Geochemistry and isotope studies of the metavolcanic rocks of Shimoga greenstone belt, Western Dharwar craton - an effort to deduce the Petrogenesis.

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The archaean greenstone belts, dominated by mafic to felsic volcanic rocks followed by younger granitic intrusions occurs associated with volcano-sedimentary sequences. The Dharwar Super group (2600 to 2900 Ma) of rocks in western Dharwar craton, underlie the older TTG gneisses. The Shimoga greenstone belt (SGB) of WDC constitute the basal polymictic conglomerate along with quartzite, pyroclastic rocks, carbonaceous rocks, greywacke-argillite sequences with a thick pile of mafic and felsic metavolcanic rocks (BADR). These rocks are suffered from greenschist to lower amphibolite grade of metamorphism. The Medur metavolcanic volcanic rocks give an age of 2638 ± 66 Ma (1), whereas the Daginakatte felsic volcanic rocks give an age of 2601 ± 6 Ma (2). The present studied age of 2638 ± 66 Ma, tells about the cessation of mafic magmatism in WDC. The metavolcanic rocks of the Medur formation are tholeiitic to calc-alkaline in nature. These rocks show flat to LREE enriched REE pattern with negative europium anomaly. And also show enrichment in LILE and depletion in HFSE elements with significant Nb-Ta anomaly. The geochemical and the isotope data suggest the involvement of partial melting of the depleted mantle by the slab components and assimilation fractional crystallization (AFC) processes for the magma generation. The SGB metavolcanic rocks have 143Nd/144Nd ratios (0.511150 to .513076) and εNd values of -3.1 to -5.5 and the negative εNd values for the rocks is due to the crustal contamination of the magma in a shallow marine subduction setting. The parental magmas were derived from melting in the mantle wedge fluxed by slab derived fluids and slab components followed by assimilation fractional crystallization (AFC) processes involving continental crust in an active continental margin.

- (1) Giri et al., 2019. Lithos, 330-331, 177-193