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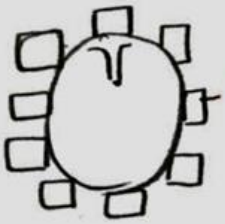
18/Sep/24

Geography Foundation

Geomorphology

12:00 - 2:30 | Lec 13

Origin & Evolution of Earth's Crust



V.V.V Mafic $\xrightarrow{P.M}$ V.V Mafic $\xrightarrow{P.M}$ Very Mafic $\xrightarrow{P.M}$

Mafic $\longrightarrow$ Basaltic formation $\longrightarrow$ Oceanic Crust

[PM = Partial Melting]

- Origin & evolution of earth's crust has witnessed diff. stages in its development :-

Stage I - Thin delicate crust formed from ancient nebular (its composition must have been very diff. from crust we have today

Stage II - Because of NO atmosphere, crust

must have been impacted by Meteorites that must have sets of Mantle convection cells & numerous episodes of volcanism [Catastrophic Theory of origin of the Crust]

[The Mantle & Interiors of Earth must have been far more hotter & fluid than what we have today]

Stage III - The volcanic eruption must have been associated with extremely Mafic rock which must have been very very dense ∴ pulled back into Mantle by the convection cells

Stage IV - There must have been series of cycles of eruptions, subduction & partial melting to create the first Ocean Basalts like those of today

...t Ocean Crust.

of today

* This is the formation of 1st Ocean Crust.

Stage V - The Ocean Crust must have again subducted, undergone P.M to form 1st Micro Continent of Andaman Composition. [1st Continent formation]

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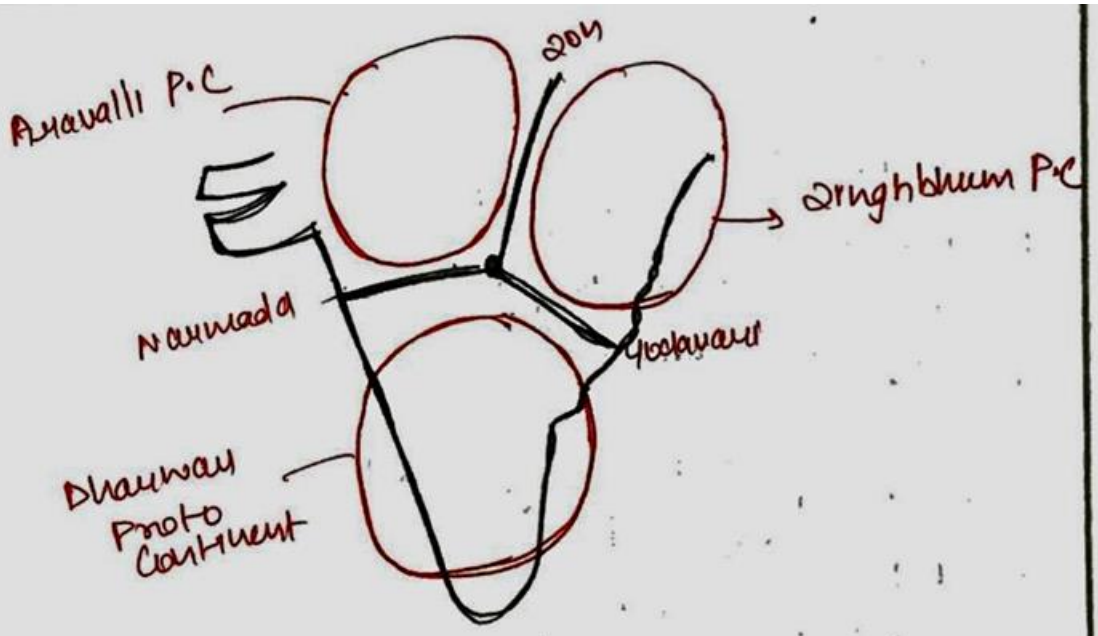
Stage VI - Once the Continent Crust are formed they are lighter & moved on surface of earth with convection cells but will never subduct

Stage VII - Micro Continent can collide and can fuse into large continent (India's old Peninsular block is a remnant of 3 Proto continents - Dharwar Proto Continent, Singbhum and Aravalli Proto Continent)



Stage VIII :- Numerous such collision must have formed larger continents & eventually super continent which must have broken numerous times & must

• Paleozoic formation of Pangea I & Wegener's super continent referred to as Pangea. This phase of super continent formation is associated with Caledonian & Hercynian Mt. building

Reference - Pg 128 (Geomorphology by Savindra Singh)

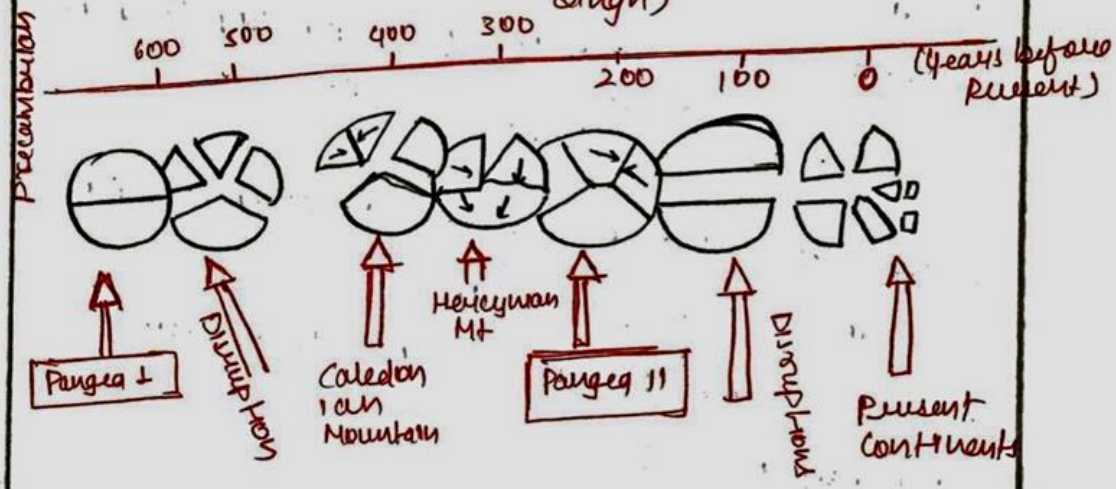


Fig Continental movement during last 700 million years

• Presently our earth is in phase of a consolidation & formation of fold mountain. This present phase is part of continuation of Tethyan mountain building phase that

includes Mountains like Himalayas, Rockies, Alps, Rockies & the extensive Tertiary Eurasian Mountain System.

- By about 130-150 My from now, we will have another Supercontinent
- This is how Continental evolution happen, Continents form and grow, Ocean get recycled, destroyed & again recreated.

- Because of Oceans getting recycled, nowhere do we have Oceans older than Mesozoic times. but Continents once formed donot get destroyed, so the oldest rocks found today are continental rocks which are old, metamorphosed part of ancient craton.