チトラドゥルガ剪断帯の構造発達過程；ダルワール地塊のテクトニクスに対するいくつかの新たな視点

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Evolution of Chitradurga Shear Zone; Some insights to the current interpretations in the tectonic context of Dharwar Craton, South India

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Here we present some insights to the current interpretations of the evolution of Chitradurga Shear Zone in the tectonic context of Dharwar Craton, South India. The Chitradurga Shear Zone (CSZ) forms a regional array of NS to NNW-SSE trending transcurrent shears, which separates Dharwar Craton into two, Western Dharwar Craton (WDC) and Eastern Dharwar Craton (EDC) (Chadwick et al., 2000; Jayananda et al., 2006; Chardon et al., 2008, 2011). The evolution of CSZ is highly debatable among the authors in the Tectonic Context of Dharwar Craton. Our study area situated within the CSZ in the east of Hiriyur town. The area exposes four major rock types from east to west; gneissose granites, amphibolites, metabasalts and metagreywackes with a general trend of NNW-SSE (Nasheeth et al., 2012). Both foliation and lineations of all the litho-units are similar. High intensive deformation along the boundary between amphibolites and metabasalts suggest that the shearing took place along this boundary. Presence of less deformed amphibolites away from the boundary indicates shearing might be taken place after the formation of amphibolites in the study area.

SHRIMP U-Pb Geochronology of zircons was carried out for three gneissose granites and two metagreywackes. Most of the detritus zircons in the metagreywackes samples show Neoarchean age of 2.64–2.61 Ga with a few older zircons of 3.21 Ga. The data suggest that the metagreywackes belongs to upper Hiriyur Formation of Dharwar Supergroup. U-Pb magmatic upper intersection ages of gneissose granite suggest two major intrusive activities in the study area; an older 3.21 Ga and a younger 2.55–2.51 Ga magmatic activity. Rejuvenation and crustal flow of granites in Eastern Dharwar Craton at 2.55 -2.51 Ga suggested in Hot Orogen model (Chardon et al., 2011) is consistent with the younger magmatism in our study area. The ages of the detritus zircons in metagraywackes correspond with those of the younger magmatism; it is likely that the protoliths of metagraywackes were derived from the younger magmatic rocks. U-Pb concordia plots for both metagreywackes and gneissose granites give a prominent lower intersection age of 650–630 Ma. We interpret that these ages indicate a tectono-thermal event along the CSZ at Neoproterozoic time, i.e. Pan-African Orogeny. Difference in the bulk Geochemistry of metabasalt and amphibolite suggest different tectonic settings for their formation. Estimated amphibolite facies metamorphic conditions are 660–840 MPa and 620–650 $^{\circ}$C. Based on our data, it is clear that all the rocks in the CSZ experienced Pan-African Orogeny in Neoproterozoic time. But the relation between Pan-African Orogeny and amphibolite facies metamorphism is not well understood. Therefore, further work is necessary to date the precise timings of amphibolite facies metamorphism.

References:

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