Mafic dykes in the Western Dharwar craton, southern India: A key to understanding late Archean to early Proterozoic cratonic correlations

A.S. Silpa, M. Satish-Kumar, Takahashi Toshiro

Graduate school of Science and Technology, Niigata University, Japan. (silpa@geo.sc.niigata-u.ac.jp)
Department of Geology, Faculty of Science, Niigata University, Japan.

Mafic dykes are one of the common features of the Archean cratons on earth which carries significant information regarding the composition of sub-continental lithosphere. Mafic dyke swarms are abundantly distributed in the Archean Dharwar craton. While those in the Eastern Dharwar Craton (EDC) have been studied in detail by several researchers previously [1,2,3] only very limited data is available for the dykes in the Western Dharwar craton (WDC). Current study focuses on the Tiptur dyke swarm of WDC.

Petrological studies indicate that the dykes in the Tiptur area fall into two distinct groups [4] The NW–SE trending dolerite dykes are unaltered, with characteristic ophitic textures and are geochemically comparable to oldest 2.3 Ga dykes reported in the EDC. In contrast, the NE–SW trending meta-doleritic dykes showed high degree of alteration. The difference in petrography, major, trace and rare earth element geochemistry between the dolerites and meta-dolerites lead to a preliminary inference that these two suits of rocks might not be co-genetic. Meta-dolerites have not been reported from the EDC and it is possible to assume that they are a part of an earlier event, restricted in WDC, that might have emplaced prior to the amalgamation of WDC and EDC.

Dyke swarms are the products of major magmatic events in the Earth’s history that probably was the driving force in the breaking up of supercontinents, and they provide clues regarding the cratonic evolution through time. Due to their wide distribution, geochemically coherent dykes can be found in many cratons, thus, providing key information on the close proximity of now separated supercontinents.