



Field and Microstructure Study of Transpressive Jogdadi shear zone near Ambaji, Aravalli- Delhi Mobile Belt, NW India and its tectonic implication on the exhumation of granulites.

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Aravalli- Delhi mobile belt is situated in the northwestern part of Indian shield. It comprises tectono- magmatic histories from Archean to Neoproterozoic age. It possesses three tectono- magmatic metamorphic belts namely Bhilwara Supergroup (3000 Ma), Aravalli Supergroup (1800 Ma) and Delhi Supergroup (1100 -750Ma). The Delhi Supergroup is divided in two parts North Delhi and South Delhi; North Delhi (1100 Ma to 850 Ma) is older than South Delhi (850 Ma to 750 Ma). The study area falls in the South Delhi terrane; BKSK granulites are the major unit in this terrane. BKSK granulites comprise gabbro- norite-basic granulite, pelitic granulite, calcareous granulite and occur within the surrounding of low grade rocks as meta- rhyolite, quartzite, mica schist and amphibolites. The high grade and low grade terranes share a sheared margin. Granulites have undergone three phases of folding, intruded by three phases of granites and traversed by many shear zones. One of the shear zones is Jogdadi shear zone which consists of granitic mylonites and other sheared rocks.

Jogdadi shear zone carries the evidence of both ductile as well as brittle shearing. It strikes NW– SE; the mylonitic foliation dip moderately to SW or NE and stretching lineations are oblique towards SE. The shear zone is folded and gabbro- norite – basic granulite occurs at the core. One limb of fold passes over coarse grained granite while other limb occurs over gabbro- norite- basic granulite. Presence of mylonitic foliation, asymmetric folding, S-C fabrics, porphyroclasts, mica fishes and book shelf- gliding are indicative of ductile deformation. Most of the porphyroclasts are sigmoidal and delta types but there are also some theta and phi type porphyroclasts. Book shelf-gliding structures are at low angle to the C plane. The shear zone successively shows protomylonite, mylonite and ultramylonites from margin to the centre. As the mylonitization increases recrystallized quartz grains appear. Porphyroclasts reduces in proportion and size. S fabric makes 13°- 40° angle with C-plane. From shear fabric NW oblique vergence has been interpreted. The Rigid Grain Net analysis of porphyroclast suggests mean kinematic vorticity number (W_m) range from 0.40 to 0.82. It suggests that this is transpressive shear zone. The mineral assemblages namely Qtz+ K- Flds+ Grt+ Bt in granite and Pla+ Hbl+ Bt in basic granulites suggests amphibolite facies of metamorphism during mylonitisation.

Thus the exhumation of granulites is primarily accomplished through several parallel thrusts with Jogdadi shear zone which are transpressive in nature. Subsequently extensional condition and normal faulting have removed the cover rocks.