

Proterozoic mafic-alkaline intrusives in the vicinity of the southern part of Cuddapah basin of south India

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Paleoproterozoic mafic dyke swarms of Tirupati–Chittor–Kadiri areas occur in the S and SW margins of Cuddapah Basin in South India. The studied syn-plutonic mafic dykes are co-magmatic with the host granite plutons and the late stage mafic intrusives show cross cutting relationship (dominantly E-W and minor N-S trends) with the basement granitoids. In addition, olivine-phlogophite-cpx bearing lamprophyre dykes are being found and reported for the first time in the NW of Kutagulla area i.e., in the central part of Archaean Kadiri greenstone belt along the eastern margin. These lamprophyre dykes occur in turn associated with differentiated pyroxenite-gabbro-diorite dyke intrusions which display wide petrological and compositional variations within the suite. The mafic dyke swarms are mostly subalkaline tholeiites which were derived from a continental arc source. They exhibit negative Ba, Nb, Sr, Zr, Hf and Ti anomalies and are enriched in Cs, Rb, U, K, Nd and Sm in the spidergram plots, suggesting their derivation from subduction modified mantle sources and contaminated during their emplacement. It is inferred that mantle wedge melting, subduction zone magmatism and mantle metasomatism have given rise to the formation of different mafic-alkaline dykes which were derived from an enriched sub-continental lithospheric mantle (SCLM) source is prevalent in the Proterozoic era in the region under study.