10) Constructing High Rise building → Create pressure.

⇒ SEISMIC ZONES OF INDIA :-

    (1) Depending on intensity & frequency :-

        (a) The Himalayan Zone

            → Most prone to earth, Young mountain (30M years)

            → Indo Australian + Eurasian plate collide.

        (b) Indo-Gangatic Zone

            → Moderate intensity earthquake

              Due to more population it
              is harmful

        (c) Peninsular / Ocean plateau :-

            → Minimum earthquake due to Stable landform.

            → Koyna eq. is due to Reservior induced Seismicity
              1967

    (2) Depending on Intensity :-

        (a) Zone V, VI, III, II, I   (Video)
             ↓   ↓
         High damge   least Damge

Types of Earth Quake :-

(1.) On the basis of Depth of focus.

  (i) Shadow focii :- Normal / Moderate
                    - Very Dangerous, Depth less than 60km
                    - mostly in Divergent & Conservative Margin

  (ii) Intermediate :- 60 to 300km Depth of focus.
                    Convergent Margin.

  (iii) Deep focus Earth Quake :- 300 to 700km
                    - Distructive Margin.

(2) Other Classified as

  (i) Techtonic EQ. - plate movement

  (ii) Volcanism EQ

  (iii) Collapse EQ - Mining Responsible

  (iv) Exploision

  (v) Reservior Induced Seismicity

Effects :- Loss of life, Loss of infrastructure, Sites, Economics hampered
          food loss ; Bad hygienic Condition

        - Biodiversity loss, Erosion, Loss of agriculture crop

        - Tsunami, landslides.