

# **Precursor alkaline magmatism from the Deccan Volcanic Province, India**

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Eruptions of continental flood basalt such as the Deccan Volcanic Province are widely attributed to plume activity in the mantle. Flood basaltic provinces record early alkaline magmatism worldover in accordance with plume incubation models. Although, several alkaline- and nephelinite-carbonatite complexes are reported from within and around the Deccan Volcanic Province, their association is refuted, either because they are not in direct contact or because they intrude through the tholeiite flows.

The Kutch region, which lies to the north-west of the main Deccan Volcanic Province records alkaline magmatism in the form of plugs, sheets and cone-like intrusions of olivine nephelinite and alkali olivine basalt that intrude through the flat lying gently dipping Mesozoic sediments. These rocks have entrained the spinel lherzolites xenoliths of mantle origin. The xenoliths have enriched light rare earth elements. Modeling of the rare earth elemental data suggests low degrees (5 to 15 %) of partial melting.

The rapid northward migration (140-200 mm/yr.) of the Indian plate over the Reunion hotspot resulted in a limited plume incubation period and probably accounts for the apparent absence of alkaline intrusive activity. However, overlapping ages and similar isotopic compositions of the alkaline- and tholeiite magmatism in Kutch suggests a close spatial and temporal relationship that is consistent with the small incubation period for the plume. Supporting evidences of domal uplift and an early extensional activity are also discernible in the Late Jurassic-Early Cretaceous sediments of this region. Thus the precursor alkaline activity in Kutch must have preceded the main tholeiite episode and the entrained spinel lherzolite xenoliths in the alkali basalts represent plume samples.