A Unified Model of Convergence and Rifting of Indian Cratons: A Proterozoic Plate Tectonics Model as Part of Columbian and Grenville Connections- Geophysical Constraints

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Neo Archean and Proterozoic sutures and collision zones are identified in the Indian Peninsular Shield based on high seismic velocity, gravity highs and high conductivity due to thrusted high density lower crustal rocks and subducted side by gravity lows due to crustal thickening. Some of them appear to form triple junctions. Based on these criteria, the shear zone- Kolar Schist Belt between the Western Dharwar Craton (WDC) and the Eastern Dharwar Craton (EDC) and the transition zone- Moyar Bhavani shear zone between the WDC and the EDC and the SGT have been identified as Neo Archean- Paleo Proterozoic suture separated by ~120^0 that characterizes present day stable triple junctions.

The second case belonging to Meso Proterozoic period is related to the collision of the Bundelkhand craton, the Bhandara-Bastar craton (BBC) and the Dharwar craton in Central India towards the north, SE and the SW across the Satpura Mobile Belt (SMB) and the Godavari Proterozoic Belt due to N-S and NE-SW convergence, respectively forming a stable triple junction at ~120^0. A similar Meso Proterozoic convergence has also been proposed across the Aravalli Delhi Mobile Belt (ADMB) with E-W convergence between the Bundelkhand craton and Rajasthan block towards the west. It is connected to the SMB in the western part forming an arcuate shaped collision zone. A prior phase of rifting during Paleo-Meso Proterozoic period (~2.0–1.6 Ga) along the SMB, the ADMB and the GPB are also identified that gave rise to large scale contemporary intrusive and basins. Simultaneous N-S and E-W directed convergences in the two cases suggest NE-SW directed primary stress that is supported by NW-SE oriented large lineaments in the peninsular shield.

The Eastern Ghat Mobile Belt (EGMB) also shows signatures of NE-SW to E-W directed Meso Proterozoic (~1.5-1.0 Ga) convergence with East Antarctica. This convergence was preceded by Paleo-Meso Proterozoic rifting (~2.0-1.6 Ga) that gave rise to contemporary intrusion and basins west of it. During the rifting phase, large scale igneous activity of ~1.9 Ga might be related to plume that may be responsible for the break up of Indian cratons and contemporary Columbian agglomeration in this section. This study suggests NE-SW directed convergence between the Indian Peninsular shield and East Antarctica during Meso Proterozoic period that was responsible for convergence of Indian cratons and an extensional phase prior to it.

Key words**:** Indian shield, convergence, suture, triple junction and geophysical anomaly