

Malani magmatism: An extensional lithospheric tectonic origin

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ABSTRACT

The Neoproterozoic Malani igneous province (ca. 750 Ma) occupies a large area (~50,000 km²) in the northwestern Indian Shield. Magmatism there commenced with initial basaltic eruptions followed by voluminous felsic lava flows. Later granitic plutonism and terminal dike activity took place. The effusive activity, though predominantly subaerial in nature, also was partly subaqueous as indicated by conglomerate, arkose, and pillow basalts and the development of sedimentary features in the volcanics. The magmatism occurred along parallel crustal fractures that developed in an extensional tectonic regime.

Because of the large areal extent of the magmatism, several workers invoked a mantle plume model for the origin of the Malani igneous province. Geological observations suggest, however, that Malani volcanism resulted from extensional tectonics. The magmatism had an intracratonic rift setting, and a deep mantle plume is neither necessary nor viable.