
Provenance and Source Rocks of Precambrian Quartz Arenites of Bhopal Area, Vindhyan Basin, Central India

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Abstract

The Upper Bhandar succession of the Vindhyan Supergroup of rocks in Bhopal area, Madhya Pradesh is a repository of arenaceous rocks. Detailed studies on petrography and geochemistry of these rocks have been carried out. Presence of overgrowth textures in quartz grains with subordinate amount of orthoclase in the arenites are suggestive of granitic rocks and high grade gneisses as the source rocks and recycled orogeny of sediments, respectively. QFL plots indicate quartz arenite to quartzose arenite composition of the sandstones that belongs to recycled orogenic field. The observed variation of Th/Sc vs. Sc, La-Th-Sc and La/Sc, Th/Co, Th/Cr ratios along with higher LREE/HREE ratio (av. 9.19) and concentration levels of Zr, Ni, V and Sc suggest that these sandstones were derived from the felsic source rocks. The provenance of these arenites is the pre-existing Bundelkhand granitic complex represented by the basement rocks of Early Archaean to Meso-Proterozoic age. Recurrence of widespread orogenic activity in this source region, which was covered largely by felsic and siliceous igneous rocks including ferruginous formations, is inferred. Penecontemporaneous sedimentary structures of the arenites under study indicate marine shelf environment of their deposition.

Keywords: Provenance, Source rock, Quartz arenite, Vindhyan Supergroup, Central India.