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Miaskitic alkaline rocks with shoshonitic affinities from the Cuddapah Intrusive Province, Southern India.

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Abstract

The alkaline rocks occurring towards the east of the eastern margin of the Cuddapah basin which belong to Proterozoic Cuddapah Intrusive Province (CIP) in the Eastern Dharwar craton (EDC) are represented by three miaskitic alkaline plutons with shoshonitic affinities, located at Elchuru, Purimetla and Uppalapadu (EPU). Nepheline syenite is the predominant litho unit in all the three plutons. Aegirine augite, amphibole, biotite, nepheline, K-feldspar are the major constituents along with accessory calcite, magnetite, ilmenite, apatite, sphene, zircon and allanite which make up all the rocks. The shoshonitic characteristics of these rocks are exhibited by high K_2O+Na_2O (>10 wt %), K_2O/Na_2O ratio (>1.5 wt %), moderate Al_2O_3 (14-22 wt %), with a low TiO_2 (0.65-2.9 wt %), peralkaline index <1.2 and an enrichment of LILE and LREE, reflect the shoshonitic affinity of EPU syenites. Major and trace elemental data indicate that the low degree partial melting of K-rich alkaline metasomatised fertile mantle source, which upon olivine fractionation yielded the melt compositionally corresponding to shonkinite, which inturn produced the feldspathoidal syenites by fractional crystallisation in the EPU complexes. The absence of Nb-Ta negative anomalies clearly elucidate the rift/ within plate rather than arc emplacement nature of the EPU intrusive complexes.

Key words: Eastern Dharwar Craton, Cuddapah Intrusive Province, Mid-Proterozoic miaskitic alkaline magma, shoshonitic affinity, rift/within plate emplacement.