A-type Malani Magmatism, NW Peninsular India

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The Trans-Aravalli Block (TAB) of the NW Indian shield is characterized by the presence of plume related anorogenic, 'within plate, high heat producing Malani magmatism' (55,000km^2; 732 Ma). TAB is characterized by high heat flow, elevated basement, and low velocity anomaly indicative of plume tectonics. The magmatism is characterized by ring structures and is indicative of extensional tectonic environment in TAB. The Siwana granites are hypersolvus with high REE abundances, with little fractionation between HREE and LREE (La/Yb: 2.3) with marked Eu anomaly (Eu/Eu*: 0.28). The Jalor granites are mainly subsolvus, with minor hypersolvus component, with lowest REE contents (La/Yb: 5) and Eu/Eu* : 0.15. The Tusham granites fall in very restricted REE range, LREE are enriched with respect to HREE, La/Yb: 17, Eu/Eu*: 0.44. The Jhunjhunu granites are subsolvus with slight enrichment of LREE La/Yb:9; Eu/ Eu*: 0.25. The mineral chemistry of biotites from Jalor, Tusham and Jhunjhunu granites show iron eurichment trend (annite rich). Due to anhydrous conditions of magma, the Jalor biotites show high FeO / MgO ratios of 6.72 whereas the lower ratios of 4.08 and 3.72 are reported from Tusham and Jhunjhunu samples respectively. The biotites fall in the anorogenic field thereby confirming the anorogenic nature of the magma. The amphiboles in the alkali granites from Siwana evolve from richterite to arfvedsonite (magmatic subsolidus trend) and the pyroxenes in alkali granites evolve from helenbergite to aegirine through aegirine angite (acmite trend). In the Jalor granites the amphiboles belong to the composition of ferro-hornblende, ferroedenitic tschermakites. The zircons in Tusham granite belong to hydrothermal and late magmetic type whereas the Jalor zircons are magmatic. The high U02 content of Tusham granites is due to high abundance of uranium in the host rock (HHP granites).

The combined Pb and Nd isotope compositions of Siwana granites show that the magma is mantle derived and for Jalor granite the combined Sr, Nd and Pb data indicate a primary mantle derivation with a variable degree of crustal contamination (BGC, Archean age)

The paper also discusses similarities between TAB, Seychelles, Madagascar, Central Iran, Nubian-Arabian shield and South China constituting the Malani supercontinent in terms of bimodal, anorogenic magmatism, ring structure, extensional tectonic environment, Strutian glaciation and

subsequent desiccation. Paleomagnetic data also support the existence of the Malani supercontinent. (Fig. 1)

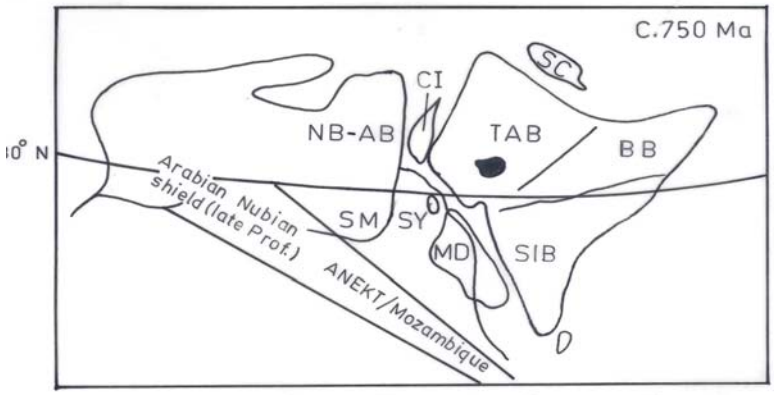

Fig. Assembly of Malani Supercotinent

NB-AB: Nubian-Arabia, SM: Somalia, MD: Madagascar
CI: Central Iran, SY: Seychelles, SC: South China,
TAB: Trans-Aravalli Block of the Indian Shield, BB:
Bundelkhand Block; SIB: South Indian Block MIS