

## ABSTRACT

Two Proterozoic orogens, e.g. the N/NNE-striking Aravalli Delhi Fold Belt (ADFB) and the E-striking Central Indian Tectonic Zone (CITZ) converge at the Godhra-Chhota Udepur (GC) sector. In this study, the results of analyses of mesoscale structures, LA-ICP-MS U-Pb zircon and EPMA monazite chemical dating, whole rock major and trace element geochemistry, bulk rock Sr-Nd isotope ratios and metamorphic phase equilibria calculations in high-grade anatectic gneisses, foliated granitoids and allochthonous low-grade supracrustal rocks demonstrate that the sector is the zone of Early Neoproterozoic accretion between ADFB and CITZ orogens.

The convergence associated with N-S shortening involved south-directed overthrusting (D2) followed by wrench-dominated deformation (D3) that induced nucleation of steep-dipping, left-lateral transpressional shear zones that truncated thrust-related structures. Emplacement of 0.95–0.93 Ga post-D2 to syn-D3 granitoids is contemporaneous with the accretion. The weakly-peraluminous granitoids having LREE-enriched, moderately-fractionated REE patterns, variable negative Eu anomalies and whole rock values of  $^{87}\text{Sr}/^{86}\text{Sr}$  (0.7185–0.7910) and  $\epsilon_{\text{Nd}(0)}$  (-23.9 to -31.2) are derived from sedimentary (dominantly meta-greywacke) precursors.

In South-GC, U-Pb zircon in the CITZ gneisses yields upper intercept/Concordia dates at 1.65–1.60 Ga for pre-D2 granulite facies metamorphism along a clockwise P-T path. The lower intercept/Concordia dates coincide with the emplacement of the 0.95–0.93 Ga granitoids. By contrast, the Early Neoproterozoic (~0.95 Ga) chlorite + phengite (Si up to 3.25 apfu) schists in the supracrustal unit in the overthrust zone, intruded by the granitoids, evolved along a high-P, low-T clockwise path with peak P-T conditions at 10–12 kbar, 450–550 °C, and decompression manifested by syn-to post-D3 phengite-poor micas (Si up to 3.05 apfu).

The pre-D2 granitoids in North-GC yield Late Neoproterozoic (2.5 Ga) Concordia/upper intercept emplacement ages, identical to the emplacement age of the Archean granites in the ADFB; the lower intercept/Concordia age is 0.95–0.93 Ga. The 2.5 Ga granites did not experience the 1.65–1.60 Ga high-grade metamorphism in the

basement gneisses, but both the lithodemic units shared the 0.95–0.93 Ga deformation, metamorphism granitoid emplacement events. At 1.03–0.93 Ga the accretion of the ~2.5 Ga ADFB granitoids and the 1.65–1.60 Ga CITZ gneisses occurred; the accretion possibly involved a reversal in the polarity of subduction from N-directed to S-directed. [350 words]

**Keywords:** *Aravalli-Delhi Fold Belt, ADFB; Central Indian Tectonic Zone, CITZ; Archean foliated granites; anatectic Paleoproterozoic gneisses; high-T, low-P granulite facies metamorphism; allochthonous supracrustal rocks; low-T, high-P metamorphism; Early Neoproterozoic accretion, syn-collisional granitoids*