# Mafic Dykes of Bhavani Shear Zone, South India: Inference from geochemistry and petrology

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The shear zones of the South Indian Granulite Terrain (SIGT) have gained significant attention in global tectonics in terms of Proterozoic East Gondwana reconstruction. The structural and kinematic analyses of these constituents have already contributed a lot to understand the tectonics of palaeo-orogens, which may provide valuable information for the correlation of Gondwana fragments. For a critical appraisal of all conceptual models dealing with the tectonic evolution of SIGT, the study of the geochemical constrains, carried out so far, is not adequate. Since the Bhavani Shear Zone (BSZ) also bears evidences of extensive magmatic activity ranging from acidic to ultramafic intrusives, as multiple episodes of Precambrian mafic and ultramafic intrusions to younger basaltic dykes of Late Cretaceous origin. The present work is an attempt to discuss the characteristic geochemical and petrologic signatures of the gabbroic and associated dyke rocks which bear important relations with the timing and tectonics of amalgamation of the Gondwana supercontinent.

Dykes of the present study exclusively belong to two groups with distinct field and chemical characteristics, both the groups containing cumulus/phenocryst olivine phase. The *Group I* dykes are dominated by gabbroic rocks and the *Group II* are doleritic in origin. Tectonic discrimination and source mantle characteristics indicate that the *Group I* dykes are formed during the Proterozoic period, from a supra-subduction zone HIMU mantle with considerable amount of upper crust contamination. The *Group I* dykes exhibit characteristics of both OIB and IAT and this variation within the group indicates the possibility of multiple emplacement characteristics or mixing of preexisting mantle source during the late-Archaean or early Proterozoic period. Crustal-scale reactivation and further movements of Gondwana fragments might have mixed new batch of mantle material to the preexisting magma chamber, leading to the MORB or tholeiite source characteristics of *Group II* dykes, which were emplaced after the shear zone reactivation.