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Paleontological constraints on India's paleogeographic history during the late Cretaceous

SUNIL BAJPAI[1] and G.V.R. PRASAD[2]

[1]*Department of Earth Sciences, IIT, Roorkee 247 667, India*
[2]*PG Department of Geology, University of Jammu, Jammu 180 006, India*

The biogeographic affinities of the late Cretaceous (Maastrichtian) non-marine biota occurring in the Deccan volcano-sedimentary province of peninsular India provide important constraints for its evolving paleogeographic relations during the northward drift that preceded its early Tertiary continental collision with Asia. This biota represents three different biogeographic domains (Gondwanic, Laurasian and the recently recognized endemic component), presenting a major biogeographic puzzle that involves several current hypotheses.

Traditionally, most plate tectonic models for the late Cretaceous show India as an island continent as it drifted northwards through the middle of the Neotethys until the India-Asia collision around 55 Ma.This island continent hypothesis has been disputed by several workers on the grounds that the Maastrichtian non-marine fossils of India do not provide any evidence of a peculiar and distinctive (endemic) biota that should have resulted if India remained in physical isolation before its contact with Asia. In fact, the presence of several Asian elements (e.g. pelobatid frogs, paleoryctid mammals) in the Indian latest Cretaceous of India is largely taken as evidence of a terrestrial connection between India and Asia around the KTB.

The Gondwanan elements in the Maastrichtian fauna of India include certain highly specialized groups (e.g. sudamericid mammals, abelisaurid dinosaurs) that are also known from South America and Madagascar, indicating that paleogeographic links existed between these landmasses during the late Cretaceous, probably as late as 80 Ma, in a sharp contrast to current geophysical models. The exact dispersal routes between these landmasses is controversial, and possible scenarios include a late Cretaceous (80-90 Ma) subareal contact between Indo-Madagascar and South America via Antarctica or Africa.

A more recent perspective of India's late Cretaceous paleobiogeography arises from the recognition of a strongly endemic ("Indian", as opposed to previously claimed Chinese/Mongolian), freshwater ostracod assemblage comprising over 25 new species. Although this endemic character is difficult to understand in view of the great dispersal ability of ostracods (particularly cypridaceans), it does suggest India's relative physical isolation during the terminal phase of its northward drift.

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