

Earthquakes → Geo - GSI
→ Dm Gs 3

↓
framework

↓
Scale

classification
of Body & surface waves

↓
Introduction

↓
Keywords

↓
Plate Boundaries
&
Earthquakes

↓
Causes

↓
Types

↓
classification

↓
define

magnitude depth

Earthquake
Impacts / Consequences

Solutions for
mitigation
Ex // Six Pillar Strategy

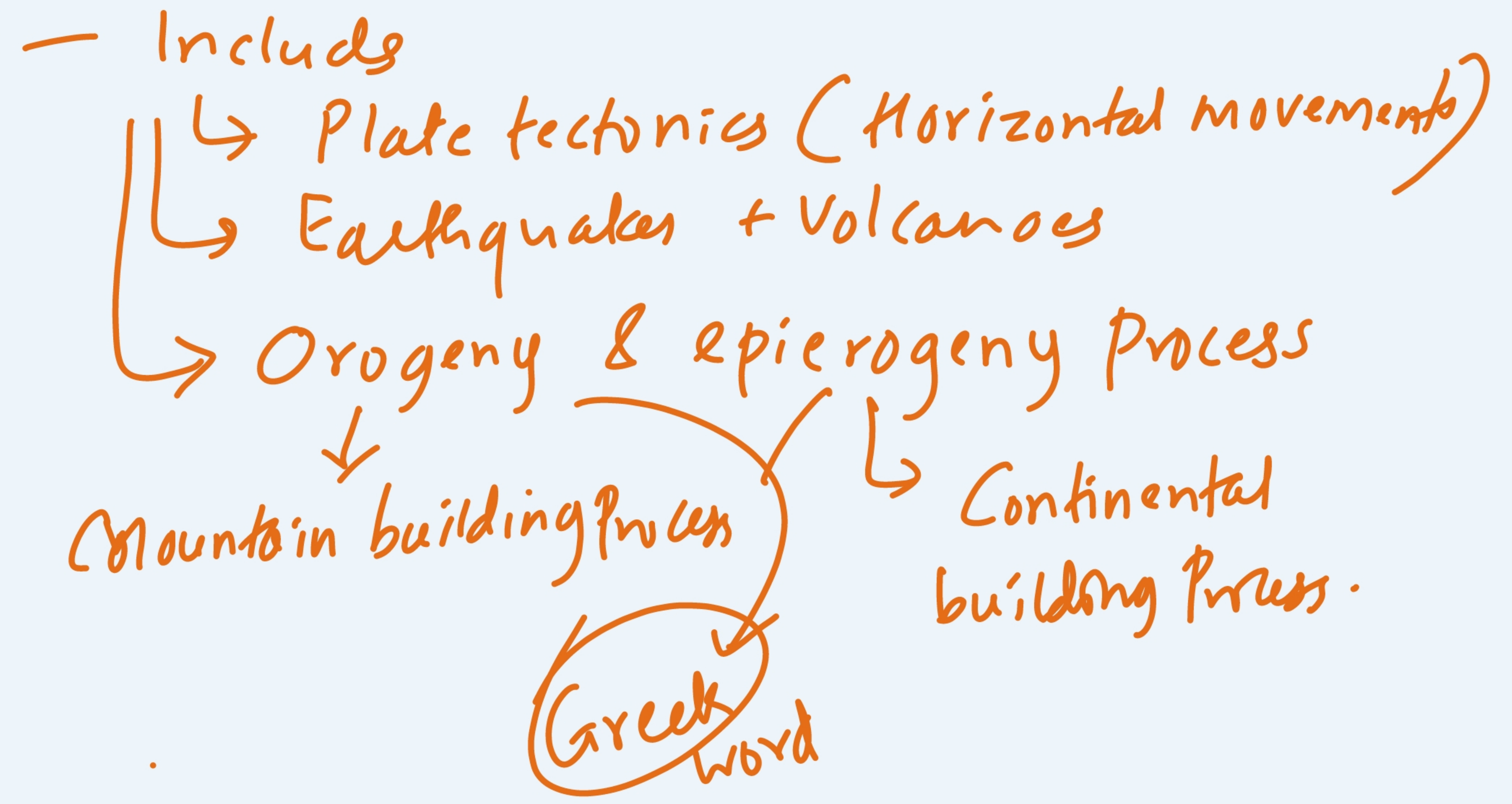
Shadow zone

Earthquakes

↳ Caused due to
Internal forces
(Endogenic forces)
Geomorphic process.

→ Earthquake -
Catastrophic sudden event
→ Earthquake related with
"Diastrophism" process.

diastrophism → All the Processes
which moves, elevate or build up
the earth portions (crust)



Earthquakes

define: →

- abrupt shaking & trembling of the Earth crust.
- all natural earthquakes happens inside the Earth.
- Sudden displacement of Earth crust (rocks) along the fault (lines)

- Earthquake release energy waves called "Seismic waves" in all directions inside the earth

- The term - seismos
Seismology: Scientific study of E and related phenomenon.
↓
Greek word

- Paleo = Old
Paleoseismology
• Study of ancient E

Earthquakes



Caused due to readjustment of stress-strain energy which is accumulated beneath the earth rock structure.

- Earthquake Related with Plate boundaries (80%) (Inter-Plate)

Intra-Plate boundaries

- Earthquakes located mainly in weaker portions of Earth (Unstable region) & ~~Isostatic~~ (so stacially weak area).

Ex

Himalayas
The NE India
A & N Is.

Bhuj area (N-Guj)

Sopra - Kashmir (Sohra)

Kangra - HP

Chamoli - Uttk

Dumra - N. Bihar

(Clarence Dutton)

Isostasy

ISO = Equal
stacy = balance

Key Principle in Geology

it is related with

"vertical movements
of the Earth".

• Basically Balancing
Mechanism

• Ex Lithosphere floats
over asthenosphere

• SIAL floats ^{over} SIMA

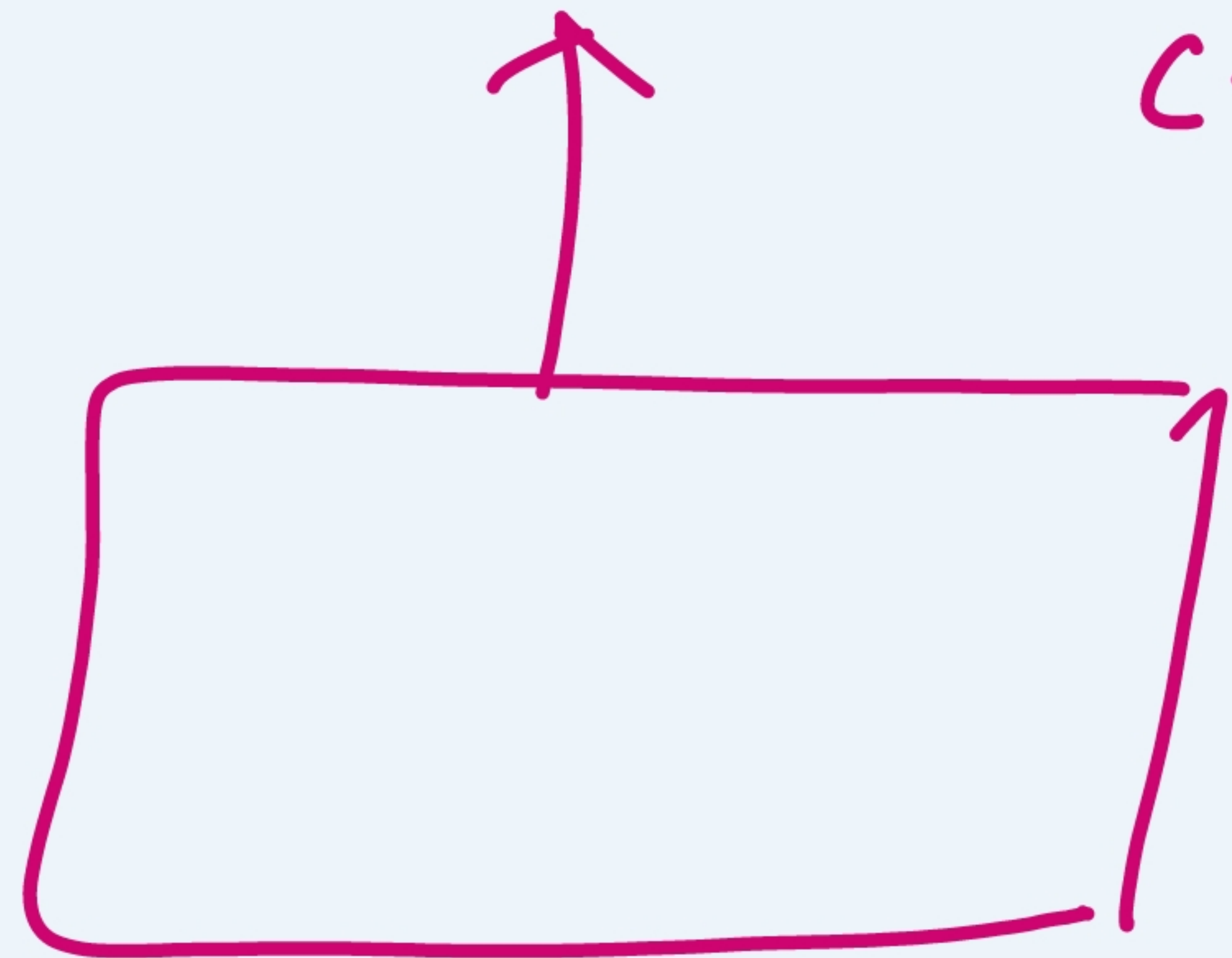
define → is mechanical balance between
or gravitational equilibrium between
Crust & mantle.

addition of mass on the landform or E. crust



Crustal subsidence

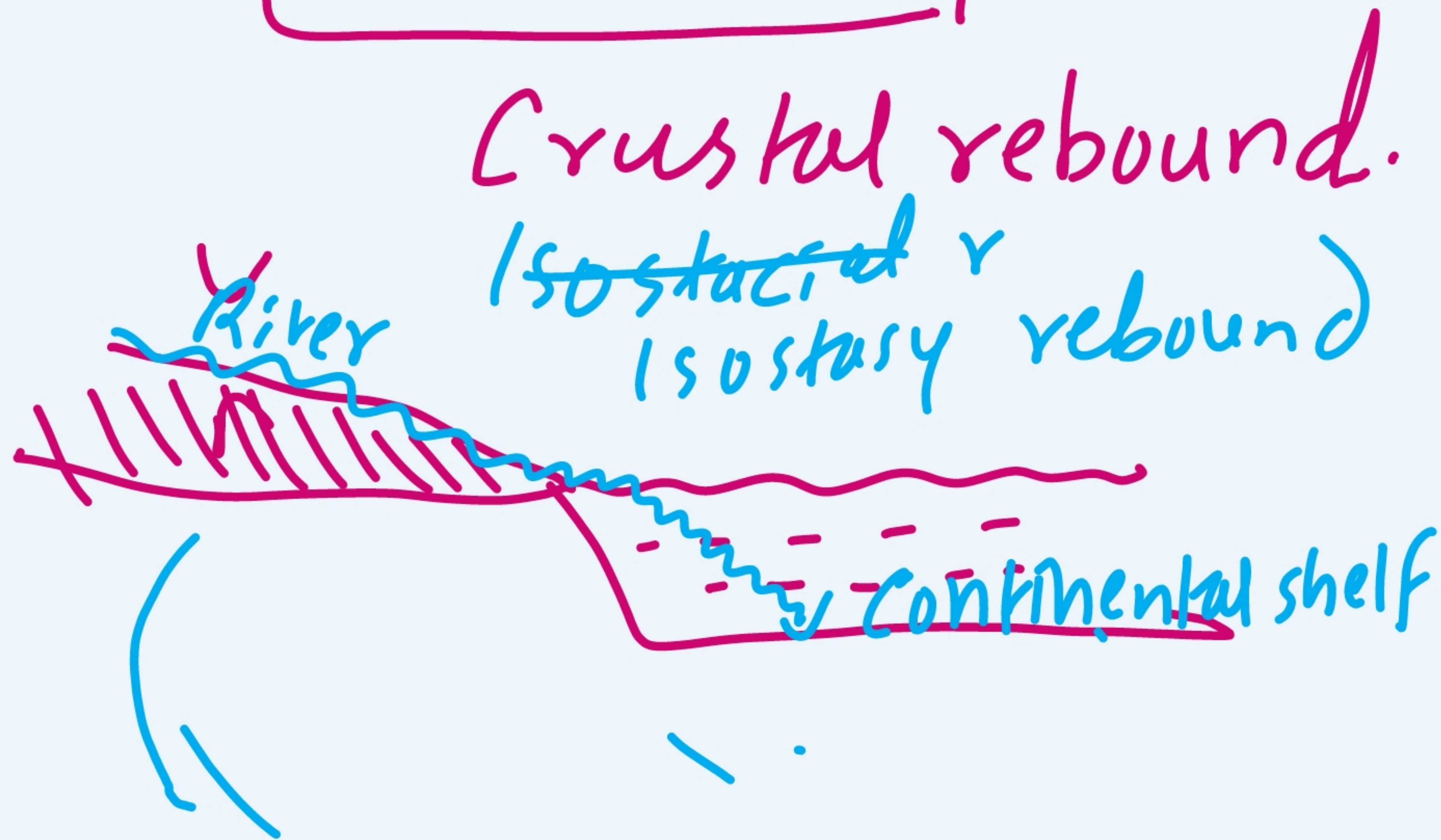
Indian Peninsula: North Himalayas
Isostatically stable : Isostatically weak
removal of mass on Earth crust
Unstable



glacier melting / Thawing



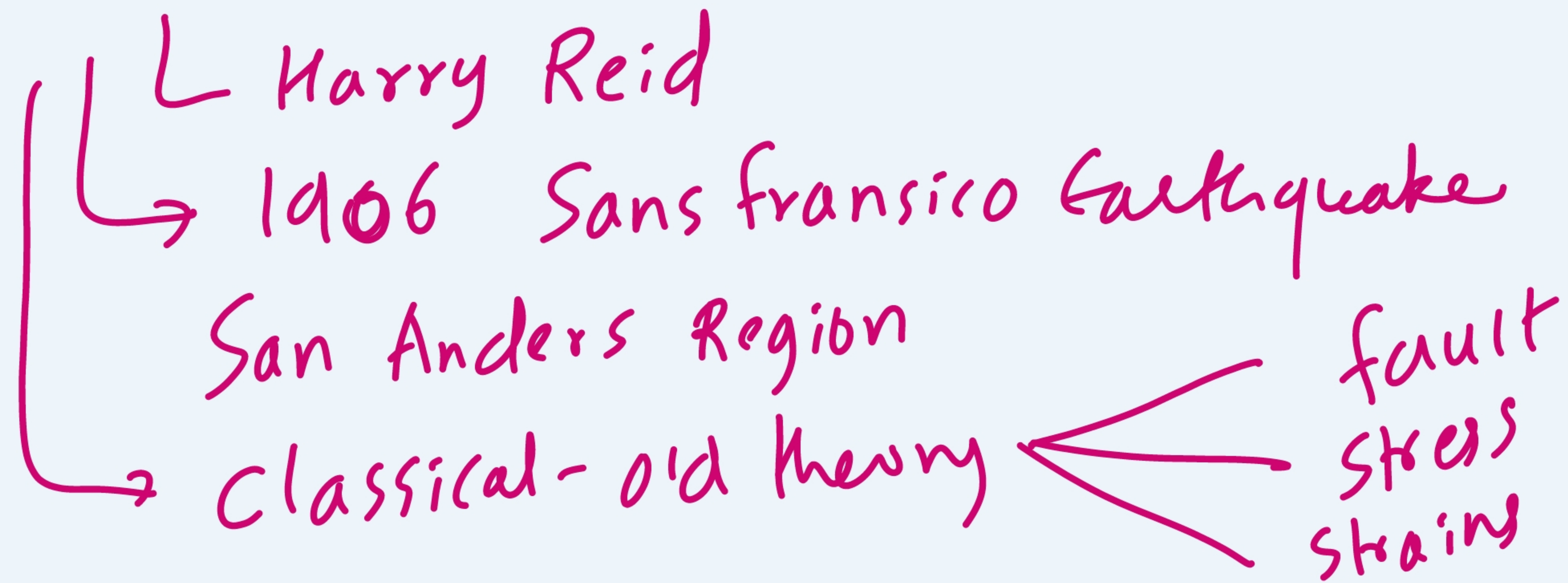
Crustal rebound



• Earthquakes & Plate tectonics Theory.

• Theories of Earthquakes

① Reid : Elastic rebound Theory



PTT




↳ Proved Earthquakes Pattern

↳ Intraplate & ~~Inter~~ Interplate ~~plate~~ Boundary
↳ 80%.

→ modern theory to explain Earthquakes

→ all tectonic plate types relevant to Earthquakes.

Acc to PTT . fault: sharp break in earth crust (rock)
 Theory dip: Angle of fault

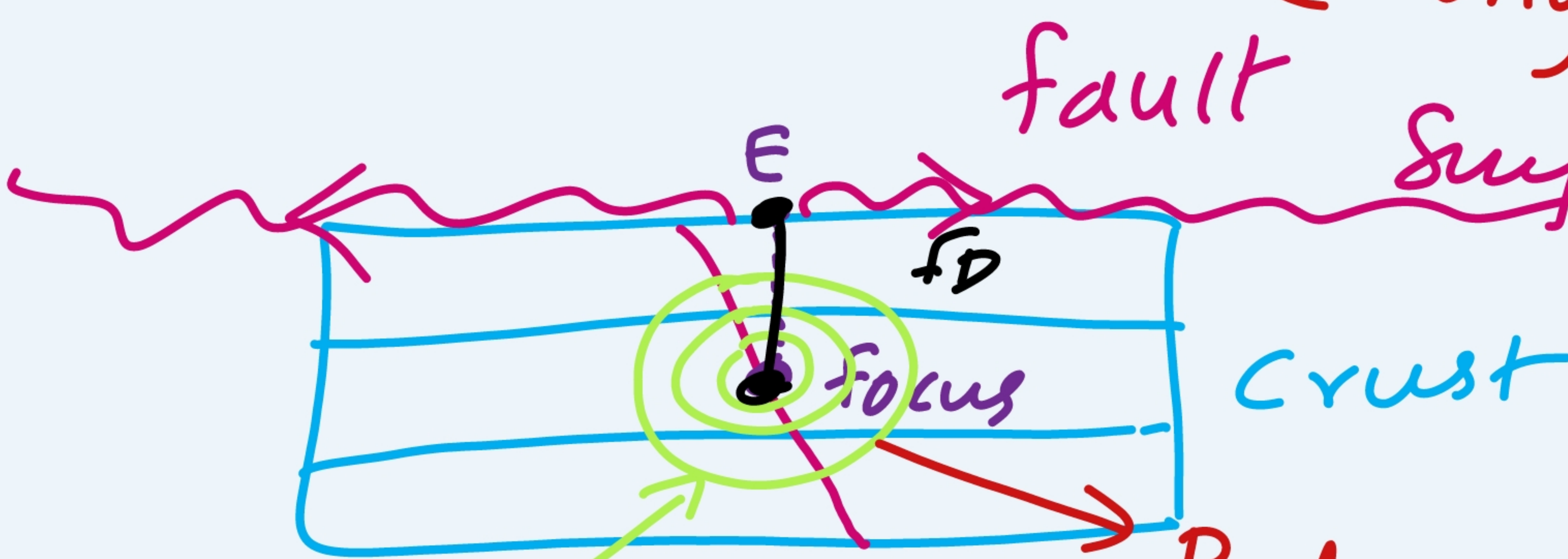
Types	Convergent plate	Divergent plate	Transform plate
Pattern			
activity	Lithosphere is destroyed	Lithosphere is created	Lithosphere neither created nor destroyed
fault	Reverse fault Thrust fault (dip slip) vertical	Normal fault (dip slip) vertical	Strike-slip fault Strike = Horizontal = lateral
Stress	Compressional stress	Tensional stress	Shear stress
Earthquake	Subduction zone volcano ✓	Spreading zone volcano ✓	Conservation zone volcano (X)

Keywords

L-wave - Long Wavelength - Freq low

(Long waves)

focal depth = vertical distance between focus to Epicentre



Rupture zone
fracture zone

High freq
wavelength less

• Seismic waves release in all dimension (3D)

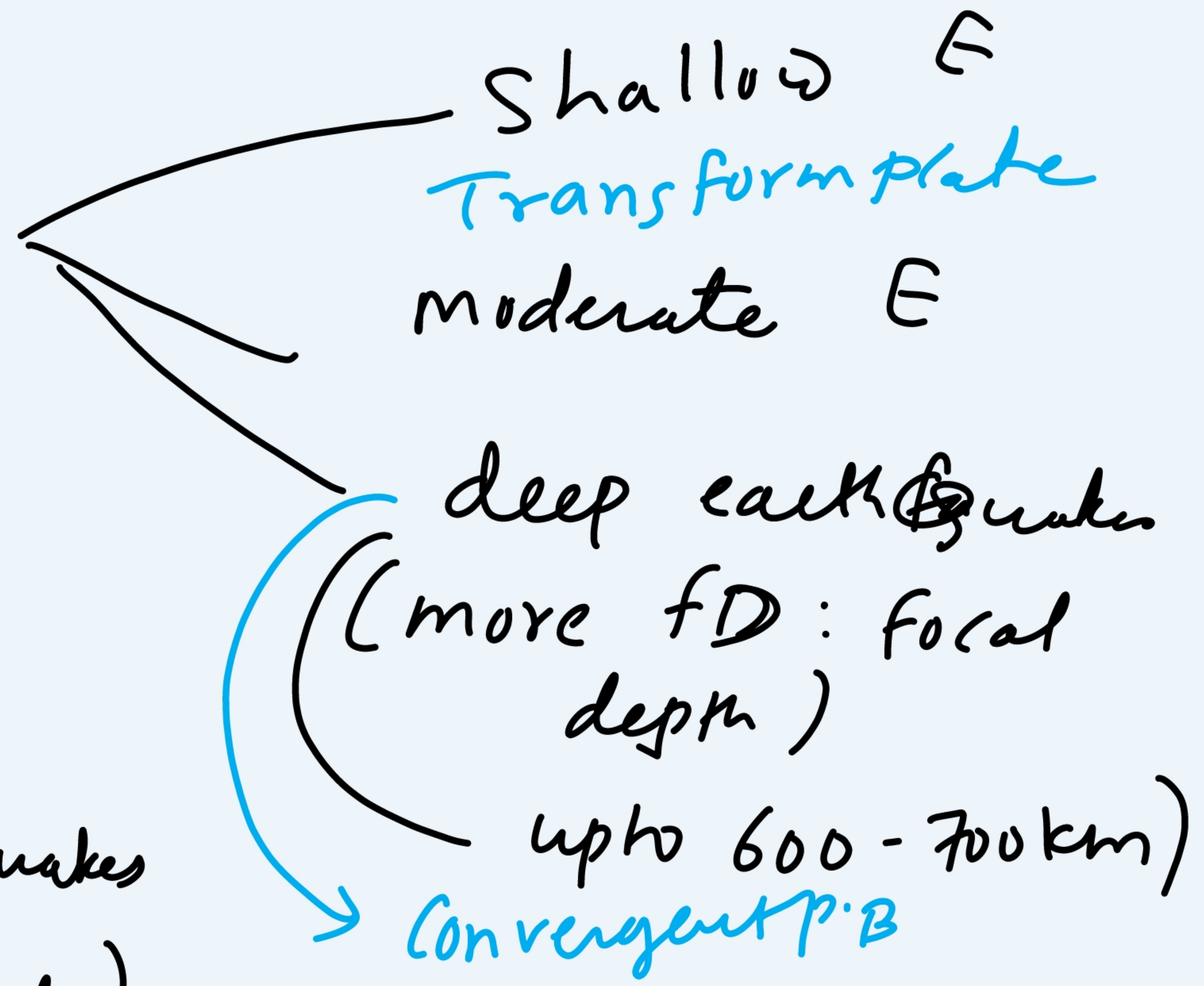
• Inside the Earth

focus
hypocentre

Epicentre (on the Earth surface)
2D - dimension
(Latitude - longitude)

Earthquakes
classification

→ depth



Magnitude

Micro earthquake
2 and less than
2 Richter
Scale.

Slight

Moderate

Megaequakes
(7⁺ magnitude)

7⁺: Tsunami (Japanese Harbour ~~wave~~
wave)

ⓔ

Types

Nuclear blast, Explosion

Volcanic Earthquake

Aspect to measure Earthquakes
Scale

Magnitude

↳ Earthquake Size

↳ 1935, Charles Richter Scale

↳ Logarithmic scale (1-10)

↳ Seismograph (based)

~~In 1962, moment magnitude scale~~
moment magnitude scale

Tectonic Earthquakes

↳ plate movements

Collapse Earthquakes

↳ mining & Quarrying

Reservoir Induced (Seismicity)

↳ dams

Ex Koyana dam

Largest artificial lake of India

~~Govind Ballabh Pant Sagar - Rihand River - Rihand dam (UP-MP)~~
Govind Ballabh Pant Sagar - Rihand River - Rihand dam (UP-MP)

Earthquake



~~Inter~~

Intensity Scale

→ Surface waves (Long waves)

↳ focus: damage & property, Livelihoods
Impact

↳ Based on "observation".

→ ① Rossi-forel Scale

② Mercalli Scale - Modified Mercalli scale (M-m-scale)

③ MSK-64 - Megaequakes ← measure
Medvedev & Sponheuer - Karnik