Sequence Stratigraphy and Paleoenvironmental Reconstruction of the Cretaceous-Tertiary Successions of the Western Rim of the Anambra Basin, S. E. Nigeria

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Integration of high resolution micropaleontologic, palynofacies and wireline logs analytical methods was carried out on subsurface sediments penetrated by the 'Nani'-1 well in the western rim of the Anambra Basin, with the aims of deducing the sequence stratigraphic framework and reconstructing the paleoenvironments of the Cretaceous and Tertiary successions of the area.

Five formations were identified on the basis of foraminifera assemblages, dinoflagellate cysts and miospores assemblages. The formations include: Nkporo Shale (early Maastrichtian; 2380m - 2160m); Mamu Formation (middle Maastrichtian; 2160m - 1450m); Ajali Sandstone (middle to late Maastrichtian; 1450m - 1100m); Nsukka Formation (late Maastrichtian to Danian; 1100m - 700m); and Imo Shale (Paleocene to Eocene; 700m-210m). The Cretaceous-Tertiary boundary was recognized in the upper part of the Nsukka Formation at a depth of 900m based on the first appearance of Danea aff. califormia and Danea cf. mutabilis in association with Cordosphaeridium fibrospinosum and the late occurrence of Danea aff. califormia and Phelodnium magnificum. Four sequence boundaries and four maximum flooding surfaces were identified within the Maastrichtian - early Eocene sediments. Well developed sand bodies, which show retrogradational stacking patterns dominate most transgressive systems tracts (TST) while prograding shoreface sands and tidal sand bodies are dominant within the highstand systems tract (HST). Fourteen dinoflagellate zones (A-N) and seven Pollen/ Spores zones (A - G) were recognized based on the use of first occurrences of two or more species and are characterized by six depositional environments namely: marginal marine to shallow marine, marshy lagoon to estuarine, shore face and tidally influence fluvial conditionin. The palynostratigraphy evidences show that fresh water palynomorphs characterize early Maastrichtian age.