

Structure and Geochronology of the Wayanad Schist Belt, Western Dharwar Craton, Southern India

Madhusmita Swain^{1*} and S Rekha¹

¹Department of Earth and Atmospheric Sciences, National Institute of Technology Rourkela, India – 769008

*Corresponding author

The Wayanad Schist Belt (WSB) located along the southern margin of the Western Dharwar Craton (WDC) is a small discontinuous schistose belt occur as pockets and patches within basement gneisses. WSB is oriented parallel to the E-W trending Moyar Shear Zone (MSZ) separating the WDC and Southern Granulite Terrane (SGT). The major rock types include metapelitic schists, metamafic schists, banded magnetite quartzite, pyroxene granulite, amphibolite, metapyroxenite, mylonite, hornblende-biotite schist/gneiss, micaceous quartzite etc. The fabrics in schistose rocks are defined mostly by the orientation of shape-preferred aggregates of biotite-chlorite-muscovite-sillimanite (in metapelites) and tremolite-talc-chlorite \pm actinolite (in metamafites). Whereas the gneissic fabric is defined by the quartz-plagioclase rich leucocratic layers and biotite-garnet-amphibole-pyroxene rich melanocratic layers.

The WSB has undergone at least three phases of deformation. The most prominent fabric in WSB is the E-W to ESE-WNW trending sub-vertical foliations developed during the D₃ deformation. Poles to the steep-dipping S₃ foliations are WNW-ESE trending and the F₃ folds are steeply plunging in nature. At the low strain domains of D₃ deformation the early foliations are preserved. The N-S to NNW-SSE trending sub-vertical S₂ fabric developed axial planar to moderately tight to open (F₂) folds during D₂ deformation. The early S₁ foliations are rarely preserved in the interfolial domains of S₂ foliation. In the regional scale, the poles to S₁ fabrics lie on a well-defined girdle with NE-SW trending upright asymmetric folds. The U-Th-total Pb dating of texturally controlled monazites from WSB has yielded prominent age populations at around 700-850 Ma and 500-600 Ma with minor age peaks at 2.2-2.3 Ga, 2.4-2.6 Ga.

The structural and chronological data suggest that, the deformation events in WSB are similar to that reported from the WDC. However, the D₃ deformation is more prominent and all the earlier fabrics are truncated or brought into parallelism with the S₃ fabric during D₃ deformation. The 700-850 Ma and 500-600 Ma monazite growths post-tectonic with respect to the D₃ deformation indicates that the Neoproterozoic accretionary events affected the whole SGT must have recrystallized the monazites present in the MSZ.