Geochemical signature of the Kartikulam Gabbro: A prominent mafic pluton from the Cauvery Suture Zone (CSZ), South India

PRATHEESH PRABHAKARAN AND PRASANNAKUMAR, V.

Centre for Geo-Information Science and Technology, University of Kerala, Kariavattom Campus, Thiruvananthapuram, India-695 581
e-mail: pratheeshponline@gmail.com

The Kartikulam Gabbro (KG), located on the western extension of Cauvery Suture Zone (CSZ), marks a prominent mafic intrusion in the area. Recent geological investigations have established CSZ as a major Precambrian suture resulted from a major continent collision and subduction. The present work demonstrates the geochemistry, petrology and tectonic significance of the KG pluton that have little systematic data available in the geological literature. Whole rock geochemistry advocates a sub-alkalic affinity with tholeiitic nature to this gabbro with minor quartz/Olivine normative character in certain samples. Characteristic trace element pattern in the KG samples indicate an LILE enriched and HFSE depleted pattern with negative Ba, Nb, and Zr anomaly, which common in mafic rocks of subduction zone environments. Consistent La/Nb and Zr/Nb ratios with average crustal values and high Cr and Ni values indicate the absence of crustal contamination in KG samples. Most of the tectonic discrimination diagrams also point to a MORB and OIT to IAT characteristics for this gabbroic pluton. Tectonic discrimination diagrams and other trace/REE ratio indicate an arc magmatism to subduction modified mantle source to the origin. In general the Archean subduction occurred along the CSZ prior to the Gondwana fragmentation, accounted a metasomatized magma chamber beneath the CSZ which later fractionated. The Pan-African reactivation and the remobilization of crustal fragments triggered the further emplacement in the CSZ area to result in the Kartikulam gabbro.