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**Proterozoic ferroan feldspathic magmatism in Eastern Dharwar Craton;  
Constraints from the petrogenesis of Mesoproterozoic granite magmatism to  
the East of the Nallamalai Fold Belt, SE India**

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Through detailed field, petrological, mineral chemistry and geochemical studies a significant event of Proterozoic ferroan feldspathic magmatism has been demarcated in the Eastern Dharwar Craton (EDC), SE India. The Proterozoic ferroan feldspathic magmatism dealt in this work occur over a stretch of 380 km long arcuate zone disposed at the interface of two geologically important Precambrian terranes i.e. the Proterozoic Nallamalai Fold Belt (NFB) and Archaean Nellore schist belt (NSB) in EDC. This zone is characterised by emplacement of a chain of granite plutons into the metavolcano - sedimentary sequence of the NSB at its western part; close to the vicinity of a major terrane boundary i.e. the eastern margin the arcuate NFB in SE India. The granitoids referred in the present work are composed of K-feldspar (microcline microperthite), quartz and Na-plagioclase with subordinate biotite ± hornblende and riebeckite. Zircon, apatite, titanite, fluorite, allanite and Fe-Ti oxides are the accessory phases. Interestingly fluorite is observed as a conspicuous accessory mineral in the host granitoids and their late magmatic phases i.e. the aplitic and quartzo-feldspathic veins. Na-plagioclase occurs as exsolved phase in the microcline perthite in hypersolvus granitoids, while in subsolvus two feldspar granitoids Na-plagioclase is seen as discrete mineral phase. Modally these granitoids vary from granite to quartz syenite through alkali feldspar granite. Geochemical studies indicate enrichment of FeO relative to MgO; the (FeO/ (FeO + MgO) in these granites is > 0.9 indicating extreme iron enrichment; characteristic of ferroan feldspathic magmatism. These granites in general are calc-alkalic metaluminous to peraluminous. In the A/NK-A/CNK plot they are positioned at the juncture of peraluminous-metaluminous-peralkaline field. Geochemically, these are characterised by high SiO<sub>2</sub> (> 70 %), high Na<sub>2</sub>O+K<sub>2</sub>O (8 to 10%), high Zr (300-660ppm), high Y (70-340 ppm), high Rb content (180-370 ppm) and high REE contents (except Eu). EPMA studies of the mafic phases i.e. biotite and hornblende indicate the enrichment of FeO relative to MgO; the (FeO/ (FeO + MgO) contents in the aforesaid mafic minerals in these granitoids range from 0.93 to 0.97. In trace element tectonic discrimination diagram [1] a majority of these granitoids fall in within plate granite (WPG) field. Rare earth element studies reveal a general enrichment of LREE, pronounced negative Eu anomaly; flat and depleted HREE. Further, this phase of Mesoproterozoic granite magmatism along with the alkali calcic to calc alkaline granitoids and nepheline syenites of ferroan nature along the Eastern Ghat Belt [2] represents the culminatory events of growth

of the Precambrian continental crust in EDC [3]. Enriched incompatible elements along with presence of fluorite as a conspicuous accessory phase indicate that these granites are crystallized from a fluorine saturated magma and available radiometric data indicate that the age of majority of these granites range from 1120 Ma to 1590 Ma; a period that recorded abundant ferroan feldspathic magmatism globally [4].

## References

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