

Crustal Development in the Dharwar Craton of Southern India

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Dharwar craton consists of Eastern and Western Blocks separated by a transpressional shear zone parallel to Closepet Granite. The Western Block exposes "schist belts" of Dharwar Supergroup representing ascending sequences of rifted margin, shelf and offshore. The dominant volcanics are tholeiites showing marginal basin chemistry. Rb-Sr and Sm-Nd ages of basalts, zircon ages of felsic volcanics and Rb-Sr ages of younger granites define the age bracket of the belts at 2600-2800 Ma. The basement TTG suite (Peninsular Gneiss) is extensively dated at 3000 Ma with vestiges of 3300 Ma.

The basement encloses ancient supracrustals of Sargur Group defining U-Pb and Sm-Nd ages of 3000-3300 Ma. The Eastern Block is dominated by volcanic belts (greenstone belts) rich in gold mineralisation. These have ages similar to that of the schist belts. These belts are engulfed by younger TTG gneisses and voluminous granitoids which have Rb-Sr and zircon ages of 2500-2600 Ma.

The two blocks of the craton share several common features. The supracrustals occur as sub-parallel arcuate belts, conforming to the regional N-S grain. Their structural evolution is also similar. Their western margins are modified depositional contacts, while the eastern margins are tectonised. They have a common metamorphic gradient to the south, with medium pressures in the west and low pressures corresponding to younger granite plutonism in the east. These features suggest a common pattern of evolution with regional compressive forces acting from northeast towards south and west.

Broadly the Western Block has marginal basin features while the Eastern Block resembles continental arc. Their similarity of development is consistent with a model of mini-plates created by the opening and closing of several parallel rifts with easterly subduction. The higher thermal budget in the east may be attributed to possible basaltic underplating.