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Structure and geochronology of Sargur schist belt, Western Dharwar Craton, southern India

Madhusmita Swain and Sukumari Rekha

National Institute of Technology, Rourkela, Department of Earth and Atmospheric Sciences, India

The Sargur schist belt (SSB) - one of the oldest supracrustal belt (>3.4 Ga) - occurs as discontinuous band along the south-eastern part of Western Dharwar Craton of Indian peninsula. It is a 320 km long belt present in form of lenses, sheets, enclaves, pockets, patches and disrupted layers within the peninsular gneisses, tectonically interleaved, deformed and metamorphosed together with the associated supracrustal rocks (Janardhan et al., 1978; Srikantappa et al., 1984, 1985; Bidyananda and Mitra, 2005; Jayananda et al., 2008). The SSB shows a wide variation in lithology ranging from metapelites, metamafites, metaultramafites, quartzites, calc-silicates etc. with a varying metamorphic grade from greenschist to granulite facies. The major rock types in the study area include garnet-biotite±muscovite±staurolite schist, talc-tremolite-chlorite schist, banded magnetite quartzite, micaceous quartzite, hornblende-biotite±garnet gneiss, amphibolite schist, pyroxene granulites, foliated/deformed granite etc. The fabric in schistose rocks is mainly defined by the shape preferred aggregates of biotite-muscovite (in metapelites) and tremolite-talc-chlorite/amphibole (in metamafites/ultramafites). Whereas the gneissic fabric is defined by the quartzo-feldspathic rich leucocratic layers and biotite-garnet-amphibole-pyroxene rich melanocratic layers.

In the northern part, the SSB trends roughly N-S but towards the southern part the fabric orientation changes to E-W, whereas the dip is nearly vertical through-out the belt. The belt has undergone at least three phases of deformations. In the northern part the most penetrative fabric is a crenulation cleavage S_1 . The S_1 fabric describes open asymmetric folds having sub-vertical N-S and NNE-SSW axial plane (S_2). The F_2 fold plunges gentle to moderately towards NNE to SSW. A set of E-W trending shears (S_3) truncating the S_2 axial zones are zonally developed. In the southern part, as the E-W trending Moyar shear zone approaches, the early fabrics are obliterated or brought into parallelism with the E-W trending penetrative S_3 fabric. U-Th-total Pb dating of texturally controlled metamorphic monazites have yielded mainly two different age peaks at 2.2-2.3Ga and 2.4-2.5Ga with few older ages of ~2.7Ga ages along the northern part while the sample from the southern part (near to the E-W trending Moyar shear zone) gave younger ages ranging from 700-850 Ma and 500-600 Ma.

From the integration of structural and chronological data the D_2 deformation corresponds to the E-W shortening during the East and West Dharwar Craton accretion is syn- to post-tectonic with respect to the 2.4-2.6 Ga monazite growth. The 700-850 Ma and 500-600 Ma monazite growths

post-tectonic with respect to the D_3 deformation indicates that the Neoproterozoic accretionary events affected the whole Southern Granulite Terrain and recrystallize the monazites present in the Moyar shear zone.