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STRUCTURAL PATTERNS IN HIGH GRADE TERRAIN
IN PARTS OF TAMIL NADU AND KARNATAKA

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Detailed geological mapping in parts of Tamil Nadu and Karnataka has brought out vast areas occupied by highly deformed charnockite and high grade gneisses. These areas, similar to high grade shield terrains in other parts of the world have the impress of extensive tectonic reworking multideformation and polymetamorphism and are closely associated with layered ultramafics, "shelf type" sediments and different igneous events.

In North Arcot and Dharmapuri districts of Tamil Nadu and Kollegal taluk in Mysore district in Karnataka, charnockite is intensely folded with a supracrustal succession of layered ultramafics, pyroxene granulite, pink granulites, magnetite quartzite and khondalites. These areas have undergone five phases of deformation, five generations of basic dyke activities, four phases of migmatization and two periods of metallogeny. Geochronological data ranges from 2900 m.y. to 750 m.y.

In working out the tectanostratigraphy of the above areas the basic dykes of different generations have served as major "time marker". In addition, the persistent strike continuity of linear bands of pyroxene granulite, pink granulite and magnetite quartzite has been of great utility in using them as "structural markers" for bringing out the complex structural history in these areas.

The regional 'F₁' folds are isoclinal asymmetrical with NNE-SSW axial trace, in which charnockite (2600 m.y.) and the supracrustals together with 'M₁' and 'M₂' migmatite and norite sills (d₁) are involved. ENE-WSW aligned open symmetrical 'F₂' folds affect the 'M₃' migmatites, Gingee granite (2450 m.y.) and (d₂) dykes. Thus 'd₂' dykes separate the granulite facies and amphibolite facies rocks. WNW-ESE trending 'd₃' dykes (2100 m.y.) transect both the granulites and amphibolite facies rocks but are faulted, sheared and saussuritized by N-S trending asymmetrical shear folds. The major N-S shears filled with mylonite, phyllonite, cataclasite and flaser rocks are related to this deformation. Regional warps on WNW-ESE axis mark the 'F₄' deformation and its interference with earlier folds has resulted in development of prominent structural basins and domes. Swarms of E-W and N-S trending pre Cuddapah dykes (pre 1700 m.y.) (d₄) mark the period of cratonisation and crustal fracturing. NNE-SSW aligned 'F₅' shear folds

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coaxial with 'F₁' folds caused extensive crustal fracturing and development of regional zones of shearing, mylonitisation etc. Synkinematic with this deformation, emplacement of alkali syenite-ultramafics and carbonatite (750 m.y.) took place. Regional retrogression of granulites and amphibolite facies rocks ensued due to fenitisation. Tinguaitite, phonolite, trachyte and lamprophyre dykes (d₅) were emplaced across the alkali syenite, fenitised gneiss and granulites.