ABSTRACT

The periphery of the Deccan Volcanic Province (DVP) of India comprises sedimentary succession deposited during the waning phase of volcanism across the Cretaceous-Paleogene. The Saurashtra Peninsula, a part of the Saurashtra-Kachchh sub-province, comprises thick intertrappean succession, exposed as patchy outcrops, characterised by distinct lithology, enable distinguishing into two basins, named as the Ninama and Chotila. Initially, they comprise fine-grain sediment, followed by thick conspicuous limestone and chert deposits respectively. Successions are divided into formal lithostratigraphic units; Ninama Basin comprises lithic greywacke, fossiliferous limestone, shale, mudstone, divided into Sukhbhadar Formation and Ninama Limestone; Chotila Basin comprises sandstone, mudstone, silty shale and clay shale, and chert, comprises Rangpar Formation, Chotila Chert, and Bamanbor Formation.

Facies analysis revealed 7 lithofacies from the Ninama Basin namely, Grey Shale, Calcareous Shale, Silty Mudstone, Lithic Greywacke, Grey Black Limestone, Cherty Limestone, and Marlite, while Chotila Basin comprises 8 lithofacies, Fossiliferous Shaly Sandstone, Grey Shale, Silty Shale, Mudstone, Fossiliferous Silty Mudstone, Massive Chert, Laminated Chert and Black Chert. To understand the influence of paleosalinity, paleoredox, paleodepth, provenance and paleoclimate, the inorganic geochemistry analysis was done and the major oxides, minor and trace elements ratios (Ca/Ca+Fe, Sr/Ba, V/V+Ni, V/Cr, Fe/Ca+Mg, Ti/Al, Na/K, K/Fe+Mg, CIA-K and MAP) was used.

The palynology of the Ninama and Chotila Basins has provided insights into the palynofossils type and paleovegetation. Both the basins comprise a smaller number of the palynofossils in their early deposits, but diversity and abundance increase later. They comprise palynofossils, opisthokonts, phytoclasts, freshwater algae belonging to Chlorophyceae (02), testate amoeba (02), dinoflagellates and other phytoplanktons, fungal fruiting bodies and fungal spores (26), pteridophytes (02), angiosperm pollens (28) and AOM. Further analysis revealed four biozones for Ninama Basin, (i) *Palaeomycites* spp. Abundance Zone, (ii) *Inapertisporites* spp. Abundance Zone, (iii) *Rhombipollis geniculatus* - *Proxapertites* spp. Assemblage Zone, and (iv) *Dermatobrevicolporites dermatus-Longapertites* sp. Assemblage Zone, and three for Chotila Basin, (i) *Palaeomycites* spp. Abundance Zone, (ii) *Proxapertites* spp. Assemblage Zone and (iii) *Florschuetzia rajpardiensis* Assemblage Zone. Integrated data of lithofacies, geochemistry and palynofossils, a 3-D depositional model is reconstructed for the Intertrappean basins which reflects three phases of evolution during the Paleogene on Insular India, dominantly controlled by the warm, humid and tropical climate.