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Role of Multi-Generation Dyke Emplacements in Moyar-Bhavani Shear Zone, South India

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The Moyar-Bhavani Shear Zone (MBSZ) of the South Indian Granulite Terrain (SIGT), a complex continental block formed by the accretion of various crustal units during the Archaean to Neoproterozoic, bear evidences of extensive magmatic activity in terms of acidic to ultramafic intrusives (Pratheesh et al., 2013a). Mafic dyke swarms observed in the MBSZ area belong to three major emplacements (Group I, Group II and Group III dykes) with NE-SW to NW-SE trends. Among the three, Group I dykes, having a typical amphibolite to meta-gabbro/ dolerite characteristics with significant tectonic imprints, are considered as neo-Proterozoic (Radhakrishna T, 2009) . Group II and III are relatively younger dolerites and basalts with no mesoscopic tectonic imprints. Geochemical investigations exhibit subalkaline to calc-alkaline nature of the Group I dykes and sub-alkaline tholeiitic basalt/basaltic -andesite nature for the other two groups. Group I belongs to the high-Mg tholeiites while most of Group II and Group III show high-Fe tholeiitic nature. Trace element modeling recommends a depleted mantle source for the Group I and II dykes, in contrast to an evolved mantle character of Group III. Rare earth distribution in these dykes shows fractionation and possible crustal contamination as well as probable elemental mobility in the presence of aqueous solution during high temperature metamorphism. Tectonic discrimination patterns indicate a MORB-CAB-IAT characteristic of Group I while Group II and Group III dykes show typical MORB with-in-plate characteristics. Over all geochemical composition of the Group III dykes are closely related with the Deccan LIP basalts and can be considered to define the extended southern margin of the Deccan (Reunion) plume boundary (Pratheesh et al., 2013b) These multiple magmatic episodes in the MBSZ dyke swarms are the significant key regarding the Paleo-Proterozoic crustal amalgamation in terms of comparable magmatic episodes from the Rodenia-Gondwana fragments.

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