Anup K. Sinha and Rajesh K. Srivastava, 2016. Mafic dykes swarms from the Chhotanagpur Gneiess Complex, Singhbhum craton, eastern India. *Acta Geologica Sinica* (English Edition), 90(supp. 1): 92.

Mafic dykes swarms from the Chhotanagpur Gneiess Complex, Singhbhum craton, eastern India

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The Singhbhum craton of the eastern Indian shield consists of two major crustal provinces viz., Chotanagpur Gneissic Complex (CGC) and Singhbhum Granite Complex; separated by a Singhbhum Mobile Belt. There are a number of geological evidences suggesting that CGC is a cratonic block rather a mobile belt. A number of mafic dykes, both Mesoproterozoic and Cretaceous, are emplaced within the CGC. Field relationships reveals that E-W to WNW trending the Mesoproteozoic mafic dykes are intruded within the Precambrian basement complex, whereas NE to ENE and NNW to WNW the Cretaceous mafic dykes are mostly intruded within the Damodar valley, however some of them are also intruded the CGC too. Two Mesoproterozoic and two Cretaceous mafic dyke swarms are identified. Petrographic characters of the studied Mesoproterozoic mafic dykes classify them as metabasites and metadolerite, whereas Cretaceous mafic dykes are classified into high-Ti dolerite (HTD) and low-Ti dolerite
(LTD). Available ages on Cretaceous mafic dykes suggest their emplacement ~110-115 Ma and indicate their relation with the Kerguelen mantle plume activities. Geochemistry of the Mesoproterozoic dykes suggests their derivation from primary mantle melts. On the other hand, geochemical characteristics of the Cretaceous mafic dykes suggest that they are emplaced in an intra-cratonic rift-setting and fed from two different melts generated through plume tectonics.

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