Journal of the Palaeontological Society of India
Volume, 54(1), June 2009: 41-71

ISSN 0522-9630

PALYNOSTRATIGRAPHY OF THE SUBSURFACE GONDWANA AND POST-GONDWANA MESOZOICS OF THE CAUVERY BASIN, INDIA

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ABSTRACT

Detailed palynostratigraphic studies on the newly discovered subsurface Pre-Cretaceous and Cretaceous sediments of the Cauvery Basin have been undertaken to identifiy the Gondwana and post-Gondwana Mesozoic sediments, with their precise age and depositional environment. Palynofossil assemblages recovered from the key wells in Tanjore Subbasin revealed the presence of distinctive Lower Gondwana succession in PD-B well. Other wells, viz. JK-A and PD-A, recorded marker latest Jurassic-Early Cretaceous marine palynofossils in their basal sediments, indicating the absence of characteristic Gondwana sediments.

An appraisal of tectono-sedimentary and biostratigraphic data has indicated that the purported Upper Gondwana successions (Upper Jurassic-Lower Cretaceous) of Indian Gondwanic grabens and East Coast pericratonic basins were deposited in their own distinctive depositional set-up after a long Jurassic unconformity, and are quite different from the Permo-Triassic Gondwana. Deposition of these sediments in both the areas is observed to be closely related with the opening of the Bay of Bengal due to break-up of Indian Plate from the East Gondwanaland during Tithonian and invariably represent the post-Gondwana Mesozoic successions.

The Lower Gondwana palynoflora of PD-B well is marked by abundant monosaccates, viz. *Parasaccites*, *Virkkipollenites* and *Divarisaccus*, besides other marker Early Permian forms. It resembles Upper Talchir palynoflora, and provides conclusive palynological evidence about the presence of distinctive Gondwana succession below the post-Gondwana Mesozoic sequence in Cauvery Basin, now named as the "Pundi Shale".

The basal subsurface post-Gondwana Mesozoic lithounit of the Cauvery Basin, viz. Andimadam Formation, recorded marker Tithonian-Neocomian dinoflagellate cysts and spore-pollen in its lower part and Aptian-Early Albian forms in upper part, suggesting above age and shallow marine depositional environment. The Sivaganga Formation, till now classed into the Upper Gondwana, also recorded marine latest Jurassic-Early Cretaceous palyno and invertebrate fossils, and thus excluded from the Gondwana sequence. Newly acquired microfossil and sedimentological data suggest that the above post-Gondwana units belong to the rift phase of the pericratonic Cauvery Basin, and deposited over the sensu-stricto Gondwana after a long gap of ca 135Ma. The succeeding Lower Cretaceous Sattapadi Shale, with Late Albian-Cenomanian to Early Turonian marine palynoflora, corresponds with the initiation of passive-margin phase. Sediments of the Bhuvanagiri, Kudavasal and Nannilam formations are respectively marked by Coniacian, Santonian and Campanian palynofloras, and represent the younger Cretaceous passive-margin sequence in the Cauvery Basin.

Keywords: Palynostratigraphy, subsurface Gondwana and post-Gondwana Mesozoics, Cauvery Basin, India