

PETROLOGY AND GEOCHEMISTRY OF DOLERITE DYKES OF DHARMAPURI AND SALEM DISTRICTS OF TAMIL NADU

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ABSTRACT

Dolerite dyke sets occur distributed in the Dharmapuri and Salem districts of northern Tamil nadu. These dykes have been emplaced in the older basement composed of granulite and gneissic rocks and cut across the later formed lineament controlled alkaline complexes. They are composed of medium to coarse calcic plagioclase and clinopyroxene with biotite, amphibole, urallite, olivine, orthopyroxene, and anhedral quartz as accessories. Based on geochemical characters, the olivine bearing dykes are classed as Type I and the quartz bearing dykes as Type II. The Type I dykes resemble basalt and the Type II dykes, basaltic andesite. They display LILE > HFSE in terms of abundance. The REE values indicate enrichment of LREE relative to MREE and HREE and an E-MORB or Plume MORB signature. The geochemistry of the sampled dykes suggests derivation from a mantle plume. This plume was emplaced into the garnet lherzolite layer and subsequently into the shallower spinel lherzolite layer in the mantle. Polybaric melting of lherzolite protoliths with varying proportions of garnet and spinel occurred with subsequent fractionation to produce a source melts with E- MORB characteristics. Emplacement of these dykes was aided by crustal extension and associated fracturing to develop a dyke swarm.

Keywords: Southern granulite terrain, Dolerite dyke, Plume MORB, Geochemistry, Petrogenesis.