

MALANI IGNEOUS SUITE OF ROCKS

The term 'Malani beds' was given by Blanford (1877) to a volcanic series of rocks in western Rajputana particularly in the Malani district of (Marwar) Jodhpur State. La Touche (1902) gave an excellent description of these rocks and according to him volcanic activity started with the outpouring of rhyolite (at places interbedded with basic flows), tuff, breccia and perlite. This was followed by intrusion of contemporaneous Siwana and Jalor granites. Dolerite dykes marked the final phase of activity. Bands of conglomerates between lava flows in many places attest to the subaerial character of the volcanics. It was Pascoe (1959) who first commented on the 'continuous ring (19 miles across from west to east, and 16 miles from north to south) pattern' of the Siwana granite bosses, and remarked 'whether the almost circular plan has any connection with the roots of a volcano'. Murthy (1962) also notes the ring pattern of the Siwana granites and suggested that the granites were emplaced along ring fracture. Rutten (1965) identified Malani volcanics of western Rajasthan as ignimbrites and advocated volcano-tectonic origin for the Siwana ring structure.

During the last 30 years or so, Kochhar and his associates have been working extensively on the Malani representatives of Tusham, Siwana, Jalor and Jhunjhunu areas. According to Kochhar (1996) the Trans-Aravalli block is unique in the geological evolution of the Indian shield as it marks a major period of anorogenic 'within plate', A-type magmatism represented by the Malani igneous suite of rocks (55,000 km²; 750 Ma). This Late Proterozoic, trans-Aravalli magmatism comprising epizonal, peralkaline (Siwana) metaluminous to mildly peralkaline (Jalor) and peraluminous (Tusham and Jhunjhunu) granites with co-genetic carapace of acid volcanics (rhyolite, trachyte, welded tuff, explosion breccia, perlite etc.) is characterised by volcano-plutonic ring structures and radial dykes. The Malani suite is bimodal in nature with minor amount of basalt, gabbro and diabase dyke phase, and the geochemical signatures attest to its high heat producing (HHP) and A-type characteristics.

The volcano-plutonic setting of widespread rocks of Malani suite, ring fracture controlled intrusions, and its HHP and A-type chemical signatures coupled with basic dykes of tholeiitic affinities are all indicative of extensional tectonic environment during the same thermal regime some 750 Ma B.P. in the Trans-Aravalli block or the Indian shield.

In the last few years much confusion has been created by postulating basalt-andesite-dacite-rhyolite associations spanning from 750 Ma to 77 Ma for defining the Malani igneous suite (Srivastva, 1988), and by correlating Diri, Tavidar and Guruptap rocks with the Malani rocks (Rathore and others, 1996). Observations made by these workers are primarily based on geochemical and geochronological data (both published and unpublished) which in the absence of proper field control has resulted in erroneous and contradictory geological interpretations.

It is recommended that if a new area is to be included in the Malani suite, the epizonal (subvolcanic) field setting must be established in the first instance. Geochemistry and geochronology can come later.

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15 Oct. 1997*

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